Read the instructions below.

You may use any space in this book for rough work.
The diagrams in these booklets are not all drawn to scale.

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Like this: ●
Not like this: ✗ ✓ ⚫ ○

Cleanly erase your answer if you wish to change it and fill in the circle for your new answer.

Fill in only one circle for each question.

<table>
<thead>
<tr>
<th></th>
<th>a</th>
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<th>c</th>
<th>d</th>
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<tr>
<td>1</td>
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<td>19</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
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<tr>
<td>6</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>20</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
<tr>
<td>7</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>21</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
<tr>
<td>8</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>22</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>
1. Which is a simplified form of this expression?

\[ \frac{x^8(x^6)}{x^4} = \frac{x^{14}}{x^4} = x^{10} \]

- a. \( x^8 \)
- b. \( x^{10} \)
- c. \( x^{12} \)
- d. \( x^{18} \)

2. The cylinder pictured below has a volume of 500 cm\(^3\) and a height of 10 cm.

Which of the following represents the radius of the cylinder, \( r \), in centimetres?

- a. \( \sqrt{\frac{50}{\pi}} \)
- b. \( \frac{\sqrt{50}}{\pi} \)
- c. \( \frac{50}{\pi} \)
- d. \( \frac{50}{2\pi} \)
Multiple-Choice

3. Which of the following is a simplified form of \((-2m + 3) - (5m - 6)\)?
   a. \(3m - 3\)
   b. \(3m + 9\)
   c. \(-7m - 3\)
   d. \(-7m + 9\)

4. The equation below can be used to convert between temperatures in degrees Celsius, \(C\), and temperatures in degrees Fahrenheit, \(F\):
   \[\frac{C}{5} = \frac{F - 32}{9}\]

   Which correctly completes the statement?
   If the temperature in degrees Celsius is 15, the temperature in degrees Fahrenheit is
   a. less than 0.
   b. greater than 60.
   c. between 20 and 40.
   d. between 40 and 60.

5. A pot of hot soup is placed in a refrigerator to cool. Information about the temperature of the soup at five different times is shown.

   Which statement below is true based on the overall trend in the data?
   a. At 90 minutes, the temperature of the soup will be 0 °C. \(\times\)
   b. The temperature of the soup decreases at a constant rate. \(\times\)
   c. It takes approximately 18 minutes for the soup to cool to half its original temperature.
   d. There is a greater decrease in temperature between 50 and 80 minutes than between 10 and 30 minutes. \(\times\)
The total cost for an extra large pizza at a restaurant is $14.50, plus $1.25 for each topping.

Which of the following equations represents the relationship between the total cost, \( C \), in dollars, and the number of toppings, \( n \)?

a) \( C = 1.25n \)

b) \( C = 15.75n \)

c) \( C = 1.25n + 14.50 \)

d) \( C = 14.50n + 1.25 \)

One of the following tables shows information about a linear relationship.

Using first differences, select this table.

a)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>9</td>
</tr>
<tr>
<td>-2</td>
<td>6</td>
</tr>
<tr>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

b)

<table>
<thead>
<tr>
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<th>( y )</th>
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</thead>
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</tr>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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</tr>
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<td>3</td>
</tr>
</tbody>
</table>

C)

<table>
<thead>
<tr>
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<th>( y )</th>
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</thead>
<tbody>
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<td>0</td>
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<tr>
<td>3</td>
<td>-2</td>
</tr>
<tr>
<td>4</td>
<td>-4</td>
</tr>
<tr>
<td>5</td>
<td>-6</td>
</tr>
</tbody>
</table>

D)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>10</td>
</tr>
<tr>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
</tbody>
</table>
Raven starts 6 m away from a motion detector. She walks quickly toward it, stops 2 m from the detector for a moment and then backs away from it slowly.

Which of the following graphs could represent the relationship between her distance from the detector, \( D \), and time \( t \), in seconds?
1 Walking Around the Park

A park in the shape of a rectangle is pictured with algebraic expressions representing its length and width, in metres.

The perimeter of the park, \( P \), can be determined using the equation

\[
P = 2l + 2w.
\]

Determine an equation to represent the perimeter of the park using the given sides

\[
P = 2(5x) + 2(3x+7)
\]

The perimeter of the park is 350 m.

Determine the length of the park. Show your work.

\[
\begin{align*}
350 &= 16x + 14 \\
350 - 14 &= 16x \\
336 &= 16x \\
\frac{336}{16} &= x \\
x &= 21
\end{align*}
\]

The length of the park is \( 105 \) m.
**Fabric Purchase**

Two companies sell fabric online. The total cost, $C$, in dollars, for $n$ metres of fabric for each company is given below.

- Fabric Fun: $C = 4.25n + 3.00$
- Sew-a-Lot: $C = 6.50n$

Complete the chart below by determining the initial value, rate of change and type of variation for the relationship for each company.

Justify the type of variation you have selected.

<table>
<thead>
<tr>
<th>Fabric Fun</th>
<th>Sew-a-Lot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial value:</strong> $$3.00</td>
<td><strong>Initial value:</strong> $$0</td>
</tr>
<tr>
<td><strong>Rate of change:</strong> $$4.25/\text{m}$</td>
<td><strong>Rate of change:</strong> $$6.50/\text{m}$</td>
</tr>
<tr>
<td><strong>Type of variation</strong></td>
<td><strong>Type of variation</strong></td>
</tr>
<tr>
<td>Circle one:</td>
<td>Circle one:</td>
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<tr>
<td>Partial</td>
<td>Partial</td>
</tr>
<tr>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td><strong>Justification</strong></td>
<td><strong>Justification</strong></td>
</tr>
<tr>
<td>- For zero metres of fabric, cost will be $$3.00</td>
<td>- For zero metres of fabric, cost is $$0</td>
</tr>
</tbody>
</table>
What's the New Price?

This graph shows information about last year's total cost for a banquet for \( n \) students.

Total Cost vs. Number of Students

This year the cost per person has decreased by $5, but the initial fee has doubled.

Determine an equation to represent total cost, \( C \), for this year.

\[
C = 11n + 1200
\]

Show your work.

Describe two ways the graph for total cost for this year will be different from the graph for total cost for last year.

Justify your answer.

- \( \text{y-int (initial value) will be higher} \rightarrow 1200 \)
- \( \text{rate (or slope) is lower, therefore line less steep} \)
Open-Response

12 Draining Away

Water drains out of two different containers at constant rates. Information about the volume of water in the containers over time is given below.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Volume (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

Out of which container is the water draining at a faster rate?

Circle one:  Container A  Container B

Justify your answer.

\[ \text{Container A:} \quad \text{rate:} \quad \frac{60 - 35}{0 - 2} = \frac{25}{-2} = -12.5 \\text{L/min} \]

\[ \text{Container B:} \quad \text{rate:} \quad \frac{-22}{2} = -11 \\text{L/min} \]

Water draining at faster rate from  Container A.
Related Relations

A new line

* is perpendicular to the line represented by $3x - y = 5$ and
* has the same $y$-intercept as the line represented by $4x - 3y - 12 = 0$.

Determine the equation of the new line.

Justify your answer.

$$3x - y = 5$$

$$3x - 5 = y$$

The perpendicular line has $m = -\frac{1}{3}$

$$4x - 3y - 12 = 0$$

$$-3y = -4x + 12$$

$$y = \frac{4}{3}x - 4$$ ← same $y$-int $= -4$

The equation of the new line is $y = -\frac{4}{3}x - 4$.
Don't Let It Melt!

A model of an ice cream cone made up of a cone and a hemisphere is pictured below.

The total surface area of the model will be painted at a cost of $0.0035/cm^2. Determine the total cost of painting the model.

Show your work.

\[
SA = \pi rl + \frac{4\pi r^2}{2}
\]

\[
= 3.14(6)(25) + \frac{(3.14)(6^2)}{2}
\]

\[
= 471 + 226.08
\]

\[
SA = 697.08\text{ cm}^2
\]

Cost: \[
697.08 \times 0.0035 = \$2.44
\]
16 What are the slope and the $y$-intercept of the line represented by $3x - 2y + 6 = 0$?

a) $\frac{3}{2}, 3$

b) $\frac{3}{2}, 6$

c) $\frac{2}{3}, 2$

d) $\frac{2}{3}, 3$

16 A line is shown on the grid below.

Which of the following equations represents a line that is perpendicular to the line on the grid?

a) $y = -2x - 4$

b) $y = 2x + 4$

c) $y = -\frac{1}{2}x - 4$

d) $y = \frac{1}{2}x + 4$
17. The relationship between the total cost, $C$, of holding a dance and the number of guests, $n$, is represented by the equation $C = 25 + 15n$.

Due to fire codes, the number of guests cannot exceed 150.

What are all the possible values of the total cost for this situation?

The total cost can range from

- $25 to $275.
- $25 to $3765.
- $275 to $275.
- $275 to $3765.

18. The total cost for T-shirts at Team Tops is made up of a set-up fee and a charge for each T-shirt as represented by the graph.

Super Shirts has no set-up fee but charges twice as much for each T-shirt as Team Tops.

Which of the following statements is true?

- a. It is always cheaper to order from Super Shirts. ✗
- b. It is the same price to order 150 T-shirts from either company. ✗
- c. It is cheaper to order 10 T-shirts from Team Tops than from Super Shirts. ✗
- d. It is more expensive to order 20 T-shirts from Super Shirts than from Team Tops. ✗
Multiple-Choice

The rectangular prism pictured below has a volume of 216 cm³.

Which of the following lengths produces the prism with the smallest height?

- a) 3 cm
- b) 6 cm
- c) 12 cm
- d) 18 cm

\[ V = \ell \times w \times h \]

216 =

20. Which equation correctly uses the Pythagorean theorem to determine the value of \( x \) in the diagram?

\[ x = \sqrt{2 + 0.25} \]

\[ x = \sqrt{2} - 0.25 \]

\[ x = \sqrt{2}^2 + 0.25^2 \]

\[ x = \sqrt{2}^2 - 0.25^2 \]
21. Paper is used to make a popcorn container in the shape of an open-topped cylinder, as pictured.

Which of the following calculations would correctly determine the least amount of paper required to make the container?

a. $\pi r^2 (22)$

b. $\pi (2x)^2 (22)$

c. $\pi r^2 + 2\pi (9)(22)$

d. $\pi (3x)^2 + 2\pi (18)(22)$

22. Four streets are pictured.

What is the value of $x$?

a. $60^\circ$  \hspace{1cm} \@ = 360 - (110 + 90 + 60)

b. $80^\circ$  \hspace{1cm} = 360 - 260

c. $100^\circ$  \hspace{1cm} = 100^\circ

d. $110^\circ$

\[ \therefore x = 180 - 100 = 80^\circ \]
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1  a b c d  15  a b c d
2  a b c d  16  a b c d
3  a b c d  17  a b c d
4  a b c d  18  a b c d
5  a b c d  19  a b c d
6  a b c d  20  a b c d
7  a b c d  21  a b c d
8  a b c d  22  a b c d
1. A ball is dropped from a height of 25 m. The ball's height, $H$, in metres, after $n$ bounces is represented by the equation below.

$$H = 25 \left( \frac{1}{2} \right)^n$$

What is the height of the ball after 4 bounces?

a. $\frac{25}{16} \text{ m}$  
b. $\frac{25}{8} \text{ m}$  
c. $\frac{25}{4} \text{ m}$  
d. $\frac{25}{2} \text{ m}$

2. A cube with a given side length is pictured below.

Which algebraic expression represents the area of one face of the cube?

a. $2x$  
b. $4x$  
c. $x^2$  
d. $x^3$

3. A school is planning a car wash to raise $600.

- There will be 8 teams.
- Each team will wash 2 cars per hour.
- The car wash will last 5 $\frac{1}{2}$ hours.
- Each team will take two 15-minute breaks.

How much should the school charge per car to raise exactly $600?

a. $15.00$  
b. $7.50$  
c. $6.82$  
d. $6.25$

4. Which of the following is equivalent to $3(5x - 1) - 2(3x + 5)$?

a. $9x - 13$  
b. $9x + 4$  
c. $21x - 13$  
d. $21x + 4$
5. Information about the relationship between the height of a plant and time is shown on the grid below.

Which table of values shows only information about this relationship?

a. Number of weeks | Height (cm)
<table>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
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<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

b. Number of weeks | Height (cm)
<table>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

c. Number of weeks | Height (cm)
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<th></th>
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<td>1</td>
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<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

d. Number of weeks | Height (cm)
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<th></th>
</tr>
</thead>
<tbody>
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<td>2</td>
<td>1</td>
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<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
Two golf courses offer student memberships. Information about the linear relationships between the total cost, $C$, in dollars, and the number of games played, $n$, at these two golf courses is given below.

**First Golf Course**

![Graph showing the relationship between total cost and number of games for the first golf course.]

<table>
<thead>
<tr>
<th>Number of games, $n$</th>
<th>Total cost, $C$ (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
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<tr>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>70</td>
</tr>
</tbody>
</table>

**Second Golf Course**

![Graph showing the relationship between total cost and number of games for the second golf course.]

<table>
<thead>
<tr>
<th>Number of games, $n$</th>
<th>Total cost, $C$ (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>4</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>153</td>
</tr>
<tr>
<td>6</td>
<td>204</td>
</tr>
</tbody>
</table>

7. The graph below represents Joe's distance from a wall as he walks.

![Graph showing distance from wall vs. time.]

Which statement could describe Joe's walk?

a. Joe walks toward the wall, stands still and then walks away from the wall.

b. Joe walks away from the wall, stands still and then walks toward the wall.

c. Joe walks toward the wall, stands still and then continues to walk toward the wall.

d. Joe walks away from the wall, stands still and then continues to walk away from the wall.

Which of the following statements correctly describes the two relationships?

a. They are both direct variations. $\times$

b. The first is a direct variation, and the second is a partial variation with an initial value of $17$. $\times$

c. The first is a partial variation with an initial value of $10$, and the second is a direct variation.

d. The first is a partial variation with an initial value of $10$, and the second is a partial variation with an initial value of $17$. $\times$
Consider the graph below.

Which of the following is an equation representing this graph?

a. \( P = \frac{2}{3}n + 6 \)

b. \( P = \frac{1}{2}n + 6 \)

c. \( P = -2n + 6 \)

d. \( P = -\frac{2}{3}n + 6 \)
Floored Areas

The diagram of the floor shown below has algebraic expressions for the lengths of its sides, in metres.

\[4x - 3\]
\[7x\]
\[3x - 3\]
\[5x\]
\[2x\]

Determine an unsimplified expression for the total area of the floor, \(A\), in \(m^2\).

\[A = 7x(3x - 3) + 5x(x)\]

Simplify your expression fully. Show your work.

\[A = 21x^2 - 21x + 5x^2\]

\[\boxed{A = 26x^2 - 21x}\]
Folding Time

A piece of paper is folded in half, which results in two layers of paper. Then the paper is folded in half again to make four layers, and so on.

The number of layers and the number of folds are recorded in the chart.

<table>
<thead>
<tr>
<th>Number of folds</th>
<th>Number of layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Determine whether this relationship is linear or non-linear.
Circle one: Linear  Non-linear

Justify your answer.
You have the option of using the grid if you wish.
- non-linear as first differences are not the same
- graphically, data is non-linear
Two golf courses offer student memberships. Information about the linear relationships between the total cost, $C$, in dollars, and the number of games played, $n$, at these two golf courses is given below.

**First Golf Course**

![Graph of First Golf Course]

**Second Golf Course**

<table>
<thead>
<tr>
<th>Number of games, $n$</th>
<th>Total cost, $C$ ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>5</td>
<td>85</td>
</tr>
<tr>
<td>9</td>
<td>153</td>
</tr>
<tr>
<td>12</td>
<td>204</td>
</tr>
</tbody>
</table>

Which of the following statements correctly describes the two relationships?

- **a** They are both direct variations.
- **b** The first is a direct variation, and the second is a partial variation with an initial value of $17$.
- **c** The first is a partial variation with an initial value of $10$, and the second is a direct variation.
- **d** The first is a partial variation with an initial value of $10$, and the second is a partial variation with an initial value of $17$.

**7** The graph below represents Joe’s distance from a wall as he walks.

![Distance From Wall vs. Time Graph]

Which statement could describe Joe’s walk?

- **a** Joe walks toward the wall, stands still and then walks away from the wall.
- **b** Joe walks away from the wall, stands still and then walks toward the wall.
- **c** Joe walks toward the wall, stands still and then continues to walk toward the wall.
- **d** Joe walks away from the wall, stands still and then continues to walk away from the wall.
Multiple-Choice

Consider the graph below.

Which of the following is an equation representing this graph?

a) \( P = 2n + 6 \)

b) \( P = \frac{3}{2}n + 6 \)

c) \( P = -2n + 6 \)

d) \( P = \frac{1}{2}n + 6 \)
Floored Areas

The diagram of the floor shown below has algebraic expressions for the lengths of its sides, in metres.

\[ A = 7x(3x-3) + 5x(x) \]

Determine an unsimplified expression for the total area of the floor, \( A \), in m².

Simplify your expression fully. Show your work.

\[ A = 21x^2 - 21x + 5x^2 \]

\[ \sqrt{A} = 26x^2 - 21x \]
10 Folding Time

A piece of paper is folded in half, which results in two layers of paper. Then the paper is folded in half again to make four layers, and so on.

The number of layers and the number of folds are recorded in the chart.

<table>
<thead>
<tr>
<th>Number of folds</th>
<th>Number of layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Determine whether this relationship is linear or non-linear.

Circle one: Linear Non-linear

Justify your answer.

You have the option of using the grid if you wish.

- Non-linear as first differences are not the same.
- Graphically, data is non-linear.
Theatre Programs

A company charges schools to print programs for school plays. Information about the linear relationship between the total cost and number of programs printed is shown below.

\[
350 \times 0.20 = 70
\]

\[
220 - 70 = 150
\]

\[
\frac{30}{150} = 0.2
\]

Determine an equation to represent this relationship.

\[
C = 0.20n + 150
\]

Show your work.

You have the option of using the grid if you wish.
Standard Lines

Two lines are represented by the equations below.

Line 1: \( x - 2y + 6 = 0 \)  
Line 2: \( 3x + 6y - 18 = 0 \)

Determine which line could be represented by \( y = \frac{1}{2}x + 3 \).

Circle one: \( \text{Line 1} \quad \text{Both} \quad \text{Line 2} \)

Justify your answer. Include information for both Line 1 and Line 2.

1. \( x - 2y + 6 = 0 \)
   \[-2y = -x - 6 \]
   \[y = \frac{1}{2}x + 3 \]

2. \( 3x + 6y - 18 = 0 \)
   \[6y = -3x + 18 \]
   \[y = -\frac{1}{2}x + 3 \]

Line 1 has a slope of \( \frac{1}{2} \) (not \( \frac{1}{2} \))
Terrific Ts

A school orders T-shirts from Terrific Ts. The total cost is made up of a set-up fee of $115 and a cost of $3 per T-shirt.

Terrific Ts requires a minimum order of 25 T-shirts. The school can spend a maximum of $800.

Determine all the possible values of the total cost, $C$, and the number of T-shirts, $n$, for this situation.

Show your work.

\[
C = 3t + 115
\]

\[
800 = 3t + 115
\]

\[
685 = 3t
\]

\[
228.3 = t
\]

The possible values of $n$ in this situation are $25 - 228$.

\[
\text{min. order 25:}
\]

\[
C = 3(25) + 115
\]

\[
= 75 + 115
\]

\[
= 190
\]

The possible values of $C$ in this situation are $\$190 - \$799$.
**Six and Five Sides**

A regular hexagon and a regular pentagon are joined as shown below.

![Diagram of a hexagon and a pentagon joined at a point, with angles and calculations shown.]

- **Sum of interior angles**
  - \(180(n-2)\)
  - \(180(5-2)\)
  - \(180(3)\)
  - \(520^\circ\)
  - \(520 \div 5 = 104^\circ\)

Complete the table below with the values of \(x\) and \(y\). Justify your answer using geometric properties.

<table>
<thead>
<tr>
<th>Value</th>
<th>Justification using geometric properties</th>
</tr>
</thead>
</table>
| \(x = 120^\circ\) | \(180(n-2) = 180(6-2)\)  
\(= 180(4)\)  
\(= 720^\circ\)  
\(720 \div 6 = 120^\circ\) |
| \(y = 136^\circ\) | \(360 - 120 - 104 = 136^\circ\)  
\(\text{int. angle hexagon} \quad \text{int. angle pentagon}\)  
\(\text{Total: } 360^\circ\) |
Information about four different linear relationships between $C$ and $n$ is shown below.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | 2 | 3 | 4 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

How many of the linear relationships have a rate of change of 5?

a. 4
b. 3
c. 2
d. 1

1. \[ \frac{40}{8} = 5 \]
2. \[ \frac{10}{2} = 5 \times \]
3. \[ \frac{\text{rise}}{\text{run}} = \frac{5}{2} = 2.5 \times \]
4. \[ \text{rate} = \text{O} \times \]
Which graph shows a line that is perpendicular to the line $y = \frac{4}{3}x - 4$?

$m = \frac{4}{3}$

**a**

**b**

**c**

**d**

Slope of perpendicular line $= -\frac{3}{4}$
1. What is an equation of the line
   • perpendicular to the line represented by
     \[ y = -\frac{3}{2}x + 1 \] and \[ M = \frac{2}{3} \]
   • with the same y-intercept as the line represented by \[ y = 7 + 5x? \]
   \[ b = 7 \]
   a) \[ y = \frac{2}{3}x + 7 \]
   b) \[ y = \frac{2}{3}x + 5 \]
   c) \[ y = -\frac{2}{3}x + 7 \]
   d) \[ y = -\frac{2}{3}x + 5 \]

18. The total cost to repair a fridge, \( C \), in dollars, can be represented by the equation \( C = 60t + 30 \), where \( t \) is the repair time in hours.
Which of the following statements is true about this relationship?
   a) The hourly rate is $90. \times$
   b) The fixed fee is $90. \times$
   c) The hourly rate is $60, and the fixed fee is $30.
   d) The hourly rate is $30, and the fixed fee is $60.

19. What is the area of the shape represented below?

   \[ A = \frac{b \times h}{2} \]
   \[ A_{\text{large}} = \frac{14 \times 20}{2} = 140 \text{ cm}^2 \]
   \[ A_{\text{small}} = \frac{14 \times 8}{2} = 56 \text{ cm}^2 \]
   \[ A = 140 - 56 \]
   \[ A = 84 \text{ cm}^2 \]
20. This diagram shows a greenhouse that is built in the shape of a half-cylinder.

\[ h = 20 \text{ m}, \quad r = 80 \text{ m} \]

Material to cover the roof costs $3/m². The shaded ends will not be covered. Which is closest to the cost of covering the roof?

- a $7540
- b $12,570
- c $15,080
- d $37,700

21. A cone is pictured below.

\[ s^2 = s^2 + l^2 \]
\[ s^2 = 25 + 14^2 \]
\[ s^2 = 625 + 196 \]
\[ s = \sqrt{821} = 28.7 \text{(cm)} \]

\[ SA = \pi r^2 + \pi rl \]
\[ = 3.14(5^2) + 3.14(5)(28.7) \]
\[ = 78.5 + 204.1 \]
\[ SA = 282.6 \text{ cm}^2 \]

Hint:
Use Pythagorean theorem as part of your process.

Which of the following is closest to the surface area of the cone?

- a 267 cm²
- b 283 cm²
- c 691 cm²
- d 723 cm²

Cost = 2512 × 3
= $7536
Multiple-Choice

Which of the following composite shapes has 900° as the sum of its interior angles?

a  \[ \begin{align*}
\text{210°} \\
\text{360°}
\end{align*} \]

b  \[ \begin{align*}
\text{210°} \\
\text{90°}
\end{align*} \]

c  \[ \begin{align*}
\text{360°}
\end{align*} \]

d  \[ \begin{align*}
\text{180(7-2)} \\
\text{= 180(5)} \\
\text{= 900°}
\end{align*} \]