1. A ramp's height increases 2 feet for every 10 feet of its base length. The function 
\( h = 0.2l \) represents the height \( h \) of the ramp when its base is \( l \) feet long. What is
the independent quantity in this relationship?
A. The slope of the ramp
B. The height of the ramp
C. 10 feet
D. The length of the ramp's base

2. What is the dependent variable in the equation \( y = 3x + 1 \)?
A. \( y \)
B. 3
C. \( x \)
D. 1

3. What is the dependent variable in the graph?
A. \( x \)
B. \( y \)
C. \( x + 2 \)
D. \( y = 2 \)

4. What is the independent variable in the graph?
A. \( x \)
B. \( y \)
C. 2\( x \)
D. \( y = -2x - 4 \)
5. A wildfire is consuming 500 acres per hour. The function \( a = 500h \) represents the number of acres \( a \) consumed during \( h \) hours. What is the independent quantity in this relationship?
A. 500  
B. \( h \)  
C. 500\( h \)  
D. \( a \)

6. Maria is burning a stick of incense. Twelve millimeters of the incense burn every 5 minutes. The function \( l = 52 - 2.4t \) represents the length in millimeters \( l \) of the incense after it has burned \( t \) minutes. What is the dependent quantity in this relationship?
A. 12 mm  
B. Millimeters per minute  
C. Length of the incense in millimeters  
D. Time in minutes that the incense has burned

7. What is the independent quantity in the function \( r = 2s + 7 \)?
A. \( r \)  
B. \( s \)  
C. 2\( s \)  
D. Not here

8. What is the independent variable in the graph?
A. \( x \)  
B. \( y \)  
C. \( x^2 \)  
D. \( y = x^2 + 1 \)

9. Which equation describes the four ordered pairs \((-1, -1), (0, 1), (2, 5), (3, 7)\)?
A. \( y = 2x + 1 \)  
B. \( y = 2x - 1 \)  
C. \( y = 4x + 1 \)  
D. \( y = x^2 - 1 \)
10. Which equation can be used to generate the values in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>-2</td>
</tr>
</tbody>
</table>

A. \( y = -2x + 1 \)
B. \( y = 3x + 1 \)
C. \( y = -3x + 1 \)
D. \( y = x^2 + 1 \)

11. Which rule describes the relationship between \( x \) and \( y \) in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>3</td>
</tr>
<tr>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

A. \( y = x + 1 \)
B. \( y = 3x \)
C. \( y = 3x - 1 \)
D. \( y = x^2 - 1 \)

12. The table shows how the number of students attending a play determines the total cost of their tickets. Which equation describes this relationship?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>250</td>
</tr>
<tr>
<td>15</td>
<td>375</td>
</tr>
<tr>
<td>22</td>
<td>550</td>
</tr>
<tr>
<td>31</td>
<td>775</td>
</tr>
</tbody>
</table>

A. \( x = 25y \)
B. \( y = 25x \)
C. \( y = x + 240 \)
D. \( y = \frac{25}{x} \)
____ 13. A function in which the y-coordinate is always 8 more than twice the x-coordinate describes the relationship between the number of players on a soccer team and the number of pairs of socks ordered by the coach. Which ordered pair belongs to this function?

A. (44, 18)  
B. (18, 11)  
C. (18, 44)  
D. (11, 18)

____ 14. Which function includes the data set \((-1, 4), (0, 0), (1, -4), (2, -8)\)?

A. \(f(x) = 4x\)  
B. \(f(x) = -4x\)  
C. \(f(x) = -x - 4\)  
D. \(f(x) = 4x^2\)

____ 15. Which equation describes the points on the graph?

A. \(y = x + 3\)  
B. \(y = x - 3\)  
C. \(y = 3x + 1\)  
D. \(y = x^2 - 3\)

____ 16. Which function can be used to generate the points of the graph?

A. \(f(x) = x\)  
B. \(f(x) = -x\)  
C. \(f(x) = -2x\)  
D. \(f(x) = x^2\)
17. The amount $A$ that the Hernandez family spends in $n$ weeks for groceries at a local food club includes $\$45$ for the initial registration fee and $\$37$ each week for a box of groceries. Which equation describes the relationship between $A$ and $n$?
   A. $A = 45(n + 37)$  
   B. $A = 45n + 37$  
   C. $A = 37n + 45$  
   D. $A = 37(n + 45)$

18. The temperature in degrees Fahrenheit $F$ is $32$ greater than $\frac{9}{5}$ of the temperature in degrees Celsius $C$. Which equation or inequality can be used to determine $F$?
   A. $F = \frac{9}{5}C + 32$  
   B. $F = \frac{9}{5}(C + 32)$  
   C. $F > \frac{9}{5}(C + 32)$  
   D. $F > \frac{9}{5}C + 32$

19. The base of a hill is $75$ feet below sea level. A path up the hill rises $2$ feet for every $7$ feet of horizontal distance it gains. Which equation shows the relationship between the elevation above sea level $E$ at any point on the path and the horizontal distance $d$ of the point from the base of the hill?
   A. $E = \frac{7}{2}d - 75$  
   B. $E = \frac{7}{2}d + 75$  
   C. $E = \frac{2}{7}d + 75$  
   D. $E = \frac{2}{7}d - 75$

20. The quantity $a$ is always less than $\frac{3}{4}$ of the sum of another quantity $b$ and $10$. Which equation or inequality represents this relationship?
   A. $a < \frac{3}{4}(b + 10)$  
   B. $a < \frac{3}{4}b + 10$  
   C. $b > \frac{3}{4}(a + 10)$  
   D. $a = \frac{3}{4}(b - 10)$
21. Kayla's height in centimeters is represented by \( k \). Randall's height in centimeters is represented by \( r \). The function \( k = 0.95(r - 3) \) describes the relationship between Kayla's height and Randall's height. What is the best interpretation of this function?

A. Randall's height is 0.95 times the difference of Kayla's height and 3.
B. Kayla's height is 3 times decreased by 0.95.
C. Kayla's height is 0.95 times the difference of Randall's height and 3.
D. Kayla's height is 3 centimeters 0.95 of Randall's height.

22. Four tenths of the sum of the quantity \( m \) and 11 is always greater than or equal to the quantity \( n \). What inequality can be used to determine the possible values of \( n \)?

A. \( n \geq 0.4(m + 11) \)
B. \( n \leq 0.4(m + 11) \)
C. \( n < 0.4(m + 11) \)
D. \( m \geq 0.4(n + 11) \)

23. Jared's weight in pounds \( j \) is 12 pounds less than twice Sheila's weight. Sheila weighs \( s \) pounds. Which equation or inequality describes this relationship?

A. \( j < 2s - 12 \)
B. \( j < 2s + 12 \)
C. \( j = 2(s - 12) \)
D. \( j = 2s - 12 \)

24. The Fraser family is traveling 475 miles for a vacation. They drive 65 miles per hour. Which equation describes how many miles \( m \) remain after \( h \) hours of driving?

A. \( m = 65h - 475 \)
B. \( h = 475 - 65m \)
C. \( m = 475 + 65h \)
D. \( m = 475 - 65h \)
25. Ashley has $15. Apples cost $0.45 apiece at a Mini Market. Which table shows how much money \( m \) Ashley will have left after buying \( a \) apples?

A. Table 1:

<table>
<thead>
<tr>
<th>( a )</th>
<th>( m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$15.00</td>
</tr>
<tr>
<td>2</td>
<td>$14.55</td>
</tr>
<tr>
<td>5</td>
<td>$14.10</td>
</tr>
</tbody>
</table>

B. Table 2:

<table>
<thead>
<tr>
<th>( a )</th>
<th>( m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$15.00</td>
</tr>
<tr>
<td>2</td>
<td>$14.10</td>
</tr>
<tr>
<td>5</td>
<td>$13.20</td>
</tr>
</tbody>
</table>

C. Table 3:

<table>
<thead>
<tr>
<th>( a )</th>
<th>( m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$15.00</td>
</tr>
<tr>
<td>2</td>
<td>$14.10</td>
</tr>
<tr>
<td>5</td>
<td>$12.75</td>
</tr>
</tbody>
</table>

D. Table 4:

<table>
<thead>
<tr>
<th>( a )</th>
<th>( m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$15.00</td>
</tr>
<tr>
<td>2</td>
<td>$9.00</td>
</tr>
<tr>
<td>5</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

26. Heidi buys some pencils, then uses up the same amount each week. The graph below shows how many pencils \( p \) Heidi has left after \( w \) weeks. Which equation describes the relationship between \( w \) and \( p \) in the graph?

A. \( p = 25 + w \)

B. \( p = 25 - 2w \)

C. \( p = 25 + 2w \)

D. \( p = 25 - w \)

27. A plane climbs 550 meters per minute after takeoff from an airport 600 meters above sea level. Which statement best describes the plane’s altitude above sea level \( x \) minutes after takeoff?

A. Its altitude in meters is the sum of 600 times \( x \) and 550.

B. Its altitude in meters is the sum of 550 times \( x \) and 600.

C. Its altitude in meters is 600 and \( x \) and 550.

D. Its altitude in meters is 600 times \( x \) and 550.
28. Rod opens a savings account and puts $225 in the account. He will put $50 in the account each month afterwards. Assume that Rod does not withdraw any money from the account. Which equation best describes the total amount $s$ that Rod has deposited after exactly $m$ months?

A. $s = 50m + 225$
B. $m = 50 + 225s$
C. $m = 50s + 225$
D. $s = 225m + 50$

29. A new skyscraper is being built downtown. One story goes up the first week and 2 stories go up each week after that. Each week Todd tries to guess how many stories the building will have when completed. Which equation or inequality best describes the number of stories $s$ Todd might guess after $n$ weeks of construction?

A. $s \geq 2n + 1$
B. $s \geq 2n - 1$
C. $s < 2n - 1$
D. $s = 2n$

30. Which equation might represent the relationship between altitude $a$ in miles and elapsed time $t$ in minutes of a space ship taking off from Earth at sea level?

A. $a = -3t$
B. $a = -10t + 5000$
C. $a = 5t$
D. $a = 2t - 2000$

31. Which graph best represents a likely relationship between study time $h$ in hours and a student's score $s$ on a test?

A. Graph 1:
B. Graph 2:
C. Graph 3:
D. Graph 4:
32. Based on the chart, which value is the best prediction of \( y \) when \( x = 5 \)?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>3.91</td>
</tr>
<tr>
<td>3</td>
<td>6.05</td>
</tr>
<tr>
<td>6</td>
<td>11.88</td>
</tr>
</tbody>
</table>

A. 8  
B. 10  
C. 11  
D. 12

33. Based on the chart, which value is the best prediction of \( b \) when \( a = 40 \)?

<table>
<thead>
<tr>
<th>( a )</th>
<th>( b )</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7.6</td>
</tr>
<tr>
<td>10</td>
<td>9.9</td>
</tr>
<tr>
<td>15</td>
<td>12.7</td>
</tr>
<tr>
<td>25</td>
<td>17.4</td>
</tr>
</tbody>
</table>

A. 20  
B. 25  
C. 30  
D. 40
34. The graph shows both the income $y$ and the expenses $y$ for a company that manufactures $x$ treadmills. Which statement is not true?

A. Expenses are greater than income when 200 treadmills are manufactured.

B. Income is greater than expenses when more than 250 treadmills are manufactured.

C. The company does not make a profit if it manufactures fewer than 250 treadmills.

D. Income is greater than expenses when 200 treadmills are manufactured.
### Standards Summary

<table>
<thead>
<tr>
<th>TX TAKS 1</th>
<th>The student will describe functional relationships in a variety of ways.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX TEKS A.1.A</td>
<td>describe independent and dependent quantities in functional relationships;</td>
</tr>
<tr>
<td>TX TAKS 4</td>
<td>The student will formulate and use linear equations and inequalities.</td>
</tr>
<tr>
<td>TX TEKS A.7.A</td>
<td>analyze situations involving linear functions and formulate linear equations or inequalities to solve problems;</td>
</tr>
<tr>
<td>TX TEKS A.1.B</td>
<td>gather and record data and use data sets to determine functional relationships between quantities;</td>
</tr>
<tr>
<td>TX TEKS A.1.C</td>
<td>describe functional relationships for given problem situations and write equations or inequalities to answer questions arising from the situations;</td>
</tr>
<tr>
<td>TX TEKS A.1.D</td>
<td>represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and</td>
</tr>
<tr>
<td>TX TEKS A.1.E</td>
<td>interpret and make decisions, predictions, and critical judgments from functional relationships.</td>
</tr>
</tbody>
</table>
1. Which function does the graph represent?

A. Linear parent function  
B. Quadratic parent function  
C. Both A and B  
D. Not here

2. Which function does the graph represent?

A. $y = x$ for $-50 \leq x \leq 50$  
B. $y = x^2$ for $-50 \leq x \leq 50$  
C. $y = -x$ for $-50 \leq x \leq 50$  
D. $y = -x^2$ for $-50 \leq x \leq 50$

3. Which statement does **not** describe the quadratic parent function?

A. For every point $(x, y)$ on the graph of the function, there is a corresponding point $(-x, y)$.
B. The graph of the function shows constant rate of increase.
C. The range of the function includes only nonnegative real numbers.
D. The domain of the function includes all real numbers.
4. Which statement is true?
   A. For every point \((x, y)\) on the graph of \(y = x^2\), the point \((-y, x)\) is also on the graph.
   B. If \((x, y)\) is a point on the graph of \(y = x\), then \((y, x)\) is also a point on the graph.
   C. The graph of \(y = x\) shows a constant rate of decrease.
   D. The domain of the function \(y = x\) includes only the positive real numbers.

5. Which function does the graph represent?
   A. Linear parent function
   B. Quadratic parent function
   C. Both A and B
   D. Not here

6. The graph of which function passes through \((-4, 16), (0, 0), (4, 16), \text{ and } (12, 144)\)?
   A. \(y = x\)
   B. \(y = x^2\)
   C. \(x = y^2\)
   D. \(y = x^2 - 1\)

7. The graph of which function passes through \((\sqrt{3}, \sqrt{3}), (\frac{7}{9}, \frac{7}{9}), (0, 0), \text{ and } (23\pi, 23\pi)\)?
   A. \(y = x\)
   B. \(y = x^2\)
   C. \(y = |x|\)
   D. \(y = -x^2\)
8. Which value is not in the domain of the function $y = \frac{3}{x}$?
   
   A. $-3$  
   B. $0$  
   C. $1$  
   D. $6$

9. Which value is not in the range of the function $y = 4x^2$?
   
   A. $-2$  
   B. $0$  
   C. $3$  
   D. $10$

10. Contestants in a game select a number from a list of numbers. The table shows that the number they select determines how many chances they have to win a prize. Which number is in the range of this function?
   
<table>
<thead>
<tr>
<th>Numbers in list</th>
<th>Number of chances to win</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>28</td>
<td>5</td>
</tr>
<tr>
<td>74</td>
<td>1</td>
</tr>
</tbody>
</table>
   
   A. 74  
   B. 21  
   C. 4  
   D. 1

11. The graph of $y = -x^2$ is shown below. What is the domain of the function?
   
   A. {real numbers}  
   B. {positive real numbers}  
   C. {negative real numbers}  
   D. {nonpositive real numbers}
12. What is the range of the function represented by the ordered pairs in the table?

\[
\begin{array}{c|cccc}
\text{x} & 1 & 3 & 6 & 7 \\
\hline
\text{y} & 2 & 6 & 7 & 3 \\
\end{array}
\]

A. \{1, 3, 6, 7\}  
B. \{2, 3, 6, 7\}  
C. \(x \leq 7\)  
D. \(y \leq 7\)

13. The scatterplot shows the height \(h\) of a plant \(d\) days after April 1. Which set describes the most reasonable range of the function for the first 30 days?

A. \{0, 1, 2, 3, \ldots, 30\}  
B. \{0, 4, 8, 10, 12, 14, 15, 16\}  
C. \{\text{real numbers less than } 30\}  
D. \{0, 1, 2, 3, \ldots, 9\}

14. Li is 16 years old and is 68 inches tall. What is the domain of the function relating Li's age on each birthday to her height in inches that day?

A. Positive integers less than or equal to 68  
B. Integers greater than zero  
C. Real numbers less than or equal to 16  
D. Integers between 0 and 16, inclusive
15. The graph shows the altitude $h$ of an airplane $t$ minutes after it begins its descent. Which information can you determine from the graph?

A. The airplane descends 1000 feet every 6 minutes.
B. The airplane starts its descent at 7000 feet.
C. The airplane is at 4000 feet after 4 minutes.
D. The airplane will land after 6 minutes.

16. Maggie's weekly salary is $250 plus a 7% commission on her sales. What is the slope of the graph that models her weekly salary as a function of her weekly sales?

A. $\frac{7}{10}$
B. 250
C. $\frac{7}{100}$
D. $\frac{10}{7}$

17. Based on the graph, which statement is true?

A. Maria does not get paid if she works only 45 minutes.
B. If she works 8 hours, Maria earns $50.
C. After 8 hours, Maria's rate doubles.
D. Maria's hourly rate increases with each additional hour she works.
18. Based on the graph, which statement is true?

A. The balloon reaches a maximum altitude of 2000 feet.
B. The balloon is at 1000 feet after 2 minutes.
C. The balloon begins falling after 6 minutes.
D. The balloon reaches 2500 feet after 4 minutes.

19. Which graph could best model the path of an Olympic diver's 10-meter platform dive?

A. A parabola that opens up
B. A parabola that opens down
C. A line with positive slope
D. A line with negative slope

20. Which graph best models the relationship between the number of gallons of water used in the shower room at an athletic club and the number of people taking a shower?

A. A line with a positive slope
B. A line with a negative slope
C. A parabola that opens up
D. A parabola that opens down

21. Which relationship most likely shows a positive correlation?

A. Ryan's age and how many cousins he has
B. Ryan's age and his sister's age
C. Ryan's age and how many years of school he has left
D. Ryan's age and his rate of growth
22. Based on the scatterplot, which is the most likely value of \( y \) when \( x = 9 \)?

   A. \(-4\)  
   B. \(0\)  
   C. \(4\)  
   D. \(8\)

23. Which equation might represent a line of best fit for this scatterplot?

   A. \( y = \frac{1}{2}x \)  
   B. \( y = -\frac{1}{2}x + 2 \)  
   C. \( y = 2x + 2 \)  
   D. \( y = \frac{1}{2}x + 2 \)

24. If a data set can be modeled by the equation \( y = -\frac{1}{3}x + 5 \), what is the value of \( y \) when \( x \) is 12?

   A. \(-1\)  
   B. \(0\)  
   C. \(1\)  
   D. \(9\)

25. Which relationship most likely shows no correlation?

   A. Exam grade and hours studied  
   B. Class size and number of desks  
   C. Age and number of pets  
   D. Teacher age and years until retirement
26. Brenda's scatterplot compares temperature when it starts to rain with total rainfall. At 248°C, how many millimeters of rain fell? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

27. There are $x$ dogs and $y$ cats living in Richard's neighborhood. Richard calculates that $\frac{1}{6}$ of the dogs and $\frac{1}{5}$ of the cats are black. Which expression represents how many more black dogs than black cats are in the neighborhood?

A. $\frac{x}{5} - \frac{y}{6}$  
B. $\left(\frac{1}{6} - \frac{1}{5}\right)(x - y)$

C. $x - y$  
D. $\frac{x}{6} - \frac{y}{5}$
28. In Wilma's class, the 14 girls collect an average of \( m \) dollars each for disaster relief. The 13 boys collect an average of \( n \) dollars each. Which expression represents the total amount of money collected by Wilma's class?

A. \( m + n \)  
B. \( 14m + 13n \)  
C. \( \frac{14m + 13n}{27} \)  
D. \( \frac{13m + 14n}{27} \)

29. In a chess tournament, 19 sophomores compete against some freshmen. The sophomores win an average of \( x \) games each. The freshmen win 23 games altogether. Which expression represents how many more games the sophomores won?

A. \( 19x - 23 \)  
B. \( 23 - 19x \)  
C. \( 23 - 19 \)  
D. \( 19 - 23x \)

30. The area of a parallelogram is \( x^2 + 8x \) square units and the base is \( x \) units. Which expression describes the parallelogram's height?

A. \( 8x \) units  
B. \( 2x + 8 \) units  
C. \( x + 8 \) units  
D. \( \frac{8}{x} \) units

31. In a game of softball, the 11 boys get an average of \( x \) hits each and the 7 girls get an average of \( y \) hits each. Which expression represents the average number of hits for all 18 players?

A. \( \frac{x + y}{2} \)  
B. \( \frac{11y + 7x}{18} \)  
C. \( 18 \left( \frac{x}{11} + \frac{y}{7} \right) \)  
D. \( \frac{11x + 7y}{18} \)

32. If \( n \) represents any integer, which expression will produce an odd integer?

A. \( 2n \)  
B. \( 2n + 1 \)  
C. \( n + 1 \)  
D. \( n - 1 \)
33. A jacket that normally sells for \( n \) dollars is discounted 20%. You buy the jacket at the discounted price and also pay a 6% sales tax. Which expression represents the total cost of the jacket including the sales tax?
A. \( 0.06(n - 0.20) \)
B. \( 0.06(0.20n) \)
C. \( 1.06(0.80n) \)
D. \( 0.06 + 0.20n \)

34. You have a $20 gift certificate to buy online music. Each song costs $.99. Which expression represents the balance of your gift certificate after you buy \( n \) songs?
A. \( 20 - (n + 0.99) \)
B. \( 20 - (n - 0.99) \)
C. \( 0.99n - 20 \)
D. \( 20 - 0.99n \)

35. A rectangular prism has a square base with sides of length \( x \) and a height \( y \). Which expression represents the total surface area of the prism?
A. \( 6xy \)
B. \( x^2y \)
C. \( x + xy \)
D. \( 2x^2 + 4xy \)

36. Which expression describes the \( n \)th term of the sequence of odd numbers that are greater than or equal to 3?
A. \( n + 1 \)
B. \( n - 1 \)
C. \( 2n + 1 \)
D. \( 3n \)

37. What is the next number in the sequence 4, 5, 7, 10, 14, \ldots ?
Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.
38. Paul, Cam, and Liz wrote expressions that will generate integers that are 1 more than a multiple of 3. Eric's expression does not generate these values. Which expression is Eric's if \( n \) is a positive integer?
A. \( 3n + 4 \)  
B. \( 4n + 1 \)  
C. \( 6n + 4 \)  
D. \( 3n + 1 \)

39. Which is the 12th term in the sequence 40, 29, 18, 7, 24, ... ?
A. \(-59\)  
B. \(-70\)  
C. \(-81\)  
D. \(-92\)

40. Which expression will generate the \( n \)th term of the sequence 2, 8, 18, 32, 50, ... ?
A. \( 2n^2 \)  
B. \( 2n \)  
C. \( n + 2 \)  
D. \( n^2 \)

41. In the chart below, Robi has indicated the number of triangles that can be drawn from one vertex of each polygon. How many triangles can be drawn from one vertex of a 12-sided polygon?

<table>
<thead>
<tr>
<th>Number of sides in the polygon</th>
<th>Number of triangles</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

A. 8  
B. 10  
C. 12  
D. 14
42. The first four **triangular** numbers are shown below. What is the next triangular number? 
Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

![Triangular Numbers Grid]

43. When \( x = 3 \), what is the value of \( f(x) \) if \( f(x) = 6x^2 - x - 2 \)? 
Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

![Answer Grid]

44. Which equation is equivalent to \( 6x^2 - x - 2 = 0 \)?
A. \( (3x + 2)(2x - 1) = 0 \)  
B. \( (3x - 2)(2x + 1) = 0 \)  
C. \( (6x - 2)(x + 1) = 0 \)  
D. \( (x + 2)(6x - 1) = 0 \)
45. The height of a triangular sail on Jenn's sailboat is 2 feet longer than twice the length of the sail's base. The area of the sail is 110 square feet. What are the dimensions of the sail?
A. 10 ft and 22 ft
B. 10 ft and 11 ft
C. 11 ft and 20 ft
D. 5 ft and 11 ft

46. A rectangle has an area of $4x^2 + 13x + 3$ square centimeters. One side measures $x + 3$ centimeters. Which expression describes the measure of the other side?
A. $4x - 1$ cm
B. $4x + 3$ cm
C. $2x + 1$ cm
D. $4x + 1$ cm

47. What are the solutions of $8x^2 + 2x - 3 = 0$?
A. $-1$ and $\frac{3}{8}$
B. $-1$ and $-\frac{3}{8}$
C. $-\frac{1}{2}$ and $\frac{3}{4}$
D. $-\frac{3}{4}$ and $\frac{1}{2}$

48. A rectangular mirror has an area of $12x^3 - 9x^2 + 3x$ square inches. Which polynomials represent possible dimensions of the mirror?
A. $3x$ in. and $4x^2 - 3x + 1$ in.
B. $3x$ in. and $4x^2 - 3x$ in.
C. $3x - 1$ in. and $4x - 3$ in.
D. $3x + 3$ in. and $4x + 1$ in.
49. When \( x = 4 \), what is the value of \( y \) if \( y = 4x^2 - 8x + 3 \)?
Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>0</td>
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<tr>
<td>1</td>
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</tr>
</tbody>
</table>

_____ 50. Which expression is equivalent to \(3ab^2 - 2a^2b - 4ab^2 - 5ab + 4a^2b\)?
A. \(-ab^2 + 2a^2b - 5ab\)  
B. \(-ab^2 - 3a^2b\)  
C. \(-3ab^2 - 5ab + 4a^2b\)  
D. \(-ab^2 - 7ab - 4a^2b\)

_____ 51. Which is the simplified expression for \(2(x - 4) - 7(x - 4)\)?
A. \(9x - 36\)  
B. \(5x - 20\)  
C. \(-5x + 20\)  
D. \(-5x - 20\)

_____ 52. Four students simplified the expression \(9(n + 4) + 4(3 + n) - 3(4 + n)\). Which student simplified the expression correctly?

<table>
<thead>
<tr>
<th>Student</th>
<th>Simplified Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amber</td>
<td>14n + 13</td>
</tr>
<tr>
<td>Gloria</td>
<td>16n + 36</td>
</tr>
<tr>
<td>Liam</td>
<td>10n + 13</td>
</tr>
<tr>
<td>Josh</td>
<td>10n + 36</td>
</tr>
</tbody>
</table>

A. Amber  
B. Gloria  
C. Liam  
D. Josh
53. Which property of real numbers justifies the statement

\[(3n + 5n) + 7 = 7 + (3n + 5n)\]?

A. Associative property of addition
B. Distributive property
C. Commutative property of addition
D. Associative property of multiplication

54. Ricardo has \(s + 3\) dollar bills in his pocket. Leda has \(9 + 3s\) dollar bills in her wallet. Which expression represents the total number of dollar bills that Ricardo and Leda have?

A. \(4s + 12\)
B. \(3s + 12\)
C. \(10s + 6\)
D. \(9s + 6\)

55. The expression \(5(y - 2) - 5(2 - y)\) represents the total number of calories Brenda burned during her workout. What is a simplified form of this expression?

A. \(10y - 20\)
B. \(10 - 5y\)
C. \(5y - 10\)
D. \(0\)

56. Which statement can be justified using the distributive property?

A. The cost of 4 bagels and 4 bottles of juice is equal to the 4 times the cost of one bagel and one bottle of juice.
B. The cost of 4 bagels and 4 bottles of juice is equal to the cost of 4 bottles of juice and 4 bagels.
C. The cost of 4 bagels, 4 bottles of juice, and 4 tubs of peanut butter is equal to the cost of 4 tubs of peanut butter, 4 bottles of juice, and 4 bagels.
D. The cost of 4 bagels and 4 bottles of juice is equal to the cost of one bottle of juice and one bagel plus $4.

57. Angela is scheduled to work \(4(q - 1)\) hours this week. She worked \(5q - 5\) hours on Monday and \(1 - q\) hours on Friday. How many hours does she have left to work this week?

A. \(10q\)
B. \(-2q + 2\)
C. \(10\)
D. \(0\)
58. Nuria has completed $2x - 1$ miles of her run. She plans to run a total of $5x + 8$ miles. Which expression represents the number of miles she has left to run?

A. $7x + 9$
B. $7x + 7$
C. $3x + 9$
D. $3x + 7$

59. What is the simplified expression for $15(4a - 7) - 2(3a - 3)$?

A. $66a - 99$
B. $54a - 99$
C. $54a - 111$
D. $66a - 99$
## Standards Summary

<table>
<thead>
<tr>
<th>TX TAKS 2</th>
<th>The student will demonstrate an understanding of the properties and attributes of functions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX TEKS A.2.A</td>
<td>identify and sketch the general forms of linear ((y = x)) and quadratic ((y = x^2)) parent functions;</td>
</tr>
<tr>
<td>TX TEKS A.2.B</td>
<td>identify mathematical domains and ranges and determine reasonable domain and range values for given situations, both continuous and discrete;</td>
</tr>
<tr>
<td>TX TEKS A.2.C</td>
<td>interpret situations in terms of given graphs or creates situations that fit given graphs; and</td>
</tr>
<tr>
<td>TX TEKS A.2.D</td>
<td>collect and organize data, make and interpret scatterplots (including recognizing positive, negative, or no correlation for data approximating linear situations), and model, predict, and make decisions and critical judgments in problem situations.</td>
</tr>
<tr>
<td>TX TEKS A.3.A</td>
<td>use symbols to represent unknowns and variables; and</td>
</tr>
<tr>
<td>TX TEKS A.3.B</td>
<td>look for patterns and represent generalizations algebraically.</td>
</tr>
<tr>
<td>TX TEKS A.4.A</td>
<td>find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations;</td>
</tr>
<tr>
<td>TX TEKS A.4.B</td>
<td>use the commutative, associative, and distributive properties to simplify algebraic expressions; and</td>
</tr>
</tbody>
</table>
1. Which situation can be represented by a linear function?
   A. Some days the temperature is higher than it was the day before, but other days it is lower than it was the day before.
   B. A ball is tossed high into the air and then falls back to the ground.
   C. The rabbit population in the county where Michael lives is doubling every 12 months.
   D. It rains one inch per hour for 10 hours.

2. Which situation can be described by a linear function?
   A. Last year Sandra doubled her savings every month.
   B. Mr. Mendez drives his car at 65 miles per hour for 5 hours until he reaches his destination.
   C. Each day for 5 days it rains only half as much as it did the day before.
   D. A parachutist jumps from a plane, falls freely for 10 seconds, opens her chute, and then floats gently down to earth.

3. Which situation can be represented by a linear function?
   A. Enriqueta earns $40 a week selling newspapers. She keeps a table recording her total income.
   B. Andy plots the number of runs his favorite baseball team scores in each game over a period of two weeks.
   C. Patricia runs 3 miles every morning during the week and 5 miles each morning during the weekend.
   D. Kevin’s stamp collection is growing by 5% every month.

4. Which situation can be represented by a linear function?
   A. Louis plots the height of a football in feet against time in seconds as a quarterback passes to his wide receiver.
   B. Some days Jamie practices her flute for 30 minutes. Other days she practices for 45 minutes.
   C. Marsha types 75 words per minute on the first part of her exam. She types 80 words per minute on the second part of the exam.
   D. During National Library Week, the students in Ms. Bernier’s class read an average of 2.5 books each.
5. Which situation cannot be described as a linear function?
   A. A submarine descends at a rate of 100 feet per minute.
   B. As it runs, a rabbit maintains a constant speed of 15 meters per second.
   C. Human hair has periods of growth followed by periods of no growth.
   D. During an 18 mile kayak race, Tamara averages 4.5 mi/h.

6. Which graph models a linear function?
   A. A V shaped graph with a vertex at (0, 0)
   B. A parabola that opens up and has a vertex at (0, 0)
   C. A parabola that opens down and has a vertex at (0, 0)
   D. A line that passes through (0, 0)

7. For which function are the ordered pairs (1, 3), (2, 1), (4, −3), and (5, −5) a solution?
   A. \( f(x) = -2x - 5 \)
   B. \( f(x) = 2x - 5 \)
   C. \( f(x) = 2x + 5 \)
   D. \( f(x) = -2x + 5 \)

8. Which ordered pairs lie on the graph of \( y = \frac{1}{2}x - 1 \)?
   A. \((-1, -4), (0, -1), (1, 2), (3, 8)\)
   B. \((-6, -3), (-3, -2), (3, 0), (6, 1)\)
   C. \((-6, -7), (-3, -4), (0, -1), (6, 5)\)
   D. \((-6, 1), (-3, 0), (0, -1), (3, -2)\)

9. Which is an equation of the graph?
   A. \( y = \frac{3}{2}x - 1 \)
   B. \( y = \frac{2}{3}x - 1 \)
   C. \( y = x + \frac{2}{3} \)
   D. \( y = \frac{3}{2}x + 1 \)
10. Which ordered pairs lie on this graph?

A. \((-4, 4), (-2, 3), (2, 1), (4, 0)\)
B. \((-4, 4), (-2, 2), (2, 1), (4, 0)\)
C. \((4, 4), (2, 3), (0, 2), (-2, 1)\)
D. \((-4, 6), (0, 2), (2, 1), (4, 0)\)

11. Which equation describes the ordered pairs in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>5</td>
</tr>
<tr>
<td>-2</td>
<td>1</td>
</tr>
<tr>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>2</td>
<td>-7</td>
</tr>
</tbody>
</table>

A. \(y = -\frac{1}{2}x - \frac{1}{3}\)
B. \(y = 6x - 3\)
C. \(y = -2x - 3\)
D. \(y = \frac{1}{2}x + 3\)

12. What is the value of \(y\) when \(x = 5\) if \(y\) is a linear function of \(x\)?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>-1</td>
</tr>
<tr>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
</tr>
</tbody>
</table>

A. 5
B. 4
C. 3.5
D. 3
13. In a linear function, $y$ increases by 4 whenever $x$ increases by 3. Also, $y = 1$ when $x = 0$. Which equation describes this function?

A. $y = \frac{4}{3}x + 1$
B. $y = \frac{3}{4}x + \frac{3}{4}$
C. $y = \frac{3}{4}x + 1$
D. $y = \frac{4}{3}x + \frac{3}{4}$

14. The linear function $f(x) = 3x - 4$ describes the relationship between $x$ and $f(x)$. What is the value of $f(x)$ when $x = -5$?

A. 19
B. 11
C. 9
D. $-19$

15. What is the slope of the linear function whose graph is shown?

A. $-3$
B. $-\frac{1}{3}$
C. $\frac{1}{3}$
D. 3
16. What is the slope of the linear function whose graph includes the points in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>4</td>
</tr>
<tr>
<td>-2</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>-3</td>
</tr>
</tbody>
</table>

A. -3  C. 1  B. -1  D. 3

17. What is the slope of the function $f(x) = -\frac{1}{4}x + 3$?

A. -4  C. $\frac{1}{4}$  B. $-\frac{1}{4}$  D. 3

18. What is the slope of the linear function whose graph is shown?

A. $-\frac{3}{2}$  D. $\frac{3}{2}$  B. $\frac{2}{3}$  E. 4
19. The data in the table can be modeled by a linear function. What does the slope of the function tell you about the rate of change between the number of days a movie is rented and the rental charge?

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Rental charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4</td>
</tr>
<tr>
<td>2</td>
<td>$6</td>
</tr>
<tr>
<td>3</td>
<td>$8</td>
</tr>
<tr>
<td>4</td>
<td>$10</td>
</tr>
</tbody>
</table>

A. It costs $2 per day to rent a movie.  
B. The cost of renting a movie decreases with the number of days the movie is rented.  
C. The rental charge is always a multiple of the number of days a movie is rented.  
D. After the first day, it costs $2 for each day the movie is rented.

20. What is the slope of the graph of the function $y + 2x = -6$?

A. $-6$  
B. $-2$  
C. $2$  
D. $6$

21. The cost $c$ per person to participate in a guided mountain biking tour depends on the number of people $n$ participating in the tour. This relationship can be described by the function $c = -3n + 60$, where $0 < n < 12$. What is the rate of change described by this function?

A. 20 people/tour  
B. $-3$ people/tour  
C. $20$/person  
D. $-3$/person
22. The graph shows the amount of gasoline in a car's gas tank after $x$ hours. Which statement is true?

A. The car uses 2 gallons of gas each hour.  
B. The car uses 8 gallons of gas every 4 hours.  
C. The car has a 16 gallon tank.  
D. The gas tank is empty after 4 hours.

23. The equation $y = 4x + 5$ gives the elevation $y$ in meters of an elevator as a function of $x$ seconds. Which statement describes the meaning of the slope of the function?

A. The elevator starts at 4 meters above street level.  
B. The elevator starts at 5 meters above street level.  
C. The elevator rises 5 meters per second.  
D. The elevator rises 4 meters per second.

24. Sam is walking down the stairs in his office building. The equation $y = -4x + 11$ gives his elevation $y$ in floors above the street after $x$ minutes. Which statement is true?

A. Sam starts below street level.  
B. Sam descends 4 floors per minute.  
C. Sam starts 4 floors above street level.  
D. Sam descends 11 floors per minute.
25. Alex's office has a water cooler. The table shows how many liters of water are left in the cooler after it is filled. Which statement describes the -intercept of the function that models the data?

- A. The cooler holds 36 liters of water.
- C. People drink 9 liters per day.
- B. The cooler is empty after 3 days.
- D. People drink 12 liters per day.

26. In the equation \( y = 2x + 3 \), \( y \) represents the total number of preseason and regular season games that your softball team played this summer. The variable \( x \) represents the number of weeks in the regular season. Which statement is true?

- A. The regular season lasts 2 weeks.
- C. Your team plays 3 preseason games.
- B. The preseason lasts 2 weeks.
- D. Your team plays 3 regular season games each week.

27. The chart shows the total cost of buying 1 pear and \( x \) apples at four different stores. Which store has the most expensive pears?

<table>
<thead>
<tr>
<th>Store</th>
<th>Cost, ( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Fest</td>
<td>( y = 0.60x + 70 )</td>
</tr>
<tr>
<td>Gianni's</td>
<td>( y = x + 0.75 )</td>
</tr>
<tr>
<td>Hunt a Peck</td>
<td>( y = 0.60x + 0.65 )</td>
</tr>
<tr>
<td>Junior Mart</td>
<td>( y = 0.65x + 0.68 )</td>
</tr>
</tbody>
</table>

- A. Fruit Fest
- C. Hunt a Peck
- B. Gianni's
- D. Junior Mart
28. The graph of \( y = x + 1 \) is shown. Which point will lie on the graph if the slope of the line is doubled and the \( y \)-intercept stays the same?

A. \((-2, -2)\)  
B. \((0, 2)\)  
C. \((1, 2)\)  
D. \((2, 5)\)

29. Suppose the \( y \)-intercept of \( y = 2x - 3 \) doubles but the slope remains the same. Which point will lie on the graph of the new line?

A. \((1, 1)\)  
B. \((2, 2)\)  
C. \((1, -2)\)  
D. \((2, -2)\)

30. The graph of \( y = -\frac{4}{5}x - 2\frac{1}{5} \) is shown. Which point will lie on the graph if the slope of the line is tripled and the \( y \)-intercept is increased by 1?

A. \((-2, 3\frac{3}{5})\)  
B. \((0, -3\frac{1}{5})\)  
C. \((1, 3)\)  
D. \((2, -4)\)

31. Which line has the steepest slope?

A. \( y = 3x + 5 \)  
B. \( y = x - 8 \)  
C. \( y = -x + 10 \)  
D. \( y = -6x - 4 \)
32. What happens to the graph of \( y = -3x + 2 \) when the y-intercept is decreased by 2?
   A. The new line is half as steep.  
   B. The graph rises left to right. 
   C. The graph is 2 units higher for every value of \( x \).  
   D. The graph passes through the origin. 

33. What happens to the graph of \( y = x - 3 \) when the slope is divided by 2?
   A. The new line is half as steep.  
   B. The new line is twice as steep. 
   C. The graph is 2 units higher for every value of \( x \).  
   D. The graph is 2 units lower for every value of \( x \). 

34. How does the graph of \( y = 0.75x - 4 \) change when the y-intercept is increased by 0.25?
   A. The slope becomes 1.  
   B. The line becomes less steep. 
   C. The graph is 0.25 unit higher for every value of \( x \).  
   D. The graph is 0.25 unit lower for every value of \( x \). 

35. How does multiplying the slope by \(-1\) change the graph of \( y = -x + 1\)?
   A. The line then rises left to right.  
   B. The line then falls left to right.  
   C. The y-intercept becomes \(-1\).  
   D. The \( y \)-coordinate is 1 unit less for every value of \( x \). 

36. Which is an equation of the line with a y-intercept of \(-6\) and a slope of 3?
   A. \( y = 3x + 6 \)  
   B. \( y = -6x - 3 \) 
   C. \( y = -6x + 3 \)  
   D. \( y = 3x - 6 \) 

37. Which equation describes a line that has a slope of \( \frac{1}{3} \) and passes through the point \((6, 4)\)?
   A. \( y - 4 = \frac{1}{3}(x - 6) \)  
   B. \( y - 6 = \frac{1}{3}(x - 4) \) 
   C. \( y + 4 = \frac{1}{3}(x + 6) \)  
   D. \( y + 6 = \frac{1}{3}(x + 4) \)
38. A line passes through \((-1, 3)\) and has a slope of \(-2\). Which is an equation of the line?
   A. \(y + 3 = -2(x - 1)\)  
   B. \(y - 3 = -2(x + 1)\)  
   C. \(y - 1 = -2(x + 3)\)  
   D. \(y + 1 = -2(x - 3)\)

39. Which equation describes a linear function with a \(y\)-intercept of 1 and a slope of \(-\frac{1}{4}\)?
   A. \(f(x) = -\frac{1}{4} + 1\)  
   B. \(f(x) = x - \frac{1}{4}\)  
   C. \(f(x) = 4x + 1\)  
   D. \(f(x) = \frac{1}{4}x - 1\)

40. Which equation describes a linear function that has a slope of 4 and passes through the point \((-1, -4)\)?
   A. \(4x - y = 15\)  
   B. \(4x = y\)  
   C. \(4x - y = 8\)  
   D. \(4x - y = -15\)

41. Which is the graph of \(y + 2 = 2(x - 1)\)?
   A. Graph 1:  
   B. Graph 2:  
   C. Graph 3:  
   D. Graph 4:
____ 42. Which equation describes the graph of a line that passes through \((-2, 0)\) and \((1, -3)\)?
A. \(y - 1 = 3(x + 3)\)  
B. \(y - 1 = -3(x + 3)\)  
C. \(y + 2 = 3x\)  
D. \(y + 3 = -(x - 1)\)

____ 43. What is the \(x\)-intercept of the line?

A. \(-3\)  
B. \(-2\)  
C. \(-\frac{2}{3}\)  
D. \(0\)

____ 44. For which function are the \(x\)-intercept and \(y\)-intercept the same?
A. \(y = 2x - 2\)  
B. \(3x + 4y = 12\)  
C. \(x - y = 10\)  
D. \(x + y = 6\)

____ 45. What is the \(y\)-intercept of the linear function that describes the data in the table?

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-5)</td>
<td>(-3)</td>
</tr>
<tr>
<td>(-4)</td>
<td>(0)</td>
</tr>
<tr>
<td>(0)</td>
<td>(12)</td>
</tr>
<tr>
<td>(2)</td>
<td>(18)</td>
</tr>
</tbody>
</table>

A. \(12\)  
B. \(3\)  
C. \(0\)  
D. \(-4\)
46. What is the \(x\)-intercept of the line \(y = -\frac{1}{2}x + 3\)?
   A. \(-\frac{1}{2}\)  
   B. 0  
   C. 3  
   D. 6

47. What is the \(x\)-intercept of the linear function that describes the data in the table?

<table>
<thead>
<tr>
<th>(x)</th>
<th>-3</th>
<th>-1</th>
<th>1</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>-14</td>
<td>-10</td>
<td>-6</td>
<td>-2</td>
<td>2</td>
</tr>
</tbody>
</table>

   A. -8  
   B. 0  
   C. \(\frac{1}{2}\)  
   D. 4

48. Which graph does not have a \(y\)-intercept?
   A. \(y - 3 = -2(x + 5)\)  
   B. \(y = -5x\)  
   C. \(4x = 4\)  
   D. \(x = y\)

49. What are the \(x\)- and \(y\)-intercepts of the line?

   A. \(x\)-intercept: 2; \(y\)-intercept: -1  
   B. \(x\)-intercept: 0; \(y\)-intercept: -1  
   C. \(x\)-intercept: 2; \(y\)-intercept: 0  
   D. \(x\)-intercept: -1; \(y\)-intercept:
50. What is the zero of the function \( y = -\frac{5}{6}x + 35? \)

Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

\[
\begin{array}{cccc|cccc}
0 & 0 & 0 & 0 & \cdot & 0 & 0 & 0 \\
1 & 1 & 1 & 1 & \cdot & 1 & 1 & 1 \\
2 & 2 & 2 & 2 & \cdot & 2 & 2 & 2 \\
3 & 3 & 3 & 3 & \cdot & 3 & 3 & 3 \\
4 & 4 & 4 & 4 & \cdot & 4 & 4 & 4 \\
5 & 5 & 5 & 5 & \cdot & 5 & 5 & 5 \\
6 & 6 & 6 & 6 & \cdot & 6 & 6 & 6 \\
7 & 7 & 7 & 7 & \cdot & 7 & 7 & 7 \\
8 & 8 & 8 & 8 & \cdot & 8 & 8 & 8 \\
9 & 9 & 9 & 9 & \cdot & 9 & 9 & 9 \\
\end{array}
\]

51. The graph shows the amount in Dee's savings account after each of the first 6 months this year. What does it mean if the slope is doubled but the \( y \)-intercept remains unchanged?

A. Dee has $200 in her account at the beginning of the year.
B. Dee has $50 in her account at the beginning of the year.
C. Dee saves $150 each month.
D. Dee saves $50 each month.

52. The amount in Rico's savings account \( y \) at the end of the first \( x \) months of the year is modeled by \( y = 100x + 250 \). What does it mean if the \( y \)-intercept is divided by 2 but the slope does not change?

A. Rico has $500 in his account at the beginning of the year.
B. Rico has $125 in his account at the beginning of the year.
C. Rico saves $200 per month.
D. Rico saves $50 per month.
53. A company’s earnings in thousands $y$ after $x$ months this year are modeled by $y = 50x - 40$. What will the earnings be after 4 months if the slope is halved but the $y$-intercept does not change?
A. $60,000  
C. $160,000  
B. $80,000  
D. $180,000

54. The cumulative annual rainfall in inches $y$ after of $x$ days this week is modeled by the function $y = 0.5x + 1.5$. What will the annual accumulation be after 5 days if the $y$-intercept is tripled but the slope stays the same?
A. 4  
C. 7  
B. 5  
D. 9

55. The graph shows how much gasoline is left in a motorcycle's gas tank after traveling $x$ hours. What does it mean if the line is half as steep but the $y$-intercept stays the same?
A. The motorcycle uses $\frac{1}{2}$ gallon per hour.  
C. The gas tank is full at the beginning of the trip.  
B. The motorcycle uses $\frac{1}{4}$ gallon per hour.  
D. The gas tank is half full at the beginning of the trip.

56. The function $y = 2x + 3$ gives the height $y$ of a plant in centimeters $x$ days after May 1. What will the plant’s height be on May 8 if the slope of the function is tripled and the $y$-intercept is doubled?
A. 17 cm  
C. 48 cm  
B. 37 cm  
D. 54 cm
57. The table shows how many feet \( y \) a race car travels in \( x \) seconds. Which equation describes the data in the table?

<table>
<thead>
<tr>
<th>Time (sec), ( x )</th>
<th>Distance (ft), ( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>440</td>
</tr>
<tr>
<td>3</td>
<td>660</td>
</tr>
<tr>
<td>4</td>
<td>880</td>
</tr>
<tr>
<td>5</td>
<td>1100</td>
</tr>
</tbody>
</table>

A. \( x = 220y \)  
B. \( y = 220x \)  
C. \( x = 440y \)  
D. \( y = \frac{220}{x} \)

58. If the function \( y = 4x + b \) is a direct variation, what is the value of \( b \)?

A. Any negative integer  
B. 0  
C. \(-4\)  
D. Any positive integer

59. The graph shows that the number of adult inline skating helmets a shop sells varies directly with the number of child helmets it sells. What is the constant of variation?

A. 2  
B. 0.5  
C. \(-0.5\)  
D. \(-2\)

60. Which is not a direct variation equation?

A. \( y - 2x = 0 \)  
B. \( y = \frac{x}{5} \)  
C. \( y + 1 = \frac{2}{3}x \)  
D. \( \frac{y}{x} = \frac{3}{5} \)
61. A line passes through the point (2, 3) and has slope \( m \). For which value of \( m \) is the equation of the line a direct variation?

A. \(-\frac{3}{2}\)  
B. \(-\frac{2}{3}\)  
C. \(\frac{2}{3}\)  
D. \(\frac{3}{2}\)

62. When \( x = 10 \), \( y = -15 \). Also, when \( x = 12 \), \( y = -18 \). If \( y \) varies directly with \( x \), what is the value of \( x \) when \( y = -7.5 \)?

Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 |

63. This table shows that a ramp's vertical drop is directly proportional to its horizontal distance. What is the constant of variation?

<table>
<thead>
<tr>
<th>Horizontal distance (ft)</th>
<th>Vertical drop (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>-3</td>
</tr>
<tr>
<td>65</td>
<td>-5</td>
</tr>
<tr>
<td>130</td>
<td>-10</td>
</tr>
</tbody>
</table>

A. 13  
B. \(\frac{1}{13}\)  
C. \(-\frac{1}{13}\)  
D. -13
### Standards Summary

<table>
<thead>
<tr>
<th>TX TAKS 3</th>
<th>The student will demonstrate an understanding of linear functions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX TEKS A.5.A</td>
<td>determine whether or not given situations can be represented by linear functions;</td>
</tr>
<tr>
<td>TX TEKS A.5.C</td>
<td>use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions.</td>
</tr>
<tr>
<td>TX TEKS A.6.A</td>
<td>develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations;</td>
</tr>
<tr>
<td>TX TEKS A.6.B</td>
<td>interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs;</td>
</tr>
<tr>
<td>TX TEKS A.6.C</td>
<td>investigate, describe, and predict the effects of changes in ( m ) and ( b ) on the graph of ( y = mx + b );</td>
</tr>
<tr>
<td>TX TEKS A.6.D</td>
<td>graph and write equations of lines given characteristics such as two points, a point and a slope, or a slope and y-intercept;</td>
</tr>
<tr>
<td>TX TEKS A.6.E</td>
<td>determine the intercepts of the graphs of linear functions and zeros of linear functions from graphs, tables, and algebraic representations;</td>
</tr>
<tr>
<td>TX TEKS A.6.F</td>
<td>interpret and predict the effects of changing slope and y-intercept in applied situations; and</td>
</tr>
<tr>
<td>TX TEKS A.6.G</td>
<td>relate direct variation to linear functions and solve problems involving proportional change.</td>
</tr>
</tbody>
</table>
1. A public swimming pool is 3 feet deep at one end and 15 feet deep at the other end. In between, the depth increases 1 foot for every 12 horizontal feet. Which equation can you use to find the distance $d$ from one end of the pool to the other?

A. $3d + 12 = 15$
B. $\frac{1}{12}(d + 3) = 15$
C. $\frac{d}{12} + 3 = 15$
D. $\frac{1}{15}d + 12 = 3$

2. Chelsea joined a discount club. For a yearly fee of $100, she will save 10% of the cost of all items she purchases at the store. How much must Chelsea spend for her savings to equal her yearly fee? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

3. Imelda makes blankets that sell for $500 each. Imelda has already woven 7 blankets. Which inequality can you solve to determine the number of additional blankets $n$ that Imelda will make if the total income from the sale of all her blankets will be at least $12,000?

A. $7 + 500n \leq 12,000$
B. $500(7 + n) \leq 12,000$
C. $7 + 500n \geq 12,000$
D. $500(7 + n) \geq 12,000$
4. You are building a rectangular deck. You want the length to be 3 feet longer than the width. The deck will have a perimeter of 54 feet. Which equation can you solve to determine the length of the deck?

A. \(2w + 2(w + 3) = 54\)  
B. \((2w)(2)(w + 3) = 54\)  
C. \(w + w + 3 = 54\)  
D. \(w(w + 3) = 54\)

5. Mrs. Johnson is filling her daughter's swimming pool with water at the rate of \(1 \frac{1}{2}\) kiloliters per minute. When she begins filling the pool, it already contains 1 kiloliter of water. When Mrs. Johnson finishes, the pool has more than 7 kiloliters. Which inequality can be used to determine how many more minutes \(m\) Mrs. Johnson spends filling the pool?

A. \(\frac{3}{2}m + 1 \geq 7\)  
B. \(\frac{3}{2}m + 1 > 7\)  
C. \(\frac{2}{3}m + 1 \leq 7\)  
D. \(\frac{3}{2}m + 1 < 7\)

6. Dan worked 55 hours last week. He is paid \(1 \frac{1}{2}\) times his regular hourly rate for all hours he works over 40 hours. Dan earned $600 last week. What is his hourly rate of pay?

A. $15  
B. $10.90  
C. $9.60  
D. $7.27

7. An airline is hiring 5 fewer than twice the number of domestic flight attendants as international flight attendants. The airline is hiring a total of 34 attendants. How many international flight attendants is the airline hiring?

A. 9  
B. 13  
C. 20  
D. 21

8. The ordered pair \((x, -1)\) is a solution of \(-2x + 9y = 1\). What is the value of \(x\)?

A. \(-5\)  
B. \(-\frac{1}{9}\)  
C. \(\frac{1}{3}\)  
D. 4
9th Grade Mathematics
TAKS Objective 4

____ 9. Which ordered pair is a solution of \(5x + 4y = 6\)?
   A. \((-0.4, -2)\)  
   B. \((-1, 2)\)  
   C. \((-2, 2.8)\)  
   D. \((-2, 4)\)

____ 10. Which inequality describes the graph?
   
   ![Graph]
   
   A. \(y - 2x \leq 1\)  
   B. \(2x - y \leq 1\)  
   C. \(y - 2x < 1\)  
   D. \(2x - y < 1\)

____ 11. What is the solution of \(-\frac{1}{2}x - 2 = x - 5\)?
   A. 2  
   B. \(2\frac{1}{3}\)  
   C. 6  
   D. 14

____ 12. Which point is not a solution of \(-2x + 3y < -3\)?
   A. \(\left(\frac{1}{3}, -\frac{7}{9}\right)\)  
   B. \((-3, -3)\)  
   C. \(0, -1\frac{1}{5}\)  
   D. \(5\frac{1}{7}, -5\)
13. The graph of $-3x + 2y = 6$ is shown. Which ordered pair is a solution of $-3x + 2y > 6$?

A. $(2, 5)$
B. $(0, 3)$
C. $(-2, 0)$
D. $(-3, -1)$

14. Which is the graph of the solution set of $5 - (2x + 3) \leq -6x + 2(x - 1)$?

A. Graph 1:
B. Graph 2:
C. Graph 3:
D. Graph 4:

15. If $3x - (x - 1) \leq -6x - 3$, which statement is true?

A. $x \leq -2$
B. $x \leq -\frac{1}{2}$
C. $x \geq -2$
D. $x \geq -\frac{1}{2}$

16. A restaurant pays $3.89 a pound for one of the meats on its menu. What is a reasonable estimate of how much meat the restaurant can buy for $100?

A. 10 lb
B. 25 lb
C. 40 lb
D. 100 lb

17. Tickets to a school play cost $7.99 each. The students want to collect at least $998 from the sale of tickets to pay for their trip to the drama competition. About how many tickets must they sell?

A. at least 170 tickets
B. at most 170 tickets
C. at least 125 tickets
D. at most 125 tickets
18. You have $27 left on a gift certificate to The Yogurt Shoppe. A frozen yogurt drink costs $2.85. Which inequality will give the best estimate of the maximum number of friends f you can treat to a frozen yogurt drink?
   A. $3f \geq 27$
   B. $3f \leq 27$
   C. $27f \geq 3$
   D. $27f \leq 3$

19. A symphony orchestra sold out one of its concerts. The tickets sold for $24 each, and the concert hall holds 609 people. About how much money did the symphony orchestra collect from the sale of the tickets?
   A. $1500$
   B. $15,000$
   C. $150,000$
   D. $1,500,000$

20. The low temperatures during the 3 winter months in Nome, Alaska ranged between $-1^\circ F$ and $-4^\circ F$. The function $C = \frac{5}{9}(F - 32)$ converts a temperature $F$ in degrees Fahrenheit to a temperature $C$ in degrees Celsius. In which quadrant does the graph of the function display reasonable Celsius temperatures for this period in Nome?
   A. I
   B. II
   C. III
   D. IV

21. Light travels about 186,000 miles per second. What is a reasonable estimate of how far light travels in an hour?
   A. 10,000,000 mi
   B. 70,000,000 mi
   C. 100,000,000 mi
   D. 700,000,000 mi

22. The equation $p = 2.8x - 300$ models the profit $p$ that a car dealer makes from selling $x$ SUVs. In which quadrant(s) does the graph of the function display reasonable profits for the dealer?
   A. I
   B. I and II
   C. I and III
   D. I and IV
23. The values in the table describe a linear function. What is a good estimate of \( y \) for this function when \( x \) is 64?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-26</td>
<td>-95</td>
</tr>
<tr>
<td>0</td>
<td>113</td>
</tr>
<tr>
<td>5</td>
<td>153</td>
</tr>
<tr>
<td>19</td>
<td>265</td>
</tr>
</tbody>
</table>

A. 250  
B. 630  
C. 1000 
D. 1770 

24. The school cafeteria sells a hamburger meal for $5 and a vegetarian burger meal for $4. On Tuesday the cafeteria sold 3 more hamburger meals than vegetarian burger meals. The income from these sales was $357. Which system of equations models the number of hamburger meals \( h \) and the number of vegetarian burger meals \( v \) sold?

A. \( 5h + 4v = 357 \)  
\( v = h + 3 \)  
B. \( 5h + 4v = 3 \)  
\( h = v + 357 \)  
C. \( 4h + 5v = 357 \)  
\( h = v - 3 \)  
D. \( 5h + 4v = 357 \)  
\( h = v + 3 \)

25. Rafael bought dried cherries for $8 a pound and raisins for $5 a pound. He paid $31. Emily bought dried cherries for $9 a pound and raisins for $4 a pound. She paid $30. They bought the same amount of cherries and the same amount of raisins. Which system of equations can you use to find how many pounds of dried cherries \( c \) and how many pounds of raisins \( r \) each person bought?

A. \( 8c + 5r = 31 \)  
\( 4c + 9r = 30 \)  
B. \( 8c + 5r = 31 \)  
\( 9c + 4r = 31 \)  
C. \( 8c + 5r = 30 \)  
\( 9c + 4r = 31 \)  
D. \( 8c + 4r = 31 \)  
\( 9c + 5r = 30 \)

26. Laurie says that her 20 nickels and 24 dimes weigh 144 grams. She also says that 8 of her dimes weigh 9 grams more than 2 of her nickels. What is the average weight of each coin?

A. nickel: 4.5 g; dime: 2.25 g  
B. nickel: 2.25 g; dime: 4.5 g  
C. nickel: 1.914 g; dime: 3.156 g  
D. nickel: 3.156 g; dime: 1.914 g
27. Sam’s Bike Shop will charge you $50 per hour plus $200 for parts to repair your mountain bike. Sue’s Bike Shop will charge you $25 per hour plus $375 for parts for the repairs. After how many hours is the repair cost the same at both shops?
A. 23 h  
B. $7\frac{2}{3}$ h  
C. 7 h  
D. $2\frac{1}{3}$ h

28. A store has 11 big packs and 20 small packs of AA batteries. All together the packs have 305 AA batteries. Another store has 8 big packs and 12 small packs, for a total of 204 AA batteries. Which system of equations can tell you the number of batteries $b$ in a big pack and the number of batteries $s$ in a small pack?
A. $11b + 20s = 204$  
B. $11b + 20s = 305$  
C. $20b + 11s = 305$  
D. $12b + 8s = 204$

29. A basketball team made 45 field goals in their last game. Some of the field goals were worth 2 points and the others were worth 3 points. The team scored a total of 101 points from field goals in the game. How many 2 point field goals were made?
A. 7  
B. 11  
C. 34  
D. 38
### Standards Summary

| TX TAKS 4 | The student will formulate and use linear equations and inequalities. |
| TX TEKS A.7.A | analyze situations involving linear functions and formulate linear equations or inequalities to solve problems; |
| TX TEKS A.7.B | investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities; and |
| TX TEKS A.7.C | interpret and determine the reasonableness of solutions to linear equations and inequalities. |
| TX TEKS A.8.A | analyze situations and formulate systems of linear equations in two unknowns to solve problems; |
1. How will the graph of the function \( y = x^2 + 1 \) shift if the function is changed to \( y = x^2 + 3 \)?
   A. The graph will translate 2 units down.
   B. The graph will translate 2 units up.
   C. The graph will translate 3 units up.
   D. The graph will translate 3 units down.

2. The graph of the function \( y = 2x^2 - 2 \) is translated 4 units down. Which is an equation of the new graph?
   A. \( y = 2x^2 + 2 \)
   B. \( y = 2x^2 + 4 \)
   C. \( y = 2x^2 - 4 \)
   D. \( y = 2x^2 - 6 \)

3. What is an equation of the parabola shown?
   A. \( y = x^2 \)
   B. \( y = x^2 - 2 \)
   C. \( y = x^2 + 2 \)
   D. \( y = x^2 + 1 \)

4. How will the graph of the function \( y = -5x^2 - 3 \) be affected if the function is changed to \( y = -5x^2 + 3 \)?
   A. The graph will stay the same.
   B. The graph will be translated 3 units right.
   C. The graph will be translated 6 units up.
   D. The graph will be translated 3 units down.
____ 5. What is an equation of the graph?

A. \( y = \frac{1}{2}x^2 - 1 \)
B. \( y = \frac{1}{2}x^2 - 2 \)
C. \( y = \frac{1}{2}x^2 + 1 \)
D. \( y = \frac{1}{2}x^2 \)

____ 6. How will the graph of the function \( y = 5x^2 + 3 \) be affected if the function is changed to \( y = 5x^2 - 1 \)?

A. The graph will be translated 2 units up.
B. The graph will be translated 2 units down.
C. The graph will be translated 4 units up.
D. The graph will be translated 4 units down.

____ 7. If the graph of the function \( y = 3x^2 - 6 \) passes through the point \( (1, -3) \), the graph is translated 11 units up. The new graph will pass through the point \( (1, y) \). What is the value of \( y \)?

A. -8
B. 5
C. 8
D. 11

____ 8. The graph of the function \( y = x^2 - 4 \) is shifted 1 unit down. What is the vertex of the new graph?

A. \( (0, -1) \)
B. \( (0, -3) \)
C. \( (0, -4) \)
D. \( (0, -5) \)
9. If \( 3^{-n} = \frac{1}{81} \), what is the value of \( 3^n \)? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

____ 10. Which expression is equivalent to \( \frac{(3x^7)(2x)}{6x^4} \)?

A. \( \frac{1}{2}x^2 \)  
B. \( x^2 \)  
C. \( x^4 \)  
D. \( x^{12} \)

____ 11. The British Thermal Unit (Btu) is a measure of energy output. One hundred gallons of home heating fuel produces about \( (3 \times 10^4)(5 \times 10^2) \) Btu when burned. Which expression is equivalent to \( (3 \times 10^4)(5 \times 10^2) \)?

A. \( 15 \times 10^8 \)  
B. \( 15 \times 10^6 \)  
C. \( 8 \times 10^8 \)  
D. \( 8 \times 10^6 \)

____ 12. Which expression is equivalent to \( (4c^3d)^2(c^5d)^2 \)?

A. \( 16c^{11}d^3 \)  
B. \( 16c^{14}d^2 \)  
C. \( 8c^{11}d^2 \)  
D. \( 8c^{45}d^3 \)

____ 13. Which expression is equivalent to \( 4^{-3} \)?

A. \(-64\)  
B. \(-12\)  
C. \( \frac{1}{64} \)  
D. \( \frac{1}{12} \)
Jeremy reasons that \( \frac{x^2 y^2}{(a^2)^0} = x^2 y^2 \) if \( a \neq 0 \). Which statement supports his reasoning?

A. \( a^0 = 1, a \neq 0 \)

B. \( a^{-n} = \frac{1}{a^n}, a \neq 0 \)

C. \( \frac{a^m}{a^n} = a^{m-n}, a \neq 0 \)

D. \( \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0 \)

Study the pattern in the table. Which statement describes the relationships in the last two rows of the table?

<table>
<thead>
<tr>
<th>Power of 10</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10^3)</td>
<td>1000</td>
</tr>
<tr>
<td>(10^2)</td>
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A. \( \frac{a^m}{a^n} = a^{m-n}, a \neq 0 \)

B. \( \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0 \)

C. \( a^0 = 1, a \neq 0 \)

D. \( a^{-n} = \frac{1}{a^n}, a \neq 0 \)

Phyllis believes that \( x^2 \cdot x^y = x^{2+y} \). Which pair of values for \( x \) and \( y \) can Kyle use to show Phyllis that she is wrong?

A. \( x = 2 \) and \( y = 0 \)

B. \( x = 1 \) and \( y = 2 \)

C. \( x = 1 \) and \( y = 0 \)

D. \( x = 0 \) and \( y = 2 \)
Standards Summary

TX TAKS 5  The student will demonstrate an understanding of quadratic and other nonlinear functions.

TX TEKS A.9.C  investigate, describe, and predict the effects of changes in c on the graph of \( y = ax^2 + c \); and

TX TEKS A.11.A  use patterns to generate the laws of exponents and apply them in problem-solving situations;
1. What scale factor was used to transform quadrilateral $QRST$ into quadrilateral $Q'R'S'T'$?

A. $\frac{1}{4}$  
B. $\frac{1}{2}$  
C. 2  
D. 4

2. $\triangle PQR \sim \triangle TUV$. What scale factor was used to transform $\triangle PQR$ to $\triangle TUV$?

Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.
3. Kayla dilated a triangle with side lengths 6, 8, and 10 units. Which could be the side lengths of the new triangle?
   A. 3, 4, and 8 units
   B. 3, 5, and 9 units
   C. 12, 14, and 16 units
   D. 18, 24, and 30 units

4. Parallelogram \( \text{DEFG} \) is dilated by a scale factor of \( \frac{1}{2} \). The origin is the center of dilation. What are the coordinates of \( E' \)?
   A. \( \left( \frac{5}{2}, \frac{3}{2} \right) \)
   B. \( \left( \frac{2}{5}, \frac{2}{3} \right) \)
   C. \( (3, 5) \)
   D. \( (5, 3) \)

5. \( \Delta \text{LMN} \) is dilated by a scale factor of 3 using the origin as the center of dilation. What are the coordinates of \( L' \)?
   A. \( (-3, 3) \)
   B. \( (-3, 6) \)
   C. \( (3, 3) \)
   D. \( (6, -3) \)
6. Rectangle PQRS is shown below. If this rectangle is reflected across the y-axis, what will be the coordinates of the vertices for the image P’Q’R’S’?

A. \(P' (1, -4), Q' (-4, 4), R' (4, -2), S' (1, -2)\)
B. \(P' (1, 4), Q' (4, 4), R' (4, 2), S' (1, 2)\)
C. \(P' (-4, -1), Q' (-4, -4), R' (-2, -4), S' (-2, -1)\)
D. \(P' (4, 1), Q' (4, 4), R' (2, 4), S' (2, 1)\)

7. Emily wants to transform \(\Delta JKL\) that \(\Delta J'K'L'\) has the coordinates \(J' (-3, 5), K' (0, 4),\) and \(L' (-5, 1)\). Which transformation should she perform?

A. Translate \(\Delta JKL\) 4 units left and 3 units up.
B. Dilate \(\Delta JKL\) by a scale factor of 2.
C. Reflect \(\Delta JKL\) across the x-axis.
D. Reflect \(\Delta JKL\) across the x-axis.

8. \(\Delta KLM\) is graphed below. If \(\Delta KLM\) is dilated by a scale factor of 2 using the origin as the center of dilation, what will be the coordinates of the vertices of \(K'L'M'\)?

A. \(K' \left(-\frac{1}{2},\frac{1}{2}\right), L' \left(\frac{1}{2},\frac{1}{2}\right), M' \left(\frac{1}{2}, 1\right)\)
B. \(K' \left(\frac{1}{2}, -\frac{1}{2}\right), L' \left(\frac{1}{2}, \frac{1}{2}\right), M' \left(1, \frac{1}{2}\right)\)
C. \(K' (-2, 2), L' (2, 2), M' (2, 4)\)
D. \(K' (2, -2), L' (2, 2), M' (4, 2)\)
9th Grade Mathematics
TAKS Objective 6

9. \( \triangle MNP \) is translated so that \( M \) is mapped to \( M' \). Which coordinate pair best represents \( N' \)?

A. \((-4, -3)\)  
B. \((2, -3)\)  
C. \((3, 5)\)  
D. \((5, 1)\)

10. Quadrilateral \( WXYZ \) is reflected across the \( y \)-axis. What are the coordinates of \( Z' \)?

A. \((-3, 1)\)  
B. \((-1, 3)\)  
C. \((2, 0)\)  
D. \((1, 3)\)

11. Which point on the graph satisfies the conditions \( x > -1 \) and \( y < -3 \)?

A. Point \( W \)  
B. Point \( X \)  
C. Point \( Y \)  
D. Point \( Z \)
12. Brittany mapped her garden on the coordinate grid below. She wants to install a birdbath at point \( B \). Which ordered pair best represents the coordinates of point \( B \)?

A. \((4, 5)\)  
B. \((4.5, 5)\)  
C. \((5, 4.5)\)  
D. \((5, 4)\)

13. Which point on the graph satisfies the conditions \( x > 2.3 \) and \( y < -1.7 \)?

A. Point \( K \)  
B. Point \( L \)  
C. Point \( M \)  
D. Point \( N \)
14. Jenna is drawing a pentagon on a coordinate grid. Which could be the coordinates of the missing vertex?

A. \((-4, 1)\)  
B. \((-2, -4)\)  
C. \((0, -3)\)  
D. \((3, 1)\)

15. Matthew used a coordinate grid to describe the location of several buildings in his community. Which ordered pair represents the coordinates of the fire station?

A. \((0.1, 0.3)\)  
B. \((0.2, 0.4)\)  
C. \((0.4, 0.6)\)  
D. \((1.2, 1.4)\)

16. Which ordered pair represents the coordinates of a point exactly halfway between \((-2, 4)\) and \((6, 6)\)?

A. \((4, 10)\)  
B. \((8, 5)\)  
C. \((2, 1)\)  
D. \((2, 5)\)
## Standards Summary

<table>
<thead>
<tr>
<th>Standard Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>TX TAKS 6</td>
<td>The student will demonstrate an understanding of geometric relationships and spatial reasoning.</td>
</tr>
<tr>
<td>TX TEKS 8.6.A</td>
<td>generate similar figures using dilations including enlargements and reductions; and</td>
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<tr>
<td>TX TEKS 8.6.B</td>
<td>graph dilations, reflections, and translations on a coordinate plane.</td>
</tr>
<tr>
<td>TX TEKS 8.7.D</td>
<td>locate and name points on a coordinate plane using ordered pairs of rational numbers.</td>
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</tbody>
</table>
1. The drawing below shows a 3-dimensional model. Which best represents the top view of the model?

A. Model 1:
B. Model 2:
C. Model 3:
D. Model 4:

2. Which three-dimensional solid has the three views shown below?

A. Solid 1:
B. Solid 2:
C. Solid 3:
D. Solid 4:
3. The drawings below show the top, front, and side views of a 3-dimensional model. Which solid figure has the top, front, and side views shown?

A. Solid 1:

B. Solid 2:

C. Solid 3:

D. Solid 4:

4. Which is the side view of the model?

A. View 1:

B. View 2:

C. View 3:

D. View 4:
5. Emily has a sheet of plastic that measures 8.5 inches by 11 inches. She wants to cut triangles out of the plastic to build a mobile. If each triangle has a 4 inch base and is 2.5 inches high, how many triangles can she cut from the sheet of plastic? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

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6. Mr. Chen wants a home improvement store to install hardwood flooring in his rectangular dining room. The formal dining room measures 18 feet by 13 feet. If the store charges $2.50 per square foot to install flooring, including tax, how much will it cost to install the flooring in the dining room?
A. $77.50
B. $93.60
C. $155
D. $585

7. Illustrations of an alligator and a heron are \( \frac{1}{15} \) the size of the average length of an alligator and the average height of a heron. The heron in the illustration is 3 inches high. If an average American alligator is 13 feet long, how long is the alligator in the illustration?
A. 10.4 in.
B. 12 in.
C. 13 in.
D. 45 in.
8. Mrs. Cooper is buying edging for three circular gardens that have the dimensions shown below. She can purchase the edging in packages of 12 feet. How many packages of edging does Mrs. Cooper need to buy? Use 3.14 for \( \pi \).

\[ \text{Circle with diameter 3 ft} \]

A. 2  C. 4  
B. 3  D. 5

9. An architect designed a window with the dimensions shown below. What is the area of the window to the nearest square inch? Use \( \frac{22}{7} \) for \( \pi \).

\[ \text{Window with semi-circle and dimensions} \]

A. 3052 in.\(^2\)  C. 1204 in.\(^2\)  
B. 1820 in.\(^2\)  D. 896 in.\(^2\)

10. A farmer used a metal bar to reinforce the wire strung between two parallel fence posts. If the measure of \( \angle 1 \) is 115°, what is the measure of \( \angle 12 \)?

\[ \text{Diagram with fence posts and angles} \]

A. 25  C. 115  
B. 65  D. 140
11. What is the area of the largest square in the model below?

A. 29 units$^2$
B. 441 units$^2$
C. 484 units$^2$
D. 841 units$^2$

12. What is the length of the shortest leg if the diagram demonstrates the Pythagorean Theorem?

A. 5 units
B. 9 units
C. 18 units
D. 81 units

13. The model below demonstrates the Pythagorean Theorem. What is the area of $b^2$?

A. 144 cm$^2$
B. 289 cm$^2$
C. 441 cm$^2$
D. 2594 cm$^2$
14. The drawing shows how three squares can be placed so three of their edges form a triangle. Which set of squares could form a right triangle?

A. Set 1:  
B. Set 2:  
C. Set 3:  
D. Set 4:  

15. The drawing below shows a lot shaped like a right triangle surrounded by three square fields. If the perimeter of Field A is 40 meters, and the perimeter of Field B is 96 meters, what is the perimeter of Field C?

A. 56 m  
B. 104 m  
C. 136 m  
D. 152 m
Standards Summary

TX TAKS 7  The student will demonstrate an understanding of two- and three-dimensional representations of geometric relationships and shapes.

TX TEKS 8.7.A  draw three-dimensional figures from different perspectives;

TX TEKS 8.7.B  use geometric concepts and properties to solve problems in fields such as art and architecture;

TX TEKS 8.7.C  use pictures or models to demonstrate the Pythagorean Theorem; and
1. Kyle built a cube using the net below. If he covers the entire cube in fabric, how many square feet of fabric does he need?

   \[ \text{A. } 9 \text{ ft}^2 \quad \text{B. } 18 \text{ ft}^2 \quad \text{C. } 36 \text{ ft}^2 \quad \text{D. } 54 \text{ ft}^2 \]

2. Katie is sending a map in the cylindrical tube shown below. She plans to gift wrap all but the ends of the cylinder. How many square inches of wrap does she need to the nearest square inch? Use \( \frac{22}{7} \) for \( \pi \).

   \[ \text{A. } 88 \text{ in.}^2 \quad \text{B. } 176 \text{ in.}^2 \quad \text{C. } 182 \text{ in.}^2 \quad \text{D. } 352 \text{ in.}^2 \]

3. Jose is using the model below to determine how much paper he needs to cover the lateral surface of the pyramid. How many square centimeters of paper will it take to cover the sides of the pyramid?

   \[ \text{A. } 48 \text{ cm}^2 \quad \text{B. } 57 \text{ cm}^2 \quad \text{C. } 96 \text{ cm}^2 \quad \text{D. } 105 \text{ cm}^2 \]
4. What is the total surface area of the cylinder in square feet? Use $3.14$ for $\pi$. Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

$$\text{Surface Area of the Cylinder} = \pi \times \text{radius} \times \text{height}$$

5. What is the total surface area of the prism shown below?

A. 120 m$^2$  
B. 510 m$^2$  
C. 750 m$^2$  
D. 870 m$^2$
6. A rectangular prism and a pyramid have the dimensions shown. If the volume of the prism is 96 cubic millimeters, what is the volume of the pyramid?

A. 32 mm$^3$
B. 48 mm$^3$
C. 96 mm$^3$
D. 288 mm$^3$

7. What is the volume of the sphere in cubic meters? Use 3.14 for $\pi$

Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

8. About how many cubic inches of water can 10 feet of hose hold? Use 3.14 for $\pi$.

A. 18 in. $^3$
B. 212 in. $^3$
C. 848 in. $^3$
D. 1507 in. $^3$
9th Grade Mathematics
TAKS Objective 8

____ 9. What formula could be used to find the volume of the composite solid figure?

A. \( v = \frac{1}{3}lw(h_1 + h_2) \)  
B. \( v = \frac{2}{3}lw(h_1 + h_2) \)  
C. \( v = \frac{1}{3}lwh_1 + lwh_2 \)  
D. \( v = \frac{1}{3}l + \frac{1}{3}(h_1 + h_2) \)

____ 10. Erin stored a rectangular box of sweaters inside a rectangular cedar chest. The dimensions of the box and chest are shown below. What is the volume of the empty space in the cedar chest?

A. 0.25 ft\(^3\)  
B. 3 ft\(^3\)  
C. 6.75 ft\(^3\)  
D. 9.25 ft\(^3\)

____ 11. Monica bought 7 square yards of fabric to cover the sides of some footstools. Each footstool is in the shape of a cylinder, and is 2 feet high with a diameter of 2 feet. How many footstools can she cover? Use 3.14 for \( \pi \).
A. 2 footstools  
B. 3 footstools  
C. 4 footstools  
D. 5 footstools

____ 12. For an art project, several students built a square pyramid. The base is 4 feet by 4 feet and the slant height is 5 feet. They plan to paint the sides of the pyramid with a custom paint that costs $22.50 per quart. If each quart covers about 32 square feet, how much will it cost to paint the sides of the pyramid?
A. $22.50  
B. $28.13  
C. $45.00  
D. $90.00
13. Paul packed 8 oranges in a rectangular box. The box is 40 centimeters long, 22 centimeters wide, and 22 centimeters high. Each orange has a 9 centimeter diameter. He used foam nuggets to fill in the empty spaces of the box and cushion the oranges. About how many cubic centimeters of foam nuggets did he use? Use 3.14 for $\pi$.
   A. 4106 cm$^3$
   B. 5056 cm$^3$
   C. 16,308 cm$^3$
   D. 16,948 cm$^3$

14. A pet store shipped an aquarium in a rectangular box that measured 3 feet by 1.5 feet by 2 feet. If they wrapped the box with a roll of paper that measured 3 feet by 11 feet, how many square feet of paper was left over?
   A. 1 ft$^2$
   B. 6 ft$^2$
   C. 15 ft$^2$
   D. 24 ft$^2$

15. A storage center charges $1.54 per cubic foot per month to store records. A business stores a rectangular stack of records that measures 5 feet by 2 feet by 4 feet. What is the cost per month, in dollars, to store the records? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

16. Michelle is filling a water trough for cows. The trough is rectangular with length 5 feet, height 1.5 feet, and width 2 feet. She is using a cylindrical bucket that is 12 inches high with a diameter of 10 inches. How many buckets of water will it take to fill the trough, if Michelle fills it half full? Use 3.14 for $\pi$.
   A. 28 buckets
   B. 14 buckets
   C. 7 buckets
   D. 3 buckets
17. A company makes cone-shaped sand candles with a diameter of 5 centimeters and a height of 15 centimeters. Sand fills \( \frac{3}{4} \) of the candle. About how many cubic centimeters of sand is needed for each candle? Use 3.14 for \( \pi \).

A. 74 cm\(^3\)  
B. 98 cm\(^3\)  
C. 104 cm\(^3\)  
D. 139 cm\(^3\)

18. A laptop screen has a diagonal of 14 inches. The screen is 11 inches wide. About how high is the screen?

A. 17.8 in.  
B. 13.6 in.  
C. 13 in.  
D. 8.7 in.

19. A rose garden has a diagonal path from one corner of the garden to the other corner as shown in the diagram. What is the approximate length of the diagonal path through the garden?

A. 17.2 m  
B. 24.2 m  
C. 30 m  
D. 33 m
20. A construction worker rests a wood board against a fence. The board is 12 feet long. The distance from the base of the fence to the end of the board is 3 feet. How high up the fence does the board reach?

A. 12.4 ft  
B. 11.6 ft  
C. 10 ft  
D. 9 ft

21. The diagram shows the roof of a log cabin model. What is the height of the roof to the nearest tenth of a centimeter? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.
22. A slide is 6 feet high with a horizontal base of 8 feet. How long is the slide?

A. 5.3 ft  
B. 10 ft  
C. 14 ft  
D. 16 ft

23. About how far is the lighthouse from the boat in the diagram below?

A. 6.6 m  
B. 11 yd  
C. 72.7 yd  
D. 90.4 yd

24. If ΔJKL is similar to ΔMKN, what is the length of MN?

A. 18 in.  
B. 18.9 in.  
C. 30 in.  
D. 34.3 in.
25. The rectangles below are similar. What is the width of the smaller rectangle in millimeters? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

![Rectangles](image)

<table>
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<tr>
<th>Width of Small Rectangle</th>
<th>Grid Bubble</th>
<th>Width of Large Rectangle</th>
<th>Grid Bubble</th>
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26. The prisms shown below are similar. What is the length of the larger prism?

![Prisms](image)

A. 32.4 ft  
B. 78 ft  
C. 90 ft  
D. 135 ft

27. Tyler and a flagpole both cast shadows at the same time. Tyler is 6 feet and his shadow is 15 feet long. The flagpole's shadow is 50 feet long. Two similar triangles are formed. What is the height of the flagpole?

![Triangles](image)

A. 125 ft  
B. 41 ft  
C. 29 ft  
D. 20 ft
28. Ian wants to make two similar rectangular prisms for his sculpture. He draws the prisms shown below. What height should he make the smaller prism?

A. 5.7 units  
B. 11.2 units  
C. 12 units  
D. 17.5 units

29. Amber is using the two similar triangles below to make a design. To the nearest unit, what is the length of the side labeled $s$?

A. 32 units  
B. 35 units  
C. 37 units  
D. 55 units

30. A landscape architect designed a circular fishpond. The circumference is about 32 meters. Planners at the site asked the architect to reduce the circumference of the pond using a scale factor of $\frac{1}{4}$. What will be the circumference of the smaller pond?

A. 4 m  
B. 8 m  
C. 24 m  
D. 40 m

31. The length of the sides of a square are $\frac{3}{2}$ times the length of the sides of a smaller square. The area of the smaller square is 100 square centimeters. What is the area of the larger square?

A. 150 cm$^2$  
B. 225 cm$^2$  
C. 312.50 cm$^2$  
D. 325 cm$^2$
32. A builder drew a floor plan of a swimming complex. He used a scale of 1 inch = 5 feet. The actual swimming complex will have a perimeter of 540 feet. What is the perimeter of the swimming complex in the floor plan?
A. 21.6 in.  
B. 54 in.  
C. 108 in.  
D. 270 in.

33. What is the effect on the area of a circle when the radius is tripled?
A. The area is \(\frac{1}{3}\) the old area.  
B. The area is 3 times the old area.  
C. The area is unchanged.  
D. The area is 9 times the old area.

34. A polygon has been dilated by a scale factor of 4 : 5 to form a smaller polygon. The perimeter of the larger polygon is 56 centimeters. What is the perimeter of the smaller polygon in centimeters? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

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35. Last year, Amanda planted a garden with an area of 252 square feet. This year, she wants to reduce the dimensions of the garden by a ratio of 2 to 3. What will be the area of this year’s garden?
A. 112 ft\(^2\)  
B. 126 ft\(^2\)  
C. 168 ft\(^2\)  
D. 378 ft\(^2\)
36. The current pasture at a horse farm is 3400 square meters. If the pasture's dimensions are increased by a scale factor of 1.5, what will be the pasture's new area?
   A. 4080 m$^2$
   B. 5100 m$^2$
   C. 7650 m$^2$
   D. 10,200 m$^2$

37. The perimeter of a triangle is $\frac{3}{5}$ the perimeter of a larger triangle. If the perimeter of the larger triangle is 135 millimeters, what is the perimeter of the smaller triangle?
   A. 225 mm
   B. 81 mm
   C. 54 mm
   D. 27 mm

38. The dimensions of a rectangular prism are dilated by a scale factor of $\frac{1}{4}$. If the volume of the prism is 1680 cubic yards, what is the volume of the smaller prism in cubic yards? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

39. The dimensions of a cone are doubled. If the approximate volume of the cone is 150 cubic meters, what is the volume of the larger cone?
   A. 300 m$^3$
   B. 600 m$^3$
   C. 900 m$^3$
   D. 1200 m$^3$
40. The dimensions of a cylinder are dilated by a scale factor of 5. The volume of the cylinder is about 12 cubic units. What is the volume of the larger cylinder?
A. 8640 units$^3$  
B. 1500 units$^3$  
C. 300 units$^3$  
D. 180 units$^3$

41. Jessica cans tomatoes in two sizes of jars. The smaller jar has half the dimensions of the larger jar. If the larger jar has a volume of 430 cubic inches, what is the volume of the smaller jar?
A. $53 \frac{3}{4}$ in.$^3$  
B. $107 \frac{1}{2}$ in.$^3$  
C. 215 in.$^3$  
D. 860 in.$^3$

42. What is the effect on the volume of a sphere if the radius of the sphere is reduced using a scale factor of $\frac{1}{3}$?
A. The volume is $\frac{1}{3}$ the old volume.  
B. The volume is $\frac{1}{9}$ the old volume.  
C. The volume is $\frac{1}{27}$ the old volume.  
D. The volume is 9 times the old volume.

43. Mr. Gonzalez needs to increase the space he rents at the boat yard. He currently rents a rectangular storage space of 6000 cubic feet. If he increases the storage space's dimensions 1.5 times, what will be the volume of the new storage space?
A. 9000 ft$^3$  
B. 13,500 ft$^3$  
C. 20,250 ft$^3$  
D. 27,000 ft$^3$

44. Kelly designed a miniature jewelry box based on a model that has dimensions 3 times the dimensions of the miniature box. If the miniature jewelry box has a volume of 1.5 cubic inches, what is the volume of the model?
A. 40.5 in.$^3$  
B. 13.5 in.$^3$  
C. 9 in.$^3$  
D. 4.5 in.$^3$
Mr. Patterson wants to reduce the dimensions of a closet by a scale factor of \( \frac{1}{3} \). If the volume of the closet is 2160 cubic feet, what will be the volume of the closet after Mr. Patterson remodels?

A. 80 ft\(^3\)  
B. 240 ft\(^3\)  
C. 270 ft\(^3\)  
D. 720 ft\(^3\)
Standards Summary

<table>
<thead>
<tr>
<th>TX TAKS 8</th>
<th>The student will demonstrate an understanding of the concepts and uses of measurement and similarity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX TEKS 8.8.A</td>
<td>find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models);</td>
</tr>
<tr>
<td>TX TEKS 8.8.B</td>
<td>connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects; and</td>
</tr>
<tr>
<td>TX TEKS 8.8.C</td>
<td>estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume.</td>
</tr>
<tr>
<td>TX TEKS 8.9.A</td>
<td>use the Pythagorean Theorem to solve real-life problems; and</td>
</tr>
<tr>
<td>TX TEKS 8.9.B</td>
<td>use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.</td>
</tr>
<tr>
<td>TX TEKS 8.10.A</td>
<td>describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally; and</td>
</tr>
<tr>
<td>TX TEKS 8.10.B</td>
<td>describe the resulting effect on volume when dimensions of a solid are changed proportionally.</td>
</tr>
</tbody>
</table>
1. At a wildlife sanctuary, \( \frac{5}{8} \) of the animals are birds, 0.25 are mammals, and the rest are reptiles. What percent of the animals are reptiles?
   A. 87.5%  
   B. 15.6%  
   C. 12.5%  
   D. 1.25%

2. A salsa recipe calls for \( 1 \frac{3}{4} \) cups of diced tomatoes. Luis wants to increase the recipe 2.5 times. How many cups of diced tomatoes will he need?
   A. \( 3 \frac{1}{2} \) c  
   B. \( 3 \frac{3}{4} \) c  
   C. \( 4 \frac{1}{4} \) c  
   D. \( 4 \frac{3}{8} \) c

3. A female Komodo dragon that weighs 67.5 kilograms can eat up to 54 kilograms of food in one meal. If a male Komodo dragon eats a proportional amount of food in one meal, how many kilograms of food can a 250 kilogram Komodo dragon eat?
   A. 312.5 kg  
   B. 200 kg  
   C. 162 kg  
   D. 145.8 kg

4. Mariah has 9.5 feet of ribbon. She sewed \( 2 \frac{3}{4} \) feet of ribbon around one panel of a skirt, and \( 5 \frac{3}{8} \) feet around a second panel. How many feet of ribbon does she have left?
   A. 1.375 ft  
   B. 6.875 ft  
   C. 16.375 ft  
   D. 17.625 ft

5. Ariel spent 15% of her allowance on school supplies and \( \frac{2}{5} \) on entertainment. What percent of her allowance is left?
   A. 40%  
   B. 45%  
   C. 55%  
   D. 60%
6. Evan planted an herb garden in a patch that measures $5 \frac{1}{2}$ feet by $6 \frac{1}{4}$ feet. Basil is planted in 40% of the garden. How many square feet of basil is planted? Express your answer as a decimal. Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

7. At a farm stand, 8 oranges cost $3.60. A customer bought 20 oranges. How much did the customer pay for the oranges?
   A. $4.05  
   B. $5.40  
   C. $9  
   D. $9.75

8. Juan typed a report in 1.25 hours. If he averaged 550 words per page and typed $5 \frac{1}{2}$ pages, about how many words did he type per minute?
   A. 40 words per minute  
   B. 44 words per minute  
   C. 50 words per minute  
   D. 80 words per minute

9. Julie hiked 3.5 miles in 45 minutes. If she hiked all of the miles at the same rate, about how far did she hike in 20 minutes?
   A. 0.7 mi  
   B. 1.17 mi  
   C. 1.6 mi  
   D. 1.75 mi
10. Twenty-eight percent of a seashell collection contains whelks. If 54 of the shells in the collection are not whelks, how many shells are in the collection? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
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<td>2</td>
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<td>9</td>
<td>9</td>
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<td>9</td>
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</tr>
</tbody>
</table>

___ 11. A tour company is offering a 25% discount on a Mississippi steam boat trip. If the usual price is $125, what is the price after the discount?
A. $31.25  
B. $93.75  
C. $100  
D. $156.25

___ 12. Shannon scored 39 points in a basketball game. If she scored 75% of her team’s points, how many points did the team score in the game?
A. 39 points  
B. 52 points  
C. 117 points  
D. 156 points

___ 13. The Buckleys bought a townhouse for $140,000. Five years later, they sold it for a profit of $21,000. By what percent did the value of their townhouse increase?
A. 13%  
B. 15%  
C. 21%  
D. 115%

___ 14. Twenty-four students in Ms. Watt’s English classes wrote an essay for extra credit. The number of students who wrote the essay represents 16% of the total students in Ms. Watt’s English classes. What is the total number of students in Ms. Watt’s classes?
A. 40 students  
B. 92 students  
C. 108 students  
D. 150 students
15. A membership discount club sells items at 3% over the wholesale price. A television at the club costs $450 wholesale. What will be the total cost if a customer also pays 6% sales tax on the club price of the television?
   A. $463.50  
   B. $477.00  
   C. $490.50  
   D. $491.31

16. A tagged dolphin swam 11 kilometers in 2.5 hours. If the dolphin continues to swim at the same rate, how long will it take to swim 17.6 kilometers?
   A. 4 hours  
   B. 6.6 hours  
   C. 7.04 hours  
   D. 16.5 hours

17. Courtney bakes a batch of 18 cookies in 25 minutes. If she continues to bake at the same rate, how many cookies can she bake in 3.25 hours?
   A. 42 cookies  
   B. 117 cookies  
   C. 140 cookies  
   D. 234 cookies

18. Angela spins the spinner twice. What is the probability that she spins the number 7 on the first pin and an even number on the second spin?
   A. $\frac{1}{16}$  
   B. $\frac{1}{14}$  
   C. $\frac{1}{8}$  
   D. $\frac{1}{2}$

19. A grab bag contains 3 basketball tickets, 4 football tickets, and 5 baseball tickets. After a ticket is randomly drawn from the bag, it is not replaced. What is the probability of drawing a football ticket and then another football ticket?
   A. $\frac{1}{11}$  
   B. $\frac{1}{9}$  
   C. $\frac{4}{11}$  
   D. $\frac{2}{3}$
20. Corey rolls a number cube, numbered 1 to 6, twice. What is the probability that he rolls two odd numbers?
A. 10%  
B. 25%  
C. 50%  
D. 75%

21. A container has 3 pink, 4 green, 6 yellow, and 3 red paper clips. After a paper clip is randomly drawn from the container, it is not replaced. What is the probability that a green paper clip is drawn and then a yellow paper clip?
A. \frac{1}{12}  
B. \frac{3}{32}  
C. \frac{1}{10}  
D. \frac{5}{8}

22. A box contains the letter tiles shown below. Leah chooses a letter at random and then replaces it. What is the probability of getting a vowel and then the letter D? Express your answer as a decimal. Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

R  O  D  E  O

23. A bin of exercise bands has 12 red bands, 8 yellow bands, and 5 blue bands. What is the probability that a physical therapist chooses a blue band at random, does not replace it, and then chooses a red band at random?
A. 1%  
B. 9.6%  
C. 10%  
D. 12%
24. At Bernard High School, 20% of the students walk to school. At the same school, 10% of the students are left-handed. What is the probability that a student chosen at random is left-handed and walks to school?
A. \( \frac{1}{50} \)  
B. \( \frac{1}{30} \)  
C. \( \frac{1}{20} \)  
D. \( \frac{1}{5} \)

25. A group of students agreed to circulate a petition to install a fruit vendor in the school cafeteria. Twelve of the students are freshmen, 6 are sophomores, 4 are juniors, and 3 are seniors. If a student is selected at random to collect all of the petitions, what is the probability that the student is not a junior or a senior?
A. 0.16  
B. 0.4  
C. 0.28  
D. 0.72

26. A toy factory randomly inspected 200 action figures and found 14 with defects. How many action figures can be predicted to have defects in a shipment of 5000 action figures?
A. 200  
B. 336  
C. 350  
D. 700

27. A random survey of 125 students at a high school showed that 15 students drive to school. If 650 students attend the high school, how many can be expected to drive to school? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.
28. A spinner is divided into 4 equal sections of red, gold, blue, and green. The table shows the number of times the spinner lands on each color. Based on the results, which predicts the number of times the spinner will land on gold after 120 spins?

<table>
<thead>
<tr>
<th>Color</th>
<th>Number of Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>3</td>
</tr>
<tr>
<td>Green</td>
<td>4</td>
</tr>
<tr>
<td>Gold</td>
<td>6</td>
</tr>
<tr>
<td>Red</td>
<td>3</td>
</tr>
</tbody>
</table>

A. 23  
B. 30  
C. 45  
D. 75

29. A random survey of 250 people showed that 80 people used online banking. Which best predicts how many people in a sample of 1000 will use online banking?

A. 250  
B. 320  
C. 640  
D. 800

30. Brooke scored the following points during a bowling competition: 124, 138, 110, 94, 120, 112, 100, 115. What is the probability that Brooke will score 120 or greater on the next game?

A. 25%  
B. 37.5%  
C. 50%  
D. 62.5%

31. A garden center conducted a random survey of its customers to find how many people use organic fertilizer on their lawns. Out of 200 people, 12 said that they buy organic fertilizer. If 500 customers buy fertilizer over the weekend, how many can be expected to buy organic fertilizers?

A. 80  
B. 72  
C. 30  
D. 12
32. Carlos is shopping for a sleeping bag for a camping trip. The prices of the sleeping bags he is comparing are shown below: $28 $52 $46 $34 $52 $45 $58. Which measure of the data does the $45 sleeping bag represent?
   A. Mean  
   B. Median  
   C. Mode  
   D. Range  

33. The number of passengers a bus picks up at each stop along a route is 14, 32, 11, 23, and 15. If the bus picks up 19 passengers at the next stop, which measure of central tendency or range will change?
   A. Mean  
   B. Median  
   C. Mode  
   D. Range  

34. The list below shows the ages of people who signed up for an aerobics class at the gym.
   18 24 19 22 64 23 45 52 28 36
   Which measure of the data will best help the instructor in planning exercises for all members in the class?
   A. Mean  
   B. Median  
   C. Mode  
   D. Range  

35. A manager at a theater complex gathered data on attendance at different types of movies. After analyzing the data, she concluded that the most popular type of movie is comedy. Which measure of the data did she most likely use to make her conclusion?
   A. Mean  
   B. Median  
   C. Mode  
   D. Range  

36. Rachel wants to know whether students at her school would prefer to work, go to camp, or take classes in the summer. Which measure of the data will tell Rachel which activity is most popular with students at her school?
   A. Mean  
   B. Median  
   C. Mode  
   D. Range
37. The chart shows the number of kilometers Lindsay rode on bicycle trips in the past month. 40 35 26 16 82 44 21 18 34 29 Which measure of central tendency is the most affected by the 82 kilometers she rode on one of those days?

<table>
<thead>
<tr>
<th>40 35 26 16 82</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 21 18 34 29</td>
</tr>
</tbody>
</table>

A. Mean       C. Mode
B. Median     D. Range

38. Daniel scored 12, 16, 12, 18, and 53 points in his last 5 basketball games. Which measure of the data gives the best indication of the number of points Daniel will score in a game?

A. Mean       C. Mode
B. Median     D. Range

39. The list below shows Lauren's biology test scores for this semester.

64 68 77 78 80 86 88 88 92 93

Which measure of Lauren's data could her teacher use for an overall assessment?

A. Mean       C. Mode
B. Median     D. Range
40. The table below shows the number of daily visitors at a cowboy museum. Which histogram correctly represents the data?

<table>
<thead>
<tr>
<th>Visitors</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>64</td>
</tr>
<tr>
<td>62</td>
<td>76</td>
</tr>
<tr>
<td>46</td>
<td>73</td>
</tr>
</tbody>
</table>

A. Histogram 1: 
B. Histogram 2: 
C. Histogram 3: 
D. Histogram 4:
41. The table shows the results of a survey that asked students how many clubs they joined. Which circle graph best represents the data?

<table>
<thead>
<tr>
<th>Number of Clubs</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>56</td>
</tr>
<tr>
<td>One</td>
<td>64</td>
</tr>
<tr>
<td>Two</td>
<td>32</td>
</tr>
<tr>
<td>Three or more</td>
<td>8</td>
</tr>
</tbody>
</table>

A. Graph 1:

- 5% Three or more
- 35% None
- 20% Two
- 40% One

B. Graph 2:

- 56% None
- 8% Three or more
- 32% Two
- 64% One

C. Graph 3:

- 5% Three or more
- 35% One
- 20% Two
- 40% None

D. Graph 4:

- 30% None
- 10% Three or more
- 20% Two
- 40% One

---

42. The circle graph shows the results of a survey of 300 students on popular pets. Which statement is an invalid conclusion of the data in the graph?

A. 150 students chose a cat or bird as the most popular pet.

B. 33 more students chose a dog over a cat as the most popular pet.

C. Less than 20% of the students chose a bird or reptile as the most popular pet.

D. 4 of the students chose a reptile as the most popular pet.
43. The table shows the type and number of book sales at a used book store last month. Based on these data, which of the following statements is true?

<table>
<thead>
<tr>
<th>Item Sold</th>
<th>Number Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books on CD</td>
<td>112</td>
</tr>
<tr>
<td>Comic book</td>
<td>128</td>
</tr>
<tr>
<td>Hardcover book</td>
<td>16</td>
</tr>
<tr>
<td>Paperback</td>
<td>64</td>
</tr>
</tbody>
</table>

A. Comic books were 40% of sales.  
B. Books on CD sold more than twice the number of paperbacks.  
C. Half as many paperbacks were sold as books on CD.  
D. Hardcover book sales were about \(\frac{1}{4}\) of comic book sales.

44. The table shows the amount Joel earned mowing lawns in four months. Which statement is supported by the information in the table?

<table>
<thead>
<tr>
<th>Month</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount ($)</td>
<td>38</td>
<td>56</td>
<td>86</td>
<td>120</td>
</tr>
</tbody>
</table>

A. Half of Joel's total earnings were in May and June.  
B. Joel earned about twice as much in August as he did in June.  
C. Less than 20% of Joel's earnings were in July.  
D. 38% of Joel's earnings were in May.
45. The histogram shows the number of hours per week students spend on homework. Which statement is supported by the data in the graph?

A. 45% of the students spend 10 to 14 hours per week on homework.

B. Fewer students spend 15 to 19 hours per week on homework than spend 0 to 4 hours on homework.

C. About 63% of the students spend 5 to 14 hours on homework each week.

D. About \(\frac{1}{4}\) of the students spends 0 to 4 hours per week on homework.
## Standards Summary

| TX TAKS 9 | The student will demonstrate an understanding of percents, proportional relationships, probability, and statistics in application problems. |
| TX TEKS 8.1.B | select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships; |
| TX TEKS 8.3.B | estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates. |
| TX TEKS 8.11.A | find the probabilities of dependent and independent events; |
| TX TEKS 8.11.B | use theoretical probabilities and experimental results to make predictions and decisions; and |
| TX TEKS 8.12.A | select the appropriate measure of central tendency or range to describe a set of data and justify the choice for a particular situation; |
| TX TEKS 8.12.C | select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology. |
| TX TEKS 8.13.B | recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis. |
1. The cost of a ticket to a minor league baseball game is $2 less than half the cost of a ticket to a professional league baseball game. If the cost of a ticket to a minor league baseball game is $7, which equation can be used to determine the cost of a ticket to a professional league baseball game?
   A. $0.5x - 2 = 7$
   B. $0.5(x - 2) = 7$
   C. $\frac{x - 2}{2} = 7$
   D. $\frac{x - 2}{0.5} = 7$

2. Mrs. James needs to reseed her lawn. The rectangular lawn measures 18 feet by 12 feet. Fescue seed costs $1.80 per pound and Bluegrass costs $3.20 per pound. Mrs. James wants to use a mixture of half fescue and half Bluegrass. What other information is needed to calculate the total cost of reseeding the lawn?
   A. The cost of half-pound bags of fescue and Bluegrass seed
   B. The cost of one pound of half fescue and half Bluegrass seed
   C. The total square feet of lawn
   D. The number of pounds of seed per square foot needed to reseed a lawn

3. A theater sold a median of 120 tickets for a 6 day run of performances. The list shows the number of tickets the theater sold on the first 5 days: 98, 121, 111, 142, 133. How many tickets could the theater have sold on the sixth day?
   A. 114 tickets
   B. 119 tickets
   C. 120 tickets
   D. 129 tickets

4. The diagram shows the path Brandon walks from his home to school to the car wash where he works part-time after school. To the nearest tenth of a mile, how far does he walk from school to the car wash?
   A. 1.5 mi
   B. 1.6 mi
   C. 1.7 mi
   D. 2.0 mi
___ 5. An outfitter charges $2.50 per person plus $8 per hour to rent canoes. Which equation represents the cost $C$ for 3 friends to rent a canoe for 4 hours?
A. $C = 3 \left[ 2.5 + (4)(8) \right]$  
B. $C = 4 \left[ 2.5 + (3)(8) \right]$  
C. $C = 3(2.5) + 4(8)$  
D. $C = 3(4) + 2.5(8)$

___ 6. A maple tree has a diameter of 15 centimeters. If the circumference of the tree grows at an average rate of 2.2 centimeters per year, what will be its circumference in 5 years? Use $3.14$ for $\pi$.
A. 58.1 cm  
B. 96.4 cm  
C. 105.2 cm  
D. 207.24 cm

___ 7. Cassandra bought $4 \frac{1}{2}$ pounds of peaches at the grocery store for $5.76$, not including tax. How much more will she pay for 6 pounds of peaches?
A. $9.60$  
B. $7.68$  
C. $3.84$  
D. $1.92$

8. A rectangular prism is dilated by a scale factor of 0.5. If the dimensions are 3 inches by 4 inches by 8 inches, by what percent does its volume decrease? Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.
9th Grade Mathematics
TAKS Objective 10

9. Jeffrey borrowed $450 from his father to pay for a surfboard. The table shows his payments for the past 3 months. If he makes the remaining monthly payments in equal installments, and the last payment in July, what will be the monthly payment?

<table>
<thead>
<tr>
<th>Month</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$75</td>
</tr>
<tr>
<td>February</td>
<td>$40</td>
</tr>
<tr>
<td>March</td>
<td>$65</td>
</tr>
</tbody>
</table>

A. $90  
B. $67.50  
C. $54  
D. $45

10. A cylindrical canteen has a diameter of 14 inches and a height of 2 inches. Natalie completely fills the canteen before a hike in the desert. If the canteen weighs 1.2 pounds when empty, and water weighs about 0.036 pounds per cubic inch, what is the approximate weight of the canteen when it is filled with water? Use 3.14 for π.

A. 11.1 lb  
B. 12.3 lb  
C. 14.2 lb  
D. 15.4 lb

11. Vincent bought 4 DVDs at an online store for $15 each. He paid tax on the order plus an additional $6.95 for shipping. If his total bill was $71.45, what percent tax did he pay on his order?

A. 1.075%  
B. 1.75%  
C. 1.79%  
D. 7.5%

12. Paige earned $378 walking dogs and pet sitting. She charges $6 to walk dogs and $9 per hour to pet sit. If she has spent 26 hours pet sitting, how many times has she walked dogs?

A. 24  
B. 26  
C. 42  
D. 63
13. Molly calculated that it would take 12 hours and 21 minutes to drive to Carlsbad Caverns at an average rate of 60 miles per hour. It actually took her 14 hours and 15 minutes to get to Carlsbad Caverns. What is the difference between 60 miles per hour and Molly's actual speed?
A. 1.9 miles/hour  
B. 8 miles/hour  
C. 12 miles/hour  
D. 52 miles/hour

14. A horse ranch has palominos, paints, and mustangs. Palominos make up 30% of the herd. If there are 12 palominos at the ranch, how many horses are not palominos?

Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

```
 0 0 0 0 0 0 0 0
 1 1 1 1 1 1 1 1
 2 2 2 2 2 2 2 2
 3 3 3 3 3 3 3 3
 4 4 4 4 4 4 4 4
 5 5 5 5 5 5 5 5
 6 6 6 6 6 6 6 6
 7 7 7 7 7 7 7 7
 8 8 8 8 8 8 8 8
 9 9 9 9 9 9 9 9
```

15. Mr. Billings passed out beakers and test tubes to lab partners in his chemistry class. The available beakers were distributed evenly among the pairs with none left over. The available test tubes also were distributed evenly with none left over. If Mr. Billings passed out 48 beakers and 72 test tubes, what is the greatest number of pairs of students he could have in his chemistry class?
A. 48  
B. 24  
C. 12  
D. 6

16. Abigail belongs to a chess club at her high school. In the club's annual competition, she is one of 5 remaining contestants. Each contestant will play each of the other contestants twice. How many games will be played in the competition?
A. 10  
B. 15  
C. 20  
D. 40
17. At a 26 mile marathon for local charities, $\frac{1}{8}$ of those who had signed up for the event could not attend for personal reasons. An additional 30% of the participants dropped out before running the full 26 miles. If 138 participants finished the marathon, how many people originally signed up for the marathon?

A. 270  
B. 260  
C. 240  
D. 210

18. A restaurant manager pushed together 3 rectangular tables to seat a large party. Each rectangular table can seat two people on each side and one person on each end. What is the greatest number of people that can be seated at the long table formed by pushing together 3 tables?

A. 12  
B. 14  
C. 16  
D. 18

19. A football stadium hires concession stand workers depending on the number of tickets it sells for a game. When the stadium sold 150 tickets, it hired 6 workers. When it sold 225 tickets, it hired 9 workers. How many workers will the stadium hire if it sells 375 tickets?

A. 12  
B. 15  
C. 18  
D. 21

20. A culture of cells doubles every day. If there are 64 cells at the end of Day 4, how many cells were in the culture at the end of Day 0?

A. 4  
B. 6  
C. 8  
D. 12
21. The graph below represents which of the following situations?

A. car travels 20 miles every hour.  
B. A sea lion swims 5 kilometers in 20 minutes.  
C. Kayak rentals are $20 for every 5 hours.  
D. A sports clinic charges $20 plus $5 per hour.

22. The equation \( C = 3.50 + 2(x - 1) \) represents the cost of sending faxes. Which statement best describes the cost for a fax?

A. The first page costs $3.50 to fax and each additional page costs $2.00.  
B. It costs $3.50 to use the equipment and $2.00 to fax each page.  
C. The first page costs $3.50 to fax, additional pages cost $2.00, and one page is discounted.  
D. It costs $5.50 per page to send a fax with a discount of $2.00.

23. Cylinder A is 9 inches high with a radius of 2 inches. Cylinder B is 4.5 inches high with a radius of 4 inches. Which best describes the relationship of the volumes of the cylinders?

A. Cylinder A has half the volume of B.  
B. Cylinder B has half the volume of A.  
C. The volumes of the cylinders are the same.  
D. The ratio of the volumes of the cylinders cannot be determined.
24. Which statement best describes the relationship between students and pencils shown in the table below?

<table>
<thead>
<tr>
<th>Students</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencils</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

A. There are 3 pencils for every 5 students.
B. There are 5 pencils for every 3 students.
C. There are 3 pencils for every student.
D. There are 5 pencils for every student.

25. William is customizing a website. He has a choice of 14 different colors, 12 different fonts, and 4 different designs. What is the best method for finding how many different combinations of colors, fonts, and designs he can choose?

A. Add the number of choices for colors, fonts, and designs.
B. Add the number of choices for colors, fonts, and designs, and then multiply by 3.
C. Multiply the number of choices for colors, the number of choices for fonts, and the number of choices for designs.
D. Make 6 lists of choices for the six pairs of categories. Then count the number of combinations on the lists.

26. Chelsea is making a candle. Which best describes the amount of liquid wax she will pour into the cylindrical mold?

A. Area
B. Circumference
C. Surface area
D. Volume
27. A fractal tree is shown below. Which is the next tree in the pattern?

A. Tree 1:  
B. Tree 2:  
C. Tree 3:  
D. Tree 4:

28. What is the next number in the pattern 3, 7, 19, 55?

A. 59  
B. 111  
C. 163  
D. 215

29. A series of transformations are shown on the same coordinate grid. Which transformation is next in the pattern?

A. Translation 2 units up  
B. 90° counterclockwise rotation  
C. Reflection in the x-axis  
D. Reflection in the y-axis
30. Morgan inherited an account in which the initial investment doubled every 14 years. The initial investment was $8,000. What will be the value of the account after 70 years?
   A. $128,000        C. $256,000
   B. $224,000        D. $512,000

31. A series of equations are graphed on the same coordinate grid. Which equation would be graphed next?
   A. $y = 3x + 10$
   B. $y = 3x + 12$
   C. $y = 4x + 12$
   D. $y = 4x + 16$

32. James has been increasing the minutes he runs each day in preparation for a marathon. If he continues to increase the time he runs at the same rate, how many minutes will he run on Day 10?
   A. 70 min
   B. 80 min
   C. 82 min
   D. 100 min

33. Which property justifies Step 2?
   Step 1: $2(x + 4) - 3 = 21$
   Step 2: $2x + 8 - 3 = 21$
   Step 3: $2x + 5 = 21$
   Step 4: $2x = 16$
   Step 5: $x = 8$
   A. Associative property of addition
   B. Commutative property of addition
   C. Distributive property
   D. Identity property of addition
34. Which is a valid conclusion?

A. All integers are whole numbers.
B. All rational numbers are integers.
C. All whole numbers are natural numbers.
D. All whole numbers are integers.

35. Which of the following is a valid statement about angles in a right triangle?

A. The sum of the measures of the angles is 180°, so one angle is obtuse.
B. Since one of the angles is right, the two other angles can be acute or obtuse.
C. The sum of the measures of the angles is 180°, so the two angles can both be obtuse.
D. The sum of the measures of the two angles has to be 90°, so they both must be acute.

36. Given the diagram below, why is it valid to conclude that $x = 110$?

A. The sum of the measures of supplementary angles is 180°.
B. The sum of the measures of complementary angles is 180°.
C. The sum of the measures of adjacent angles is 180°.
D. The sum of the measures of vertical angles is 180°

37. The Pythagorean Theorem states that $a^2 + b^2 = c^2$. Which of the following side lengths form a right triangle?

A. 12, 35, 37
B. 7, 12, 13
C. 8, 14, 16
D. 3, 6, 8
38. Lines \( a \) and \( b \) in the diagram below are parallel. They are cut by the transversal \( s \). Which statement is a valid conclusion?

A. \( m < 1 = m < 2 \)  
B. \( m < 2 + m < 4 = 180^\circ \)  
C. \( m < 5 = m < 7 \)  
D. \( m < 3 + m < 7 = 180^\circ \)
| TX TAKS 10 | The student will demonstrate an understanding of the mathematical processes and tools used in problem solving. |
| TX TEKS 8.14.A | identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics; |
| TX TEKS 8.14.B | use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness; |
| TX TEKS 8.14.C | select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and |
| TX TEKS 8.15.A | communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and |
| TX TEKS 8.16.A | make conjectures from patterns or sets of examples and nonexamples; and |
| TX TEKS 8.16.B | validate his/her conclusions using mathematical properties and relationships. |