CUNY Elementary Algebra Final Exam

Problem Sets
November 2012

For the most up-to-date information on this exam, please visit
http://www.cuny.edu/testing
CUNY Elementary Algebra Final Exam Format:

- 25 multiple choice questions (4 choices each)
- Students will have 100 minutes to complete the exam.
- No calculators will be allowed on the exam.
- The exam will be administered on a computer.

Test Taking Tips/Strategies:

- Read each question completely and carefully before you begin any calculations.
- Pace yourself so that you don’t spend too much time on one question.
- Stay calm and focus on the exam until you are finished.
- Copy down all relevant information from the example on scrap paper including all the formulas that you have memorized. Draw a diagram where needed. Begin solving the problem neatly step by step on the scrap paper. Don’t forget to answer all parts of the question.
- Try to solve the problem before looking at the choices. Reread the problem before choosing an answer to make sure you are answering the question that was asked.
- Check your work.
- If you are unable to arrive at a correct answer, look at the choices and use the process of elimination to make an educated guess.
- Make sure you have answered all the questions. Don’t leave any questions blank!

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Problem Set I

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1. Simplify. $\sqrt{3}(4 - 2\sqrt{6})$

A) $4\sqrt{3} - 6\sqrt{2}$  
B) $2\sqrt{3} - 6\sqrt{2}$  
C) $-2\sqrt{6}$  
D) $4\sqrt{3} - 6$

2. Simplify. $6\sqrt{2} - \sqrt{12} + 5\sqrt{8}$

A) $16\sqrt{2} - 2\sqrt{3}$  
B) $16\sqrt{3} - 3\sqrt{2}$  
C) $20\sqrt{2}$  
D) $4\sqrt{2} - 2\sqrt{3}$

3. Multiply. Answer must be in scientific notation. $(1.7 \times 10^2)(6.3 \times 10^5)$

A) $10.71 \times 10^7$  
B) $10.71 \times 10^{10}$  
C) $1.071 \times 10^8$  
D) $1.071 \times 10^7$

4. Simplify and write with positive exponents. $(-x^3y^{-6}z^5)(8x^{-3}yz^4)$

A) $\frac{24x^6z^9}{y^5}$  
B) $-\frac{8z^{20}}{x^9y^6}$  
C) $\frac{z^9}{8y^5}$  
D) $-\frac{8z^9}{y^5}$

5. Translate the sentence into an equation.
“Eight less than three times a number is equal to the sum of a number and four.”

A) $8 - 3x = x + 4$  
B) $3x - 8 = x + 4$  
C) $8 - 3x = 4x$  
D) $3x - 8 = 3(x + 4)$

6. Simplify. $(-7x^3y^2 + 4xy) - (3x^3y^2 + 2xy)$

A) $-10x^6y^4 + 6x^2y^2$  
B) $-10x^3y^2 + 6xy$  
C) $-4x^6y^4 + 2x^2y^2$  
D) $-10x^3y^2 + 2xy$
7. Multiply. \((4x - 3)(2x^2 - 5x - 4)\)

A) \(8x^3 - 20x^2 - 16x + 12\) \quad B) \(8x^3 - 26x^2 - 31x + 12\) \quad C) \(8x^3 - 26x^2 - x + 12\) \quad D) \(8x^3 - 5x + 12\)

8. Multiply. \((7x - 2)^2\)

A) \(49x^2 - 28x + 4\) \quad B) \(49x^2 + 4\) \quad C) \(14x^2 + 4\) \quad D) \(49x^2 - 14x + 4\)

9. Divide. \(\frac{21x^3y^2 - 28x^2y^2 + 7xy^2}{-7xy^2}\)

A) \(-3x^2 + 4x\) \quad B) \(-3x^2 + 4x - 1\) \quad C) \(-3x^4y^4 + 4x^3y^4 - x^2y^4\) \quad D) \(21x^3y^2 - 28x^2y^2\)

10. Factor Completely. \(6x^3y^2 - 24xz^2\)

A) \(6(xz - 2)^2\) \quad B) \(6(x^2y^2 - 4z^2)\) \quad C) \(6(x^3y^2 - 4xz^2)\) \quad D) \(6(xy + 2z)(xy - 2z)\)

11. Which of the following is a factor of the polynomial \(4x^2 - 13x + 10\)?

A) \(x + 5\) \quad B) \(4x - 2\) \quad C) \(4x + 5\) \quad D) \(x - 2\)

12. Which of the following is a factor of the polynomial \(8sx + 28sy - 6tx - 21ty\)?

A) \(4s - 3t\) \quad B) \(2x - 7y\) \quad C) \(2x + 7t\) \quad D) \(4s + 3t\)
13. Factor Completely.  \(24s^2t - 18st - 15t\)
A) \(t(24s^2 - 18s - 15)\)       B) \(3t(4s - 5)(2s + 1)\)      C) \(st(24s - 3)\)      D) \(3t(4s + 5)(2s - 1)\)

14. Translate and Solve.
"Nine is three times the difference between a number and two."
A) \(x = \frac{11}{3}\)       B) \(x = 29\)       C) \(x = 5\)       D) \(x = \frac{27}{2}\)

15. Solve.  \(-3(x - 4) + 8 = 4(2x - 1) - 9\)
A) \(x = \frac{11}{8}\)       B) \(x = -3\)       C) \(x = -\frac{11}{9}\)       D) \(x = 3\)

16. What is the value of the \(x\)-coordinate of the solution to the following system of equations?
\[
\begin{align*}
3x + y &= 3 \\
-2x + 2y &= -10
\end{align*}
\]
A) \(x = -3\)       B) \(x = 2\)       C) \(x = -7\)       D) \(x = -2\)

17. Solve for \(t\).  \(v = v_0 + at\)
A) \(t = \frac{v - v_0}{a}\)       B) \(t = \frac{v_0 - v}{a}\)       C) \(t = v_0 - v - a\)       D) \(t = av - v_0\)

18. Solve for all values of \(x\).  \((2x + 3)(x - 8) = 0\)
A) \(x = -3\) or \(x = -8\)       B) \(x = \frac{-3}{2}\) or \(x = 8\)       C) \(x = \frac{3}{2}\) or \(x = -8\)       D) \(x = \frac{-2}{3}\) or \(x = 8\)
19. Solve for all values of $n$. \[ 5n^2 + 15n = 0 \]
A) \( n = -3 \) \hspace{1cm} B) \( n = 0 \) or \( n = -3 \) \hspace{1cm} C) \( n = 3 \) \hspace{1cm} D) \( n = 0 \) or \( n = 3 \)

20. Solve for all values of $x$. \[ 4x^2 - 25 = 0 \]
A) \( x = \frac{5}{2} \) \hspace{1cm} B) \( x = -\frac{5}{4} \) or \( x = \frac{5}{4} \) \hspace{1cm} C) \( x = -\frac{5}{2} \) or \( x = \frac{5}{2} \) \hspace{1cm} D) \( x = -\frac{2}{5} \) or \( x = \frac{2}{5} \)

21. Olivia runs 10 meters diagonally across a rectangular field that has a width of 6 meters. Find the length of the rectangular field.
A) 12 meters \hspace{1cm} B) 8 meters \hspace{1cm} C) 4 meters \hspace{1cm} D) 16 meters

22. Solve. \[ x - 5(4x + 8) \geq 3x - 2(x + 10) \]
A) \( x \geq -1 \) \hspace{1cm} B) \( x \geq 1 \) \hspace{1cm} C) \( x \leq 1 \) \hspace{1cm} D) \( x \leq -1 \)

23. Find the graph of the solution to the inequality \[-4(3x - 5) < 2(x - 11)\].

![Graph Options]

24. If \( f(x) = -3x^2 + 7x - 5 \), find \( f(-5) \).
A) \(-15\) \hspace{1cm} B) \(-115\) \hspace{1cm} C) 35 \hspace{1cm} D) \(-70\)
25. Find the equation of the line that passes through the points \((-5, -6)\) and \((-7, 4)\). Write the equation in slope-intercept form.

A) \(y = \frac{1}{6}x - \frac{31}{6}\)  
B) \(y = -\frac{1}{5}x + \frac{13}{5}\)  
C) \(y = -5x + 39\)  
D) \(y = -5x - 31\)

26. Find the equation of the vertical line that passes through the point \((-2, 5)\).

A) \(x = -2\)  
B) \(y = x + 5\)  
C) \(y = -\frac{5}{2}x\)  
D) \(y = 5\)

27. Find the slope and \(y\) intercept of the line \(7y - 4x = 21\).

A) slope = \(-\frac{4}{7}\) and \(y\) intercept = (0, 3)  
B) slope = \(\frac{4}{7}\) and \(y\) intercept = (0, 21)  
C) slope = \(\frac{7}{4}\) and \(y\) intercept = (0, -3)  
D) slope = \(\frac{4}{7}\) and \(y\) intercept = (0, 3)

28. If a car travels 350 miles in 5 hours, at the same speed how long will it take to travel 560 miles?

A) 4 hours  
B) 6 hours  
C) 8 hours  
D) 10 hours

29. You would like to purchase a new car from the dealer listed for \$25,000. After negotiating, you agree to pay \$20,000 for the new car. What is the percent decrease?

A) 25%  
B) 20%  
C) 15%  
D) 10%
30. Which of the following is the graph of the equation $9x - 6y = 18$?
## Answer Key - Problem Set I

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Correct Answer</th>
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<tbody>
<tr>
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<td>2.</td>
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Solution Guide to Problem Set I

1. Simplify. \( \sqrt{3}(4 - 2\sqrt{6}) \)

Solution:
Use the Distributive Property.
\[
= \sqrt{3} \cdot 4 - \sqrt{3} \cdot 2\sqrt{6} \\
= 4\sqrt{3} - 2\sqrt{18} \\
= 4\sqrt{3} - 2\sqrt{9 \cdot 2} \\
= 4\sqrt{3} - 2\sqrt{9} \cdot \sqrt{2} \\
= 4\sqrt{3} - 2 \cdot 3\sqrt{2} \\
= 4\sqrt{3} - 6\sqrt{2}
\]
Choice A

2. Simplify. \( 6\sqrt{2} - \sqrt{12} + 5\sqrt{8} \)

Solution:
\[
= 6\sqrt{2} - \sqrt{4 \cdot 3} + 5\sqrt{4 \cdot 2} \\
= 6\sqrt{2} - \sqrt{4} \cdot \sqrt{3} + 5 \cdot \sqrt{4} \cdot \sqrt{2} \\
= 6\sqrt{2} - 2\sqrt{3} + 5 \cdot 2\sqrt{2} \\
= 6\sqrt{2} - 2\sqrt{3} + 10\sqrt{2} \\
= (6 + 10)\sqrt{2} - 2\sqrt{3} \\
= 16\sqrt{2} - 2\sqrt{3}
\]
Choice A

3. Multiply.
Answer must be in scientific notation.
\((1.7 \times 10^{5})(6.3 \times 10^{9})\)

Solution:
\[
= (1.7 \cdot 6.3) \times (10^{2} \cdot 10^{5}) \\
= 10.71 \times 10^{2+5} \\
= 10.71 \times 10^{7}
\]
Move the decimal point one place to the left and add 1 to the exponent.
\[
= 1.071 \times 10^{8}
\]
Choice C

4. Simplify and write with positive exponents.
\((-x^{3}y^{-6}z^{5})(8x^{-3}yz^{4})\)

Solution:
\[
= (-1 \cdot 8)(x^{-3} \cdot x^{-3})(y^{-6} \cdot y)(z^{5} \cdot z^{4}) \\
= -8x^{-3+(-3)}y^{-6+1}z^{5+4} \\
= -8x^{0}y^{-5}z^{9} \\
\]
Note: If \(x \neq 0\), then \(x^{0} = 1\).
\[
= -8(1)y^{-5}z^{9} \\
= -8y^{-5}z^{9} \\
= -\frac{8z^{9}}{y^{5}}
\]
Choice D

5. Translate the sentence into an equation.
"Eight less than three times a number is equal to the sum of a number and four."

Solution:
Note: “less than” reverses the terms in the equation
Let \(x\) be a number.
“three times a number”: \(3x\)
“Eight less than three times a number”: \(3x - 8\)
“sum of a number and four”: \(x + 4\)
\[
3x - 8 = x + 4
\]
Choice B

6. Simplify. \((-7x^{3}y^{2} + 4xy) - (3x^{3}y^{2} + 2xy)\)

Solution:
\[
= -7x^{3}y^{2} + 4xy - 3x^{3}y^{2} - 2xy \\
= -7x^{3}y^{2} - 3x^{3}y^{2} + 4xy - 2xy \\
\]
Add coefficients of like terms.
\[
= (-7 - 3)x^{3}y^{2} + (4 - 2)xy \\
= -10x^{3}y^{2} + 2xy
\]
Choice D
7. Multiply. \((4x - 3)(2x^2 - 5x - 4)\)

**Solution:**
Use the Distributive Property.
\[
\begin{align*}
&= 4x \cdot (2x^2 - 5x - 4) - 3 \cdot (2x^2 - 5x - 4) \\
&= 4x \cdot 2x^2 - 4x \cdot 5x - 4 \cdot 4 - 3 \cdot 2x^2 + 3 \cdot 5x + 3 \cdot 4 \\
&= 8x^3 + 20x^2 - 16x - 6x^2 + 15x + 12 \\
&= 8x^3 + 16x - 6x^2 + 15x + 12 \\
&= 8x^3 - 26x^2 - x + 12 \\
\end{align*}
\]
Choice C

8. Multiply. \((7x - 2)^2\)

**Solution:**
\[
\begin{align*}
&= (7x)^2 - 2(7x)(2) + (2)^2 \\
&= 7x \cdot 7x - 2 \cdot 7 \cdot 2 \cdot x + (2) \cdot (2) \\
&= 49x^2 + 28x + 4 \\
\end{align*}
\]
Choice A

9. Divide. \[
\frac{21x^3y^2 - 28x^2y^2 + 7xy^2}{-7xy^2}
\]

**Solution:**
Divide each term in the numerator by the denominator.
\[
\begin{align*}
&= \frac{21x^3y^2}{-7xy^2} - \frac{28x^2y^2}{-7xy^2} + \frac{7xy^2}{-7xy^2} \\
&= -3x^3y - 4x^2y^2 - 1x^1y^2 \quad \text{Note: If } x \neq 0, \text{ then } x^0 = 1. \\
&= -3x^2(1) + 4x(1) - 1(1)(1) \\
&= -3x^2 + 4x - 1 \\
\end{align*}
\]
Choice B

10. Factor Completely. \(6x^3y^2 - 24xz^2\)

**Solution:**
Factor the Greatest Common Factor (GCF) from each term.
\[
\begin{align*}
&= 6x(x^2y^2 - 4z^2) \\
&= 6x[(xy)^2 - (2z)^2] \\
&= 6x(xy - 2z)(xy + 2z) \\
&= 6(xy + 2z)(xy - 2z) \\
\end{align*}
\]
Choice D

11. Which of the following is a factor of the polynomial \(4x^2 - 13x + 10\)?

**Solution:**
Factor by grouping.
\[
\begin{align*}
a \cdot c &= (4) \cdot (10) = 40 \\
\text{Find the factors of } 40 \text{ whose sum is } b = -13. \\
(-8) \cdot (-5) &= 40 \quad \text{and } (-8) + (-5) = -13 \\
\text{Rewrite } -13x \text{ as } -8x - 5x. \\
&= 4x^2 - 8x - 5x + 10 \\
&= (4x^2 - 8x) + (-5x + 10) \\
&= 4x(x - 2) - 5(x - 2) \\
&= (x - 2)(4x - 5) \\
The factors are (x - 2) and (4x - 5). \\
\end{align*}
\]
Choice D

12. Which of the following is a factor of the polynomial \(8sx + 28sy - 6xt - 21ty\)?

**Solution:**
Factor by grouping.
\[
\begin{align*}
&= (8sx + 28sy) + (-6xt - 21ty) \\
&= 4s(2x + 7y) - 3t(2x + 7y) \\
&= (2x + 7y)(4s - 3t) \\
The factors are (2x + 7y) and (4s - 3t). \\
\end{align*}
\]
Choice A
13. Factor Completely. \(24s^2t - 18st - 15t\)

**Solution:**
Factor the Greatest Common Factor (GCF) from each term.
\[= 3t(8s^2 - 6s - 5)\]
Factor by grouping.
\[a \cdot c = (8) \cdot (-5) = -40\]
Find the factors of \(-40\) whose sum is \(b = -6\)
\[(-10) \cdot (4) = -40 \text{ and } (-10) + (4) = -6\]
Rewrite \(-6s\) as \(-10s + 4s\)
\[= 3t[8s^2 - 10s + 4s - 5]\]
\[= 3t[2s(4s - 5) + 1(4s - 5)]\]
\[= 3t(4s - 5)(2s + 1)\]
**Choice B**

14. Translate and Solve.
"Nine is three times the difference between a number and two."

**Solution:**
Let \(x\) be a number.
\(9 = 3 \cdot (x - 2)\)
\[9 = 3x - 6\]
\[9 + 6 = 3x - 6 + 6\]
\[15 = 3x \rightarrow \frac{15}{3} = \frac{3x}{3}\]
\[5 = x \text{ or } x = 5\]
**Choice C**

15. Solve. \(-3(x - 4) + 8 = 4(2x - 1) - 9\)

**Solution:**
Simplify both sides of the equation.
\[-3 \cdot x - (-3) \cdot 4 + 8 = 4 \cdot 2x - 4 \cdot 1 - 9\]
\[-3x + 12 + 8 = 8x - 4 - 9\]
\[-3x + 20 = 8x - 13\]
Isolate the variable \(x\).
\[-3x - 8x + 20 = 8x - 8x - 13\]
\[-11x + 20 = -13\]
\[-11x + 20 - 20 = -13 - 20\]
\[-11x = -33 \rightarrow \frac{-11x}{-11} = \frac{-33}{-11}\]
\[x = 3\]
**Choice D**

16. What is the value of the \(x\)-coordinate of the solution to the following system of equations?
\[
\begin{align*}
3x + y &= 3 \\
-2x + 2y &= -10
\end{align*}
\]

**Solution:**
Eliminate the \(y\) variable.
Multiply equation (1) by \(-2\)
\[-2(3x + y) = 3\]
\[-6x - 2y = -6 \rightarrow \text{new equation (1)}\]
Add new equation (1) and equation (2)
\[-6x - 2y = -6\]
\[\quad + \quad -2x + 2y = -10\]
\[\quad -8x = -16\]
\[\quad \frac{-8x}{-8} = \frac{-16}{-8} \rightarrow x = 2\]
**Choice B**

17. Solve for \(t\). \(v = v_0 + at\)

**Solution:**
\[\frac{v - v_0}{a} = \frac{at}{a}\]
\[\frac{v-v_0}{a} = t \text{ or } t = \frac{v-v_0}{a}\]
**Choice A**

18. Solve for all values of \(x\). \((2x + 3)(x - 8) = 0\)

**Solution:**
Set each factor equal to zero and solve.
\[
\begin{align*}
2x + 3 &= 0 & x - 8 &= 0 \\
2x + 3 - 3 &= 0 - 3 & x - 8 + 8 &= 0 + 8 \\
2x &= -3 & x &= 8 \\
\frac{2x}{2} &= \frac{-3}{2} & x &= \frac{3}{2} \\
\quad \frac{x}{2} &= \frac{3}{2} & \quad x &= 8
\end{align*}
\]
**Choice B**
19. Solve for all values of $n$. $5n^2 + 15n = 0$

Solution:
Factor the Greatest Common Factor (GCF).

$$5n(n + 3) = 0$$

Set each factor equal to zero and solve.

<table>
<thead>
<tr>
<th>$5n = 0$</th>
<th>$n + 3 = 0$</th>
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</thead>
<tbody>
<tr>
<td>$5n = 0$</td>
<td>$n + 3 - 3 = 0 - 3$</td>
</tr>
<tr>
<td>$\frac{5n}{5} = \frac{0}{5}$</td>
<td>$n = -3$</td>
</tr>
</tbody>
</table>

Choice B

20. Solve for all values of $x$. $4x^2 - 25 = 0$

Solution:
Factor using the Difference of Two Squares.

$$(2x)^2 - (5)^2 = 0$$

$$(2x + 5)(2x - 5) = 0$$

Set each factor equal to zero and solve.

<table>
<thead>
<tr>
<th>$2x + 5 = 0$</th>
<th>$2x - 5 = 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2x + 5 - 5 = 0 - 5$</td>
<td>$2x - 5 + 5 = 0 + 5$</td>
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<tr>
<td>$2x = -5$</td>
<td>$2x = 5$</td>
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<td>$2x = -5$</td>
<td>$2x = 5$</td>
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<tr>
<td>$\frac{2}{2} = \frac{-5}{2}$</td>
<td>$\frac{2}{2} = \frac{5}{2}$</td>
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<tr>
<td>$x = -\frac{5}{2}$</td>
<td>$x = \frac{5}{2}$</td>
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Choice C

21. Olivia runs 10 meters diagonally across a rectangular field that has a width of 6 meters. Find the length of the rectangular field.

Solution:
Draw a diagram and label the given sides.

![Diagram](image)

Use Pythagorean Theorem to solve the right triangle: $a^2 + b^2 = c^2$ where $c$ is the hypotenuse.

Let $a = 6$, and $c = 10$

$6^2 + b^2 = 10^2$

$36 + b^2 = 100$

$36 - 36 + b^2 = 100 - 36$

$b^2 = 64$

$b = \sqrt{64} = 8$ meters

Choice B

22. Solve. $x - 5(4x + 8) \geq 3x - 2(x + 10)$

Solution:

$x - 5 \cdot 4x + (-5) \cdot 8 \geq 3x - 2 \cdot x + (-2) \cdot 10$

$x - 20x - 40 \geq 3x - 2x - 20$

$-19x - 40 \geq x - 20$

$-19x - x - 40 \geq x - x - 20$

$-20x - 40 \geq -20$

$-20x - 40 + 40 \geq -20 + 40$

$-20x \geq 20$ $\Rightarrow \quad \frac{-20x}{-20} \leq \frac{20}{-20}$

Note: Reverse the inequality sign when multiplying or dividing by a negative number.

$x \leq -1$

Choice D
23. Find the graph of the solution to the inequality 
\(-4(3x - 5) < 2(x - 11)\)

**Solution:**
Solve the inequality.
\[-4 \cdot 3x - (-4) \cdot 5 < 2 \cdot x - 2 \cdot 11\]
\[-12x + 20 < 2x - 22\]
\[-12x - 2x + 20 < 2x - 2x - 22\]
\[-14x + 20 < -22\]
\[-14x + 20 - 20 < -22 - 20\]
\[-14x < -42\]  \(\rightarrow\)  \(-\frac{14x}{-14} > \frac{-42}{-14}\)
Note: Reverse the inequality sign when multiplying or dividing by a negative number.
\(x > 3\)
“\(x\) is greater than 3”
**Choice C**

24. If \(f(x) = -3x^2 + 7x - 5\), find \(f(-5)\).

**Solution:**
Substitute \(-5\) for \(x\).
\[= -3(-5)^2 + 7(-5) - 5\]
\[= -3(25) + 7(-5) - 5\]
\[= -75 - 35 - 5\]
\[= -115\]
**Choice B**

25. Find the equation of the line that passes through the points \((-5, -6)\) and \((-7, 4)\). Write the equation in slope intercept form.

**Solution:**
Find the slope of the line using the slope formula:
\[m = \frac{y_2 - y_1}{x_2 - x_1}\]
\((x_1, y_1) = (-5, -6)\)
\((x_2, y_2) = (-7, 4)\)
\[m = \frac{(-6) - (-6)}{(-7) - (-5)} = \frac{10}{-2} = -5\]
Use one of the given points \((x_1, y_1) = (-5, -6)\), the slope \(m = -5\), and the point-slope formula to find the equation of the line:
\[y - y_1 = m(x - x_1)\]
\[y - (-6) = -5(x - (-5))\]
\[y + 6 = -5(x + 5)\]
\[y + 6 = -5x - 25\]
\[y + 6 - 6 = -5x - 25 - 6\]
\[y = -5x - 31\]
**Choice D**

26. Find the equation of the vertical line that passes through the point \((-2, 5)\).

**Solution:**
The equation of a vertical line passing through the point \((a, b)\) is \(x = a\).
\((a, b) = (-2, 5); a = -2\)
\[x = -2\]
**Choice A**
27. Find the slope and y-intercept of the line
\[ 7y - 4x = 21. \]

**Solution:**
Write the equation in slope-intercept form, 
\[ y = mx + b, \]
by solving for \( y \). The slope of the line is \( m \) and the y-intercept is \((0, b)\).

\[
7y - 4x + 4x = 4x + 21 \\
7y = 4x + 21 \\
y = \frac{4}{7}x + 3 \\
m = \frac{4}{7} \\
y-intercept: (0, 3)
\]

**Choice D**

28. If a car travels 350 miles in 5 hours, at the same speed how long will it take to travel 560 miles?

**Solution:**
Write and solve a proportion using \( x \) to represent hours.

\[
\frac{350 \text{ miles}}{5 \text{ hours}} = \frac{560 \text{ miles}}{x} \]
Reduce each ratio, if possible.

\[
\frac{350}{5} = \frac{560}{x} \rightarrow \frac{70}{1} \cdot \frac{560}{x} \\
70x = (560) \cdot (1) \\
70x = 560 \Rightarrow \frac{70x}{70} = \frac{560}{70} \\
x = \frac{56}{7} \]

\[ x = 8 \text{ hours} \]

**Choice C**

29. You would like to purchase a new car from the dealer listed for $25,000. After negotiating, you agree to pay $20,000 for the new car. What is the percent decrease?

**Solution:**
Percent Decrease = \( \frac{\text{original amount} - \text{new amount}}{\text{original amount}} \cdot 100\% \)

Percent Decrease = \( \frac{25,000 - 20,000}{25,000} \cdot 100\% \)

Percent Decrease = \( \frac{5,000}{25,000} \cdot 100\% \)

Percent Decrease = \( \frac{1}{5} \cdot 100\% = 20\% \)

**Choice B**

30. Which of the following is the graph of the equation \( 9x - 6y = 18 \)?

**Solution:**
Find both intercepts of the line:

\[
\begin{array}{cc}
\text{x-intercept} & \text{y-intercept} \\
\hline
\text{x-intercept: let } y = 0 & \text{y-intercept: let } x = 0 \\
9x - 6(0) = 18 & 9(0) - 6y = 18 \\
9x - 0 = 18 & 0 - 6y = 18 \\
9x = 18 & -6y = 18 \\
9x = 18 & \text{subtract } 9 \text{ from both sides} \\
x = 2 & -6y = 18 \\
\end{array}
\]

\[ x \text{-intercept: (2, 0)} \]

**Choice A**
Problem Set II

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1. Simplify. \( \frac{(5\sqrt{24})(3\sqrt{45})}{\sqrt{6}} \)
   
   A) 30\(\sqrt{15} \)  
   B) 180\(\sqrt{5} \)  
   C) 90\(\sqrt{5} \)  
   D) 60\(\sqrt{15} \)

2. Simplify. \( -5\sqrt{3} - \sqrt{8} + 4\sqrt{18} - 2\sqrt{12} \)
   
   A) 3\sqrt{3} - 8\sqrt{2}  
   B) -4\sqrt{21}  
   C) 5\sqrt{2} - 9\sqrt{3}  
   D) 10\sqrt{2} - 9\sqrt{3}

3. Write the number 23,000,000 in scientific notation.
   
   A) 2.3 \times 10^7  
   B) 2.3 \times 10^{-7}  
   C) 23 \times 10^6  
   D) 23 \times 10^{-6}

4. Evaluate. Answer must be in scientific notation. \( \frac{(24 \times 10^5)(2 \times 10^3)}{(3 \times 10^{-4})} \)
   
   A) 1.6 \times 10^{13}  
   B) 16 \times 10^{12}  
   C) 16 \times 10^4  
   D) 1.6 \times 10^5

5. Simplify. \( \frac{(2y)^3(y^4)}{(8y)^2} \)
   
   A) \frac{y^6}{8}  
   B) \frac{3y^5}{8}  
   C) 8y^5  
   D) \frac{y^5}{8}
6. **Translate the sentence into an equation.**
   “Twelve subtracted from seven times a number is equal to the square of a number.”

   A) \(12 - 7x = 2x\)  
   B) \(7x - 12 = x^2\)  
   C) \(12 - 7x = x^2\)  
   D) \((7 - 12)x = x^2\)

7. **Simplify.** \((-5a^2 + 3a - 6) - (4a^2 + 2a - 3)\)

   A) \(-a^2 + a - 3\)  
   B) \(-9a^4 - a^2 - 3\)  
   C) \(-9a^2 + 5a - 3\)  
   D) \(-9a^2 + a - 3\)

8. **Multiply.** \((3x + 2)(4x^2 - 2x - 1)\)

   A) \(12x^3 + 2x^2 - 7x - 2\)  
   B) \(12x^3 - 2x - 2\)  
   C) \(12x^3 - 14x^2 - 7x - 2\)  
   D) \(12x^3 - 10x - 2\)

9. **Divide.** \(\frac{-24n^6 + 18n^4 + 6n^2}{6n^2}\)

   A) \(-4n^3 + 3n^2\)  
   B) \(-4n^3 + 3n^2 + 1\)  
   C) \(-4n^3 + 3n^2 + 1\)  
   D) \(-24n^4 + 3n^2\)

10. **Factor Completely.** \(32x^3y - 18xy^3\)

    A) \(2xy(4x + 3y)(4x - 3y)\)  
    B) \(2xy(4x - 3y)^2\)  
    C) \(2x(16x^2y - 9y^3)\)  
    D) \(2y(16x^3 - 9xy^2)\)
11. Which of the following is a factor of the polynomial $6z^2 + 17z - 3$?

A) $6z + 3$  
B) $6z + 1$  
C) $z + 3$  
D) $z - 3$

12. Which of the following is a factor of the polynomial $15xy - 10xq - 6py + 4pq$?

A) $5x + 2p$  
B) $3y - 2q$  
C) $5x - 2q$  
D) $3y + 2q$

13. Factor Completely. $18a^4 - 24a^3b + 8a^2b^2$

A) $2a^2(3a - 2b)(3a + 2b)$  
B) $2(9a^4 - 12a^3b + 4a^2b^2)$  
C) $2(9a^4 - 12a^3b + 4a^2b^2)$  
D) $2a^2(3a - 2b)^2$

14. Translate and Solve.

“Four times a number is twice the difference between a number and three.”

A) $x = -\frac{3}{2}$  
B) $x = \frac{3}{2}$  
C) $x = -3$  
D) $x = 3$

15. Solve. $8x - 3(x - 4) = 2x - 9$

A) $x = -7$  
B) $x = 1$  
C) $x = -\frac{5}{3}$  
D) $x = 7$
16. What is the value of the $y$-coordinate of the solution to the following system of equations?

$\begin{align*}
-4x + 8y &= 10 \\
3x - 4y &= -8
\end{align*}$

A) $y = 2$  
B) $y = \frac{1}{4}$  
C) $y = -4$  
D) $y = -\frac{1}{4}$

17. Choose the graph that shows the solution to the system.

$\begin{align*}
-2x + y &= 4 \\
4x + 2y &= 8
\end{align*}$

A) ![Graph A]  
B) ![Graph B]  
C) ![Graph C]  
D) ![Graph D]
18. Solve for \( w \). \[ P = 2l + 2w \]

A) \( w = P - l \) \quad B) \( w = \frac{P - 2l}{2} \) \quad C) \( w = \frac{2l - P}{2} \) \quad D) \( w = l - P \)

19. Solve for all values of \( t \). \[ 6t^2 = 144 \]

A) \( t = 2\sqrt{6} \) \quad B) \( t = 0 \) or \( t = 24 \) \quad C) \( t = -12 \) or \( t = 12 \) \quad D) \( t = 2\sqrt{6} \) or \( t = -2\sqrt{6} \)

20. Solve for all values of \( x \). \[ 8x^2 = 36x \]

A) \( x = \frac{9}{2} \) \quad B) \( x = 0 \) or \( x = \frac{9}{2} \) \quad C) \( x = -\frac{9}{2} \) or \( x = \frac{9}{2} \) \quad D) \( x = 0 \) or \( x = \frac{2}{9} \)

21. Find the missing side of the right triangle.

\[ \begin{array}{c}
7 \\
\downarrow \\
\text{b} \\
\downarrow \\
11
\end{array} \]

A) \( b = 2\sqrt{6} \) \quad B) \( b = 2\sqrt{12} \) \quad C) \( b = 6\sqrt{3} \) \quad D) \( b = 3\sqrt{3} \)
22. Find the graph of the solution to the inequality \(-10x + 5(x - 3) > -4(x + 2)\).

A) \hspace{1cm} B)

C) \hspace{1cm} D)

23. If \(f(x) = 2x^2 - 9x - 1\), find \(f(-a)\).

A) \(f(-a) = 2a^2 + 9a - 1\) \hspace{1cm} B) \(f(-a) = -2a^2 + 9a - 1\)

C) \(f(-a) = 2a^2 + 8a\) \hspace{1cm} D) \(f(-a) = 4a^2 + 9a - 1\)

24. Find the equation of the line that passes through the points \((-2, 3)\) and \((1, -9)\). Write the equation in slope intercept form.

A) \(y = -2x - 1\) \hspace{1cm} B) \(y = 6x + 12\) \hspace{1cm} C) \(y = -4x + 3\) \hspace{1cm} D) \(y = -4x - 5\)

25. Find the equation of the horizontal line that passes through the point \((7, -4)\).

A) \(y = x - 4\) \hspace{1cm} B) \(y = -\frac{4}{7}x\) \hspace{1cm} C) \(x = 7\) \hspace{1cm} D) \(y = -4\)
26. Find the slope and y intercept of the line $3x - 6y = 48$.

A) slope $= \frac{1}{2}$ and $y$ intercept $= (0, -8)$

B) slope $= -\frac{1}{2}$ and $y$ intercept $= (0, 8)$

C) slope $= -3$ and $y$ intercept $= (0, 0)$

D) slope $= 3$ and $y$ intercept $= (0, 8)$

27. Find the equation of the line that passes through the point $(-3, 4)$ and has slope $-\frac{2}{3}$.

A) $y = -\frac{2}{3} x + 6$

B) $y = -\frac{2}{3} x + 2$

C) $y = -\frac{2}{3} x + 4$

D) $y = -\frac{2}{3} x - 6$

28. If it takes $\frac{3}{4}$ cup of vegetable oil to make 6 cupcakes, how many cupcakes can be made with 2 cups of vegetable oil?

A) 9 cupcakes

B) 4 cupcakes

C) 16 cupcakes

D) 12 cupcakes

29. Your annual salary is $55,000. If you get a 30% bonus this year, what is your total salary this year?

A) $165,000

B) $58,300

C) $71,500

D) $85,000
30. Which of the following is the graph of the equation \(-10x - 5y = 20\)?
## Answer Key - Problem Set II

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Correct Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>C</td>
</tr>
<tr>
<td>2.</td>
<td>D</td>
</tr>
<tr>
<td>3.</td>
<td>A</td>
</tr>
<tr>
<td>4.</td>
<td>A</td>
</tr>
<tr>
<td>5.</td>
<td>D</td>
</tr>
<tr>
<td>6.</td>
<td>B</td>
</tr>
<tr>
<td>7.</td>
<td>D</td>
</tr>
<tr>
<td>8.</td>
<td>A</td>
</tr>
<tr>
<td>9.</td>
<td>C</td>
</tr>
<tr>
<td>10.</td>
<td>A</td>
</tr>
<tr>
<td>11.</td>
<td>C</td>
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<tr>
<td>12.</td>
<td>B</td>
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<tr>
<td>13.</td>
<td>D</td>
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<td>14.</td>
<td>C</td>
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<tr>
<td>15.</td>
<td>A</td>
</tr>
<tr>
<td>16.</td>
<td>D</td>
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<tr>
<td>17.</td>
<td>A</td>
</tr>
<tr>
<td>18.</td>
<td>B</td>
</tr>
<tr>
<td>19.</td>
<td>D</td>
</tr>
<tr>
<td>20.</td>
<td>B</td>
</tr>
<tr>
<td>21.</td>
<td>C</td>
</tr>
<tr>
<td>22.</td>
<td>D</td>
</tr>
<tr>
<td>23.</td>
<td>A</td>
</tr>
<tr>
<td>24.</td>
<td>D</td>
</tr>
<tr>
<td>25.</td>
<td>D</td>
</tr>
<tr>
<td>26.</td>
<td>A</td>
</tr>
<tr>
<td>27.</td>
<td>B</td>
</tr>
<tr>
<td>28.</td>
<td>C</td>
</tr>
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<td>29.</td>
<td>C</td>
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<tr>
<td>30.</td>
<td>C</td>
</tr>
</tbody>
</table>

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Solution Guide to Problem Set II

1. Simplify. \( \frac{(5\sqrt{24})(3\sqrt{35})}{\sqrt{6}} \)

Solution:
\[
\frac{(5\sqrt{4\cdot6})(3\sqrt{9\cdot5})}{\sqrt{6}} = \frac{(5\cdot\sqrt{4\cdot6})(3\cdot\sqrt{9\cdot5})}{\sqrt{6}}
\]
\[
= \frac{(5 \cdot 2 \cdot \sqrt{6})(3 \cdot 3 \cdot \sqrt{5})}{\sqrt{6}}
\]
\[
= \frac{(10\cdot\sqrt{6})(9\cdot\sqrt{5})}{\sqrt{6}} = \frac{(10\cdot9)\cdot\sqrt{6}\cdot\sqrt{5}}{\sqrt{6}}
\]
Rationalize the denominator.
\[
= \frac{90\sqrt{30}}{\sqrt{6}} = \frac{90\cdot\sqrt{180}}{6}
\]
\[
= \frac{90\sqrt{36\cdot5}}{6} = \frac{90\cdot6\cdot\sqrt{5}}{6}
\]
\[
= 90 \cdot 1 \cdot \sqrt{5} = 90\sqrt{5}
\]
Choice C

2. Simplify. \(-5\sqrt{3} - \sqrt{8} + 4\sqrt{18} - 2\sqrt{12} \)

Solution:
\[
= -5\sqrt{3} - \sqrt{4\cdot2} + 4\sqrt{9\cdot2} - 2\sqrt{4\cdot3}
\]
\[
= -5\sqrt{3} - \sqrt{4\cdot2} + 4\cdot3\sqrt{2} - 2\cdot2\sqrt{3}
\]
\[
= -5\sqrt{3} - 2\sqrt{2} + 12\sqrt{2} - 2\cdot2\sqrt{3}
\]
\[
= (-2 + 12)\sqrt{2} + (-5 - 4)\sqrt{3}
\]
\[
= 10\sqrt{2} - 9\sqrt{3}
\]
Choice D

3. Write the number 23,000,000 in scientific notation.

Solution:
Move the decimal point seven places to the left.
\[
= 2.3 \times 10^7
\]
Choice A

4. Evaluate. Answer must be in scientific notation. \( \frac{(24 \times 10^5)(2 \times 10^3)}{(3 \times 10^{-4})} \)

Solution:
\[
= \frac{24 \cdot 2}{3} \times \frac{10^5 \cdot 10^3}{10^{-4}}
\]
\[
= 16 \times \frac{10^{5+3}}{10^{-4}}
\]
\[
= 16 \times \frac{10^8}{10^{-4}}
\]
\[
= 16 \times 10^{8-(-4)} = 16 \times 10^{8+4}
\]
\[
= 16 \times 10^{12}
\]
Move decimal point one place to the left and add 1 to the exponent.
\[
= 1.6 \times 10^{13}
\]
Choice A

5. Simplify. \( \frac{(2y)^3(y^4)}{(8y)^2} \)

Solution:
\[
= \frac{2^3 \cdot y^3 \cdot y^4}{8^2 \cdot y^2}
\]
\[
= \frac{8 \cdot y^{3+4}}{64 \cdot y^2}
\]
\[
= \frac{1 \cdot y^{7-2}}{8} = \frac{y^5}{8}
\]
Choice D

6. Translate the sentence into an equation.
“Twelve subtracted from seven times a number is equal to the square of a number.”

Solution:
Note: “subtracted from” reverses the terms in the equation
Let \( x \) be a number.
“seven times a number”: \( 7x \)
“Twelve subtracted from seven times a number”: \( 7x - 12 \)
“square of a number”: \( x^2 \)
\[
7x - 12 = x^2
\]
Choice B
7. Simplify. \((-5a^2 + 3a - 6) - (4a^2 + 2a - 3)\)

\[
\begin{align*}
\text{Solution:} \\
&= -5a^2 + 3a - 6 - 4a^2 - 2a + 3 \\
&= -5a^2 - 4a^2 + 3a - 2a - 6 + 3 \\
&= (-5 - 4)a^2 + (3 - 2)a + (-6 + 3) \\
&= -9a^2 + a - 3 \\
\text{Choice D}
\end{align*}
\]

8. Multiply. \((3x + 2)(4x^2 - 2x - 1)\)

\[
\begin{align*}
\text{Solution:} \\
&\text{Use the Distributive Property.} \\
&= 3x \cdot (4x^2 - 2x - 1) + 2 \cdot (4x^2 - 2x - 1) \\
&= 3x \cdot 4x^2 - 3x \cdot 2x - 3x \cdot 1 + 2 \cdot 4x^2 - 2 \cdot 2x - 2 \cdot 1 \\
&= 12x^3 - 6x^2 - 3x + 8x^2 - 4x - 2 \\
&= 12x^3 + (-6 + 8)x^2 + (-3 - 4)x - 2 \\
&= 12x^3 + 2x^2 - 7x - 2 \\
\text{Choice A}
\end{align*}
\]

9. Divide. \(\frac{-24n^6 + 18n^4 + 6n^2}{6n^2}\)

\[
\begin{align*}
\text{Solution:} \\
&\text{Divide each term in the numerator by the} \\
&\text{denominator.} \\
&= \frac{-24n^6}{6n^2} + \frac{18n^4}{6n^2} + \frac{6n^2}{6n^2} \\
&= -4n^{6-2} + 3n^{4-2} + 1n^{2-2} \\
&= -4n^4 + 3n^2 + 1n^0 \\
&\text{Note: If } x \neq 0, \text{ then } x^0 = 1. \\
&= -4n^4 + 3n^2 + 1(1) \\
&= -4n^4 + 3n^2 + 1 \\
\text{Choice C}
\end{align*}
\]

10. Factor Completely. \(32x^3y - 18xy^3\)

\[
\begin{align*}
\text{Solution:} \\
&\text{Factor the Greatest Common Factor (GCF) from each term.} \\
&= 2xy(16x^2 - 9y^2) \\
&\text{Use the Difference of Two Squares.} \\
&= 2xy[(4x)^2 - (3y)^2] \\
&= 2xy[(4x + 3y)(4x - 3y)] \\
&= 2xy(4x + 3y)(4x - 3y) \\
\text{Choice A}
\end{align*}
\]

11. Which of the following is a factor of the polynomial \(6z^2 + 17z - 3\) ?

\[
\begin{align*}
\text{Solution:} \\
&\text{Factor by grouping.} \\
&\text{Find the factors of } -18 \text{ whose sum is } b = 17. \\
&(18) \cdot (-1) = -18 \text{ and } (18) + (-1) = 17 \\
&\text{Rewrite } 17z \text{ as } 18z - 1z \\
&= 6z^2 + 18z - 1z - 3 \\
&= (6z^2 + 18z) + (-1z - 3) \\
&= 6z(z + 3) - 1(z + 3) \\
&= (z + 3)(6z - 1) \\
&\text{The factors are } (z + 3) \text{ and } (6z - 1). \\
\text{Choice C}
\end{align*}
\]

12. Which of the following is a factor of the polynomial \(15xy - 10xz - 6py + 4pq\) ?

\[
\begin{align*}
\text{Solution:} \\
&\text{Factor by grouping.} \\
&=(15xy - 10xz) + (-6py + 4pq) \\
&\text{Factor the Greatest Common Factor (GCF) from each set of parentheses.} \\
&= 5x(3y - 2q) - 2p(3y - 2q) \\
&= (3y - 2q)(5x - 2p) \\
&\text{The factors are } (3y - 2q) \text{ and } (5x - 2p). \\
\text{Choice B}
\end{align*}
\]
13. Factor Completely. \(18a^4 - 24a^3b + 8a^2b^2\)

**Solution:**
Factor the Greatest Common Factor (GCF) from each term.
\[
= 2a^2(9a^2 - 12ab + 4b^2)
\]
Note: \((x - y)^2 = x^2 - 2xy + y^2\)
\[
= 2a^2 [(3a)^2 - 2(3a)(2b) + (2b)^2]
\]
Let \(x = 3a\)
Let \(y = 2b\)
\[
= 2a^2(3a - 2b)^2
\]
Choice D

14. Translate and Solve.
"Four times a number is twice the difference between the number and three."

**Solution:**
Let \(x\) be a number.
\(4 \cdot x\) is 2 (difference between \(x\) and 3)
\[
4x = 2(x - 3)
\]
\[
4x = 2 \cdot x - 2 \cdot 3
\]
\[
4x = 2x - 6
\]
\[
x - 2x = 2x - 2x - 6
\]
\[
2x = -6 \quad \rightarrow \quad \frac{2x}{2} = \frac{-6}{2}
\]
\[
x = -3
\]
Choice C

15. Solve. \(8x - 3(x - 4) = 2x - 9\)

**Solution:**
Simplify both sides of the equation.
\[
8x - 3 \cdot x + (-3) \cdot (-4) = 2x - 9
\]
\[
8x - 3x + 12 = 2x - 9
\]
\[
5x + 12 = 2x - 9
\]
Isolate the variable \(x\).
\[
5x - 2x + 12 = 2x - 2x - 9
\]
\[
3x + 12 = -9
\]
\[
3x + 12 - 12 = -9 - 12
\]
\[
3x = -21 \quad \rightarrow \quad \frac{3x}{3} = \frac{-21}{3}
\]
\[
x = -7
\]
Choice A

16. What is the value of the \(y\)-coordinate of the solution to the following system of equations?
\[
\begin{align*}
(1) & \quad -4x + 8y = 10 \\
(2) & \quad 3x - 4y = -8
\end{align*}
\]

**Solution:**
Eliminate the \(x\) variable.
Multiply equation (1) by 3 and equation (2) by 4
\[
3(-4x + 8y = 10)
\]
\[
-12x + 24y = 30 \quad \rightarrow \quad \text{new equation (1)}
\]
\[
4(3x - 4y = -8)
\]
\[
12x - 16y = -32 \quad \rightarrow \quad \text{new equation (2)}
\]
Add the new equations (1) and (2)
\[
-12x + 24y = 30
\]
\[
+ 12x - 16y = -32
\]
\[
8y = -2
\]
\[
\frac{8y}{8} = \frac{-2}{8} \quad \rightarrow \quad y = -\frac{1}{4}
\]
Choice D
17. Choose the graph that shows the solution to the system.

Line 1: \(-2x + y = 4\)
Line 2: \(4x + 2y = 8\)

**Solution:**

Graph both equations on the same coordinate system.

<table>
<thead>
<tr>
<th>Line 1</th>
<th>Line 2</th>
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\(x\)-intercept: Let \(y = 0\)

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<td>(\frac{4}{4} = 1)</td>
</tr>
<tr>
<td>(x = -2)</td>
<td>(x = 2)</td>
</tr>
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<td>(x)-intercept: ((-2,0))</td>
<td>(x)-intercept: ((2,0))</td>
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Points on Line 1: \((0, 4)\) and \((-2,0)\)
Points on Line 2: \((0, 4)\) and \((2, 0)\)

Choice A

19. Solve for all values of \(t\). \(6t^2 = 144\)

**Solution:**

\(\frac{6t^2}{6} = \frac{144}{6}\)

\(t^2 = 24\)

Take the square root of both sides of the equation.

\(\sqrt{t^2} = \sqrt{24}\)

\(t = \pm\sqrt{24}\)

\(t = \pm\sqrt{4 \cdot 6}\)

\(t = \pm 2\sqrt{6}\)

\(t = 2\sqrt{6}\) or \(t = -2\sqrt{6}\)

Choice D

18. Solve for \(w\). \(P = 2l + 2w\)

**Solution:**

\(P - 2l = 2l + 2w\)
\(P - 2l = 2w\)
\(\frac{P - 2l}{2} = \frac{2w}{2}\)

\(\frac{P - 2l}{2} = w\) or \(w = \frac{P - 2l}{2}\)

Choice B

20. Solve for all values of \(x\). \(8x^2 = 36x\)

**Solution:**

Set the equation equal to zero: \(8x^2 - 36x = 0\)

Factor the Greatest Common Factor.

\(4x(2x - 9) = 0\)

Set each factor equal to zero and solve.

\(\begin{array}{c|c}
4x = 0 & 2x - 9 = 0 \\
4x = 0 & 2x - 9 + 9 = 0 + 9 \\
x = 0 & 2x = 9 \\
\frac{2}{2} = \frac{9}{2} & x = \frac{9}{2} \\
x = 0 & x = \frac{9}{2} \\
\end{array}\)

Choice B
21. Find the missing side of the right triangle.

\[
\begin{array}{c}
7 \\
11 \\
\hline
b \\
\end{array}
\]

Solution:
Use Pythagorean Theorem to solve the right triangle: \(a^2 + b^2 = c^2\) where \(c\) is the hypotenuse.
Let \(a = 7\) and \(c = 11\)
\[7^2 + b^2 = 11^2\]
\[49 + b^2 = 121\]
\[49 - 49 + b^2 = 121 - 49\]
\[b^2 = 72\]
\[b = \sqrt{72} = \sqrt{36 \cdot 2} = \sqrt{36} \cdot \sqrt{2} = 6\sqrt{2}\]

Choice C

22. Find the graph of the solution to the inequality

\[-10x + 5(x - 3) > -4(x + 2)\]

Solution:
Solve the inequality.
\[-10x + 5 \cdot x - 5 \cdot 3 > -4 \cdot x + (-4) \cdot 2\]
\[-10x + 5x - 15 > -4x - 8\]
\[-5x - 15 > -4x - 8\]
\[-5x + 4x - 15 > -4x + 4x - 8\]
\[-1x - 15 > -8\]
\[-1x - 15 + 15 > -8 + 15\]
\[-1x > 7 \quad \Rightarrow \quad \frac{-1x}{-1} < \frac{7}{-1}\]
\[x < -7\]
Note: Reverse the inequality sign when multiplying or dividing by a negative number.
“\(x\) is less than -7”

Choice D

23. If \(f(x) = 2x^2 - 9x - 1\), find \(f(-a)\)

Solution:
Substitute \(-a\) for \(x\).
\[= 2(-a)^2 - 9(-a) - 1\]
\[= 2(-a)(-a) - 9(-a) - 1\]
\[= 2a^2 + 9a - 1\]

Choice A

24. Find the equation of the line that passes through the points \((-2, 3)\) and \((1, -9)\). Write the equation in slope-intercept form.

Solution:
Find the slope of the line using
slope formula: \(m = \frac{y_2-y_1}{x_2-x_1}\)
\((x_1, y_1) = (-2, 3)\)
\((x_2, y_2) = (1, -9)\)
\[m = \frac{(-9)-3}{1-(-2)} = \frac{-12}{3} = -4\]

Let \((x_1, y_1) = (-2, 3)\) and use the point-slope formula to find the equation of the line: \(y - y_1 = m(x - x_1)\)
\[y - 3 = -4(x - (-2))\]
\[y - 3 = -4(x + 2)\]
\[y - 3 = -4x - 8\]
\[y - 3 + 3 = -4x - 8 + 3\]
\[y = -4x - 5\]

Choice D

25. Find the equation of the horizontal line that passes through the point \((7, -4)\).

Solution:
The equation of a horizontal line passing through a point \((a, b)\) is \(y = b\).
\((a, b) = (7, -4); b = -4\)
\[y = -4\]

Choice D
26. Find the slope and y-intercept of the line $3x - 6y = 48$.

Solution:
Write the equation in slope-intercept form, $y = mx + b$, by solving for $y$. The slope of the line is $m$ and the y-intercept is $(0, b)$.

\[3x - 3x - 6y = -3x + 48\]
\[-6y = -3x + 48\]
\[y = \frac{-3x + 48}{-6} \quad \rightarrow \quad y = \frac{1}{2}x - 8\]

$m = \frac{1}{2}$ and y-intercept: $(0, -8)$

Choice A

27. Find the equation of the line that passes through the point $(-3, 4)$ and has slope $-\frac{2}{3}$.

Solution:
Use the point-slope formula to find the equation of the line: $y - y_1 = m(x - x_1)$

Let $(x_1, y_1) = (-3, 4)$ and $m = -\frac{2}{3}$

\[y - 4 = -\frac{2}{3}(x - (-3))\]
\[y - 4 = -\frac{2}{3}(x + 3)\]
\[y - 4 = -\frac{2}{3}x + \left(-\frac{2}{3}\right) \cdot 3\]
\[y - 4 = -\frac{2}{3}x - 2\]
\[y - 4 + 4 = -\frac{2}{3}x - 2 + 4\]
\[y = -\frac{2}{3}x + 2\]

Choice B

28. If it takes $\frac{3}{4}$ cup of vegetable oil to make 6 cupcakes, how many cupcakes can be made with 2 cups of vegetable oil?

Solution:
Write and solve a proportion using $x$ to represent the number of cupcakes.

\[\frac{\frac{3}{4} \text{ cup of oil}}{6 \text{ cupcakes}} = \frac{2 \text{ cups of oil}}{x}\]

Cross multiply and solve for $x$.

\[\frac{3}{4}x = (2) \cdot (6) \quad \rightarrow \quad \frac{3}{4}x = 12\]

Multiply both sides of the equation by the reciprocal of the coefficient of $x$: $\frac{4}{3} \cdot \frac{3}{4}x = \frac{4}{3} \cdot 12$

$x = 16$ cupcakes

Choice C

29. Your annual salary is $55,000. If you get a 30% bonus this year, what is your total salary this year?

Solution:
Total Salary = Annual Salary + Bonus

Bonus = $55,000 \cdot 0.30 = \frac{3}{10} \cdot 55,000 = 3 \cdot 5,500$

Bonus = $16,500$

Total Salary = $55,000 + 16,500$

Total Salary = $71,500$

Choice C

30. Which of the following is the graph of the equation $-10x - 5y = 20$?

Solution:
Find both intercepts of the line:

$x$-intercept: let $y = 0$

\[-10x - 5(0) = 20\]

\[-10x = 20\]

\[x = -2\]

$y$-intercept: let $x = 0$

\[-10(0) - 5y = 20\]

\[-5y = 20\]

\[y = -4\]

$x$-intercept: $(-2, 0)$ $y$-intercept: $(0, -4)$

Choice C