1. What is the value of this expression when $x = -5$ and $y = -3$?

$$\frac{2}{3}x^3y^2$$

- $a. -750$
- $b. -60$
- $c. 60$
- $d. 750$

$$\frac{2}{3}(-5)^3(-3)^2$$
$$= \frac{2}{3}(-125)(9)$$
$$= \frac{2}{3}(-125)(9)$$
$$= \frac{2}{3}(-125)(9)$$
$$= -750$$

2. Cereal comes in two different-sized boxes.
- Box A costs $5.25 for 250 g.
- Box B costs $4.50 for 375 g.

Which box is cheaper per gram, and how much cheaper per gram is it?

- $a. Box B, $0.009 per gram$
- $b. Box B, $0.75 per gram$
- $c. Box A, $0.033 per gram$
- $d. Box A, $35.71 per gram$

3. Which of these expressions is equivalent to $3x - 4y - (-5x + y)$?

- $a. 8x - 5y$
- $b. 8x - 3y$
- $c. -2x - 5y$
- $d. -2x - 3y$

$$3x - 4y + 5x - 1y$$
$$= 8x - 5y$$

$$\frac{5.25}{250g} = \frac{0.021}{19}$$
$$\frac{4.50}{375g} = \frac{0.012}{19}$$

$0.021 - 0.012 = 0.009$

Box A
4. Information from linear relationships are shown in three of the tables below.

One table shows information from a non-linear relationship.

Use first differences to determine which option shows information from a non-linear relationship.

<table>
<thead>
<tr>
<th>q</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
</tbody>
</table>

5. A scatter plot with a line of best fit is shown below.

What is the equation of the line of best fit?

- \( A = 10 - 3t \)
- \( A = 30 - 3t \)
- \( A = 10 + 3t \)
- \( A = 30 + 3t \)

\( m = \frac{y_2 - y_1}{x_2 - x_1} \)

\( m = \frac{10 - 0}{10 - 0} = 1 \)

\( y = mx + b \)

\( (0) = (0) + b \)

\( b = 0 \)

\( A = -3t + 30 \)

\( A = 30 - 3t \)
6 Water in a swimming pool is draining at a constant rate. The graph below shows information about the depth of the water at certain times since the draining began.

![Depth vs. Time Graph]

Depth (cm)

-30

Time (h)

0 1 2 3 4 5

How long since the draining began will it take for the water to get to a depth of 90 cm?

- a) 5 hours
- b) 6 hours
- c) 7 hours
- d) 9 hours

7 The graph shown represents the four segments of Chen’s trip home from a lake.

![Distance from the Lake vs. Time Graph]

Distance from the lake (m)

- 240
- 160
- 120
- 80
- 40
- 0

Time (min)

0 2 4 6 8

Which statement about his trip is true?

- a) He stopped for a total of 3 minutes.
- b) He travelled 120 m in the first minute.
- c) He travelled the fastest between minute 4 and minute 6.
- d) He travelled the same speed in the first and fourth segments of his trip.

\[ D = -30t + 300 \]

\[ 90 = -30t + 300 \]

\[ 90 - 300 = -30t \]

\[ -210 = -30t \]

\[ t = \frac{-210}{-30} = \frac{7}{1} = 7 \]
14. Which of the following is not an equation of a line?

- $y = -4$
- $y = 9x^2$ [degree $= 2$]
- $y = 3x + 6$
- $7x - 2y + 28 = 0$

15. The rise to run ratio of a ramp must be less than 0.13.

Which of these ramps meets this requirement?

- A: $\frac{130}{100} = 1.3$
- B: $\frac{130}{200} = 0.65$
- C: $\frac{13}{50} = 0.26$
- D: $\frac{13}{200} = 0.065$
16. Four line segments are shown on this grid.

Which statement about the line represented by \( y = \frac{3}{5}x - 2 \) is true?

- It is parallel to line segment AB.
- It is parallel to line segment EF.
- It is perpendicular to line segment CD.
- It is perpendicular to line segment GH.

17. A line on a graph has a rise of \(-3\) for each run of 2, and a \(y\)-intercept of \(-5\).

Which of the following is the equation of the line?

- \( y = \frac{3}{2}x + 5 \)
- \( y = \frac{2}{3}x + 5 \)
- \( y = -\frac{3}{2}x - 5 \)
- \( y = -\frac{2}{3}x - 5 \)

18. The total cost of purchasing T-shirts for the math club, \( C \), in dollars, is represented by the equation \( C = 20 + 8n \), where \( n \) is the number of T-shirts purchased.

The club will order a minimum of 5 T-shirts and a maximum of 10.

What is the range of possible values for the total cost of the T-shirts?

- $40 to $80
- $40 to $100
- $60 to $80
- $60 to $100
16. The rectangular prism pictured has a square base and a volume of 1728 cm$^3$.

Which of these values of $h$ and $l$ produce the prism with the smallest surface area?

- a. $h = 108$ cm, $l = 4$ cm
- b. $h = 48$ cm, $l = 6$ cm
- c. $h = 27$ cm, $l = 8$ cm
- d. $h = 12$ cm, $l = 12$ cm

\[ V = l \times l \times h \]
\[ V = (12) \times (12) \times (12) \]
\[ V = 1728 \text{ cm}^3 \]

20. Two different designs for fencing a rectangular garden are pictured.

- Design A uses fencing on all 4 sides.
- Design B uses fencing on only 3 sides.

Each design uses 6 m of fencing in total and has a width of 1 m.

- Design A
  - $A = 7.2 \text{ m}^2$
  - $P = 6$ m

- Design B
  - $A = 4 \text{ m}^2$
  - $P = 6$ m

Which design creates the garden with the largest area, and what is that area?

- a. Design A, 2 m$^2$
- b. Design A, 5 m$^2$
- c. Design B, 4 m$^2$
- d. Design B, 6 m$^2$
21. Two chocolate bar options are available:
   - a large bar in the shape of a triangular prism
   - 6 identical small bars that form a hexagonal prism when joined

   Both options are pictured.

   **Option 1: Large Bar**
   \[ V = \frac{1}{2} \times 6 \times 8 \times 3 \times 8 \]
   \[ V = \frac{720}{2} \text{ cm}^3 \]

   **Option 2: 6 Small Bars**
   \[ V = \frac{6 \times 1 \times 4 \times 10}{2} \]
   \[ V = \frac{240}{2} \text{ cm}^3 \]

   Which of the following statements correctly compares the amount of chocolate in the two options?

   a. The 6 small bars contain the same amount of chocolate as the large bar.
   b. The 6 small bars contain 6 times the amount of chocolate as the large bar.
   c. The large bar contains 2 times the amount of chocolate as the 6 small bars.
   d. The large bar contains 3 times the amount of chocolate as the 6 small bars.

22. A park is surrounded by 4 streets.

   What is the value of \( x \)?

   a. 50°
   b. 65°
   c. 70°
   d. 80°