



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) 10.71×10^7 B) 10.71×10^{10} C) 1.071×10^8 D) 1.071×10^7

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) $8x^3 - 20x^2 - 16x + 12$ B) $8x^3 - 26x^2 - 31x + 12$ C) $8x^3 - 26x^2 - x + 12$ D) $8x^2 - 5x + 12$

8. **Multiply.** $(7x - 2)^2$

- A) $49x^2 - 28x + 4$ B) $49x^2 + 4$ C) $14x^2 + 4$ D) $49x^2 - 14x + 4$

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

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

10. **Factor Completely.** $6x^3y^2 - 24xz^2$

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

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

- A) $x + 5$ B) $4x - 2$ C) $4x + 5$ D) $x - 2$

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

- A) $4s - 3t$ B) $2x - 7y$ C) $2x + 7t$ 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?

$$\begin{aligned} 3x + y &= 3 \\ -2x + 2y &= -10 \end{aligned}$$

- 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) $n = -3$ B) $n = 0$ or $n = -3$ C) $n = 3$ D) $n = 0$ or $n = 3$

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

- A) $x = \frac{5}{2}$ B) $x = -\frac{5}{4}$ or $x = \frac{5}{4}$ C) $x = -\frac{5}{2}$ or $x = \frac{5}{2}$ 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.

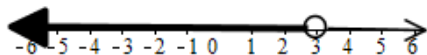
- A) 12 meters B) 8 meters C) 4 meters D) 16 meters

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

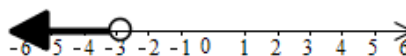
- A) $x \geq -1$ B) $x \geq 1$ C) $x \leq 1$ D) $x \leq -1$

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

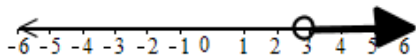
A)



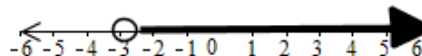
B)



C)



D)



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

- A) -15 B) -115 C) 35 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?

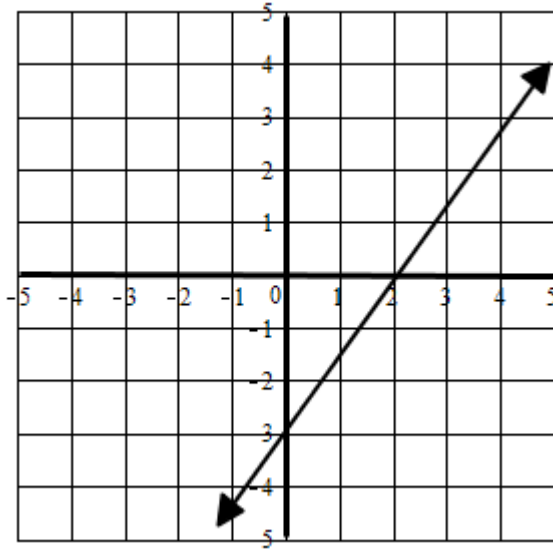
A) 4 hours B) 6 hours C) 8 hours D) 10 hours

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?

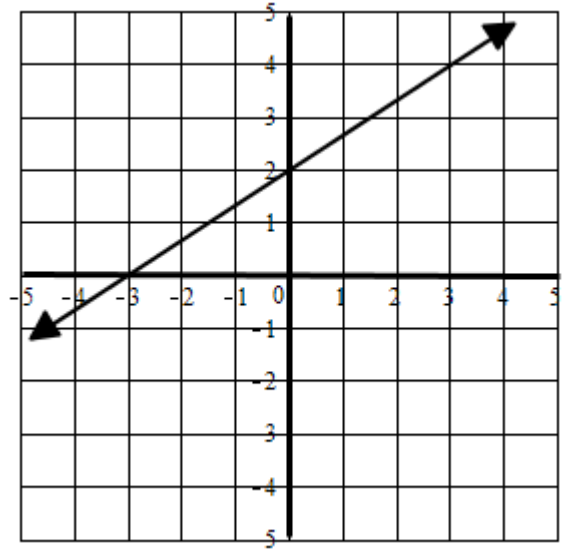
A) 25% B) 20% C) 15% D) 10%

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

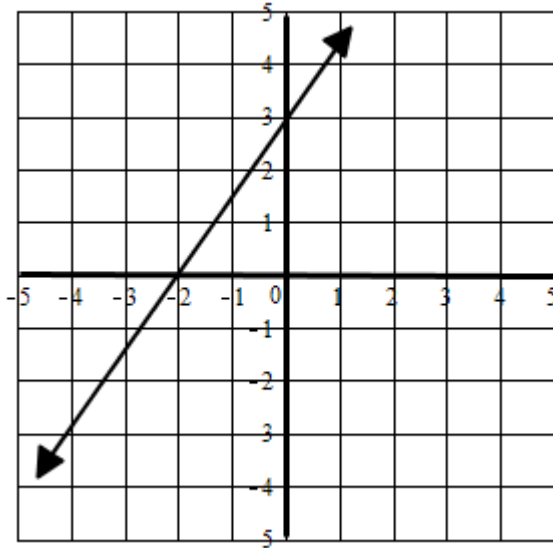
A)



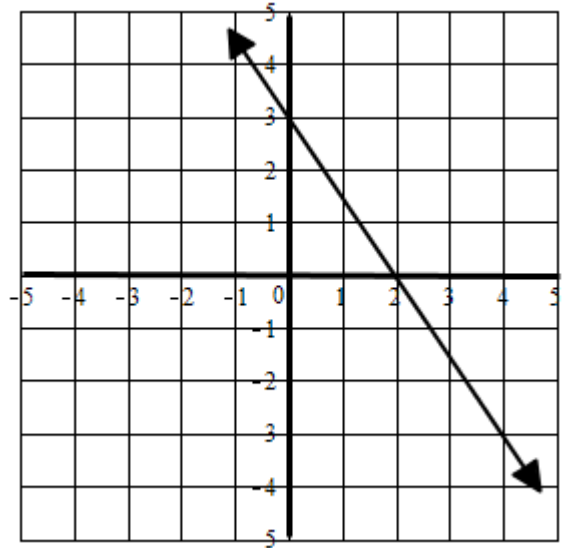
B)



C)



D)



Answer Key - Problem Set I

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

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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.

$$(1.7 \times 10^2)(6.3 \times 10^5)$$

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.

$$(-x^3y^{-6}z^5)(8x^{-3}yz^4)$$

Solution:

$$= (-1 \cdot 8)(x^3 \cdot x^{-3})(y^{-6} \cdot y)(z^5 \cdot z^4)$$

$$= -8x^{3+(-3)}y^{-6+1}z^{5+4}$$

$$= -8x^0y^{-5}z^9$$

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

Solution:

$$= -7x^3y^2 + 4xy - 3x^3y^2 - 2xy$$

$$= -7x^3y^2 - 3x^3y^2 + 4xy - 2xy$$

Add coefficients of like terms.

$$= (-7 - 3)x^3y^2 + (4 - 2)xy$$

$$= -10x^3y^2 + 2xy$$

Choice D

7. Multiply. $(4x - 3)(2x^2 - 5x - 4)$

Solution:

Use the Distributive Property.

$$\begin{aligned} &= 4x \cdot (2x^2 - 5x - 4) - 3 \cdot (2x^2 - 5x - 4) \\ &= 4x \cdot 2x^2 - 4x \cdot 5x - 4x \cdot 4 - 3 \cdot 2x^2 + 3 \cdot 5x + 3 \cdot 4 \\ &= 8x^{1+2} - 20x^{1+1} - 16x - 6x^2 + 15x + 12 \\ &= 8x^3 - 20x^2 - 16x - 6x^2 + 15x + 12 \\ &= 8x^3 + (-20 - 6)x^2 + (-16 + 15)x + 12 \\ &= 8x^3 - 26x^2 - x + 12 \end{aligned}$$

Choice C

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

Solution:

Note: $(a - b)^2 = a^2 - 2ab + b^2$

Let $a = 7x$ and $b = 2$

$$\begin{aligned} &= (7x)^2 - 2(7x)(2) + (2)^2 \\ &= 7x \cdot 7x - (2 \cdot 7 \cdot 2)x + (2) \cdot (2) \\ &= 49x^{1+1} - 28x + 4 \\ &= 49x^2 - 28x + 4 \end{aligned}$$

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.

$$\begin{aligned} &= \frac{21x^3y^2}{-7xy^2} - \frac{28x^2y^2}{-7xy^2} + \frac{7xy^2}{-7xy^2} \\ &= -3x^{3-1}y^{2-2} + 4x^{2-1}y^{2-2} - 1x^{1-1}y^{2-2} \\ &= -3x^2y^0 + 4xy^0 - 1x^0y^0 \end{aligned}$$

Note: If $x \neq 0$, then $x^0 = 1$.

$$\begin{aligned} &= -3x^2(1) + 4x(1) - 1(1)(1) \\ &= -3x^2 + 4x - 1 \end{aligned}$$

Choice B

10. Factor Completely. $6x^3y^2 - 24xz^2$

Solution:

Factor the Greatest Common Factor (GCF) from each term.

$$= 6x(x^2y^2 - 4z^2)$$

Use the Difference of Two Squares.

$$\begin{aligned} &= 6x[(xy)^2 - (2z)^2] \\ &= 6x[(xy + 2z)(xy - 2z)] \\ &= 6x(xy + 2z)(xy - 2z) \end{aligned}$$

Choice D

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

Solution:

Factor by grouping.

$$a \cdot c = (4) \cdot (10) = 40$$

Find the factors of 40 whose sum is $b = -13$.

$$(-8) \cdot (-5) = 40 \quad \text{and} \quad (-8) + (-5) = -13$$

Rewrite $-13x$ as $-8x - 5x$.

$$\begin{aligned} &= 4x^2 - 8x - 5x + 10 \\ &= (4x^2 - 8x) + (-5x + 10) \\ &= 4x(x - 2) - 5(x - 2) \\ &= (x - 2)(4x - 5) \end{aligned}$$

The factors are $(x - 2)$ and $(4x - 5)$.

Choice D

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

Solution:

Factor by grouping.

$$= (8sx + 28sy) + (-6xt - 21ty)$$

Factor the Greatest Common Factor (GCF) from each set of parentheses.

$$\begin{aligned} &= 4s(2x + 7y) - 3t(2x + 7y) \\ &= (2x + 7y)(4s - 3t) \end{aligned}$$

The factors are $(2x + 7y)$ and $(4s - 3t)$.

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 is 3 times (difference between x and 2)

$$9 = 3 \cdot (x - 2)$$

$$9 = 3x - 6$$

$$9 + 6 = 3x - 6 + 6$$

$$15 = 3x \rightarrow \frac{15}{3} = \frac{3x}{3}$$

$$5 = x \text{ or } x = 5$$

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?

$$(1) \quad 3x + y = 3$$

$$(2) \quad -2x + 2y = -10$$

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)

$$-6x - 2y = -6$$

$$+ -2x + 2y = -10$$

$$\hline -8x \qquad \qquad = -16$$

$$\frac{-8x}{-8} = \frac{-16}{-8} \rightarrow x = 2$$

Choice B

17. Solve for t . $v = v_0 + at$

Solution:

$$v - v_0 = v_0 - v_0 + at$$

$$v - v_0 = at$$

$$\frac{v - v_0}{a} = \frac{at}{a}$$

$$\frac{v - v_0}{a} = t \text{ or } t = \frac{v - v_0}{a}$$

Choice A

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

Solution:

Set each factor equal to zero and solve.

$2x + 3 = 0$	$x - 8 = 0$
$2x + 3 - 3 = 0 - 3$	$x - 8 + 8 = 0 + 8$
$2x = -3$	$x = 8$
$\frac{2x}{2} = \frac{-3}{2}$	
$x = -\frac{3}{2}$	$x = 8$

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.

$5n = 0$	$n + 3 = 0$
$\frac{5n}{5} = \frac{0}{5}$	$n + 3 - 3 = 0 - 3$
$n = 0$	$n = -3$

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.

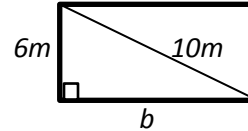
$2x + 5 = 0$	$2x - 5 = 0$
$2x + 5 - 5 = 0 - 5$	$2x - 5 + 5 = 0 + 5$
$2x = -5$	$2x = 5$
$\frac{2x}{2} = \frac{-5}{2}$	$\frac{2x}{2} = \frac{5}{2}$
$x = -\frac{5}{2}$	$x = \frac{5}{2}$

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.



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

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

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

$$36 + b^2 = 100$$

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

$$b^2 = 64$$

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

Choice B

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

Solution:

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

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

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

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

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

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

$$-20x \geq 20 \rightarrow \frac{-20x}{-20} \leq \frac{20}{-20}$$

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

$$\text{slope formula: } m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$(x_1, y_1) = (-5, -6)$$

$$(x_2, y_2) = (-7, 4)$$

$$m = \frac{(4) - (-6)}{(-7) - (-5)} = \frac{10}{-2} = -5$$

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 $(0, b)$.

$$7y - 4x + 4x = 4x + 21$$

$$7y = 4x + 21$$

$$y = \frac{4x}{7} + \frac{21}{7}$$

$$y = \frac{4}{7}x + 3$$

$$m = \frac{4}{7}$$

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.

$$\frac{350}{5} = \frac{560}{x} \rightarrow \frac{70}{1} = \frac{560}{x}$$

Cross multiply and solve for x .

$$70x = (560) \cdot (1)$$

$$70x = 560 \rightarrow \frac{70x}{70} = \frac{560}{70}$$

$$x = \frac{560}{70} = \frac{56}{7}$$

$x = 8$ 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:

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

$$\text{Percent Decrease} = \frac{\$25,000 - \$20,000}{\$25,000} \cdot 100\%$$

$$\text{Percent Decrease} = \frac{\$5,000}{\$25,000} \cdot 100\%$$

$$\text{Percent Decrease} = \frac{1}{5} \cdot 100\% = 20\%$$

Choice B

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

Solution:

Find both intercepts of the line:

x-intercept	y-intercept
x -intercept: let $y = 0$ $9x - 6(0) = 18$ $9x - 0 = 18$ $9x = 18$ $\frac{9x}{9} = \frac{18}{9}$ $x = 2$ x -intercept: $(2, 0)$	y -intercept: let $x = 0$ $9(0) - 6y = 18$ $0 - 6y = 18$ $-6y = 18$ $\frac{-6y}{-6} = \frac{18}{-6}$ $y = -3$ y -intercept: $(0, -3)$

Choice A

Problem Set II

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1. Simplify. $\frac{(5\sqrt{24})(3\sqrt{45})}{\sqrt{6}}$

- A) $30\sqrt{45}$ 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) 2.3×10^7 B) 2.3×10^{-7} C) 23×10^6 D) 23×10^{-6}

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

- A) 1.6×10^{13} B) 16×10^{12} C) 16×10^4 D) 1.6×10^5

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)
- $-4n^4 + 3n^2 + 1$
- 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?

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

A) $y = 2$

B) $y = \frac{1}{4}$

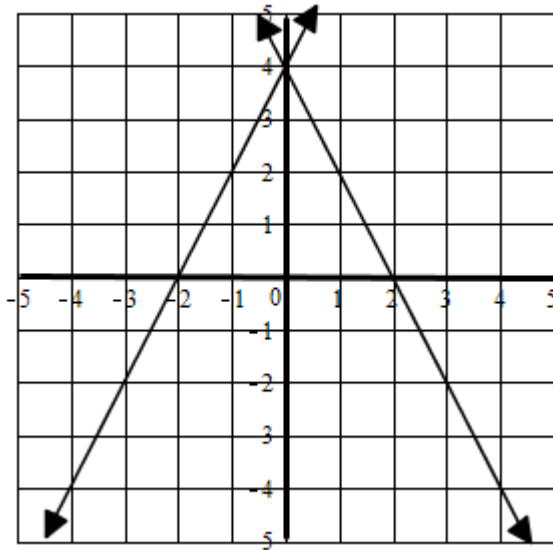
C) $y = -4$

D) $y = -\frac{1}{4}$

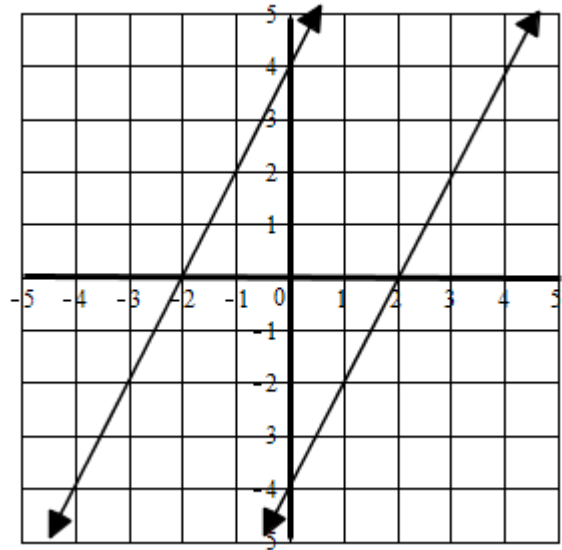
17. Choose the graph that shows the solution to the system.

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

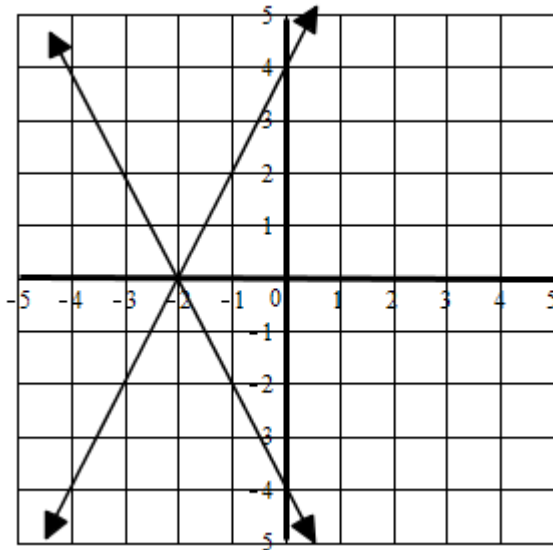
A)



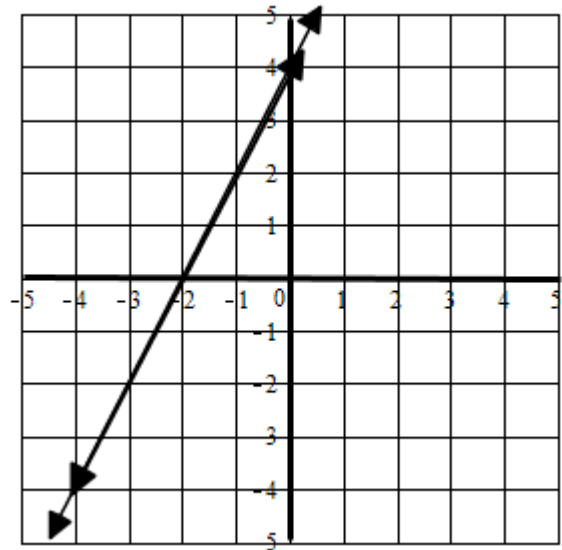
B)



C)



D)



18. Solve for w . $P = 2l + 2w$

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

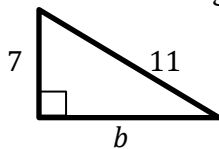
19. Solve for all values of t . $6t^2 = 144$

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

20. Solve for all values of x . $8x^2 = 36x$

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

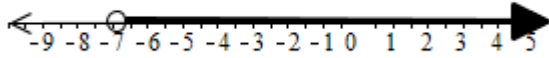
21. Find the missing side of the right triangle.



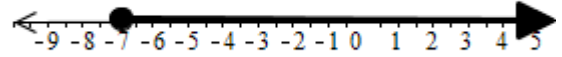
- A) $b = 2\sqrt{6}$ B) $b = 2\sqrt{2}$ C) $b = 6\sqrt{2}$ D) $b = 3\sqrt{3}$

22. Find the graph of the solution to the inequality $-10x + 5(x - 3) > -4(x + 2)$.

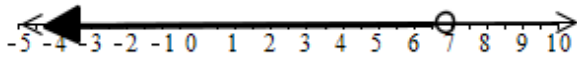
A)



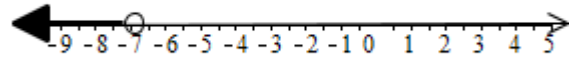
B)



C)



D)



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

A) $f(-a) = 2a^2 + 9a - 1$

B) $f(-a) = -2a^2 + 9a - 1$

C) $f(-a) = 2a^2 + 8a$

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) $y = -2x - 1$

B) $y = 6x + 12$

C) $y = -4x + 3$

D) $y = -4x - 5$

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

A) $y = x - 4$

B) $y = -\frac{4}{7}x$

C) $x = 7$

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 = $(0, 48)$ 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?

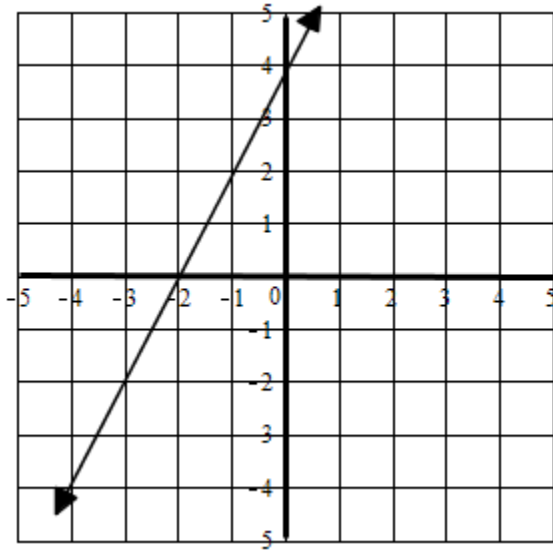
- A) 9 cupcakes B) 4 cupcakes C) 16 cupcakes D) 12 cupcakes

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

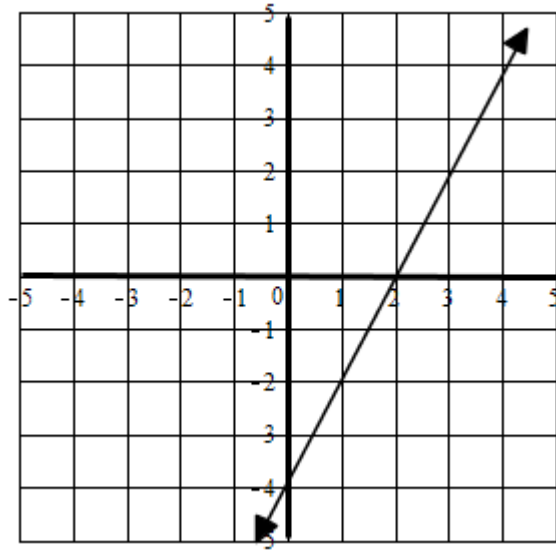
- A) \$165,000 B) \$58,300 C) \$71,500 D) \$85,000

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

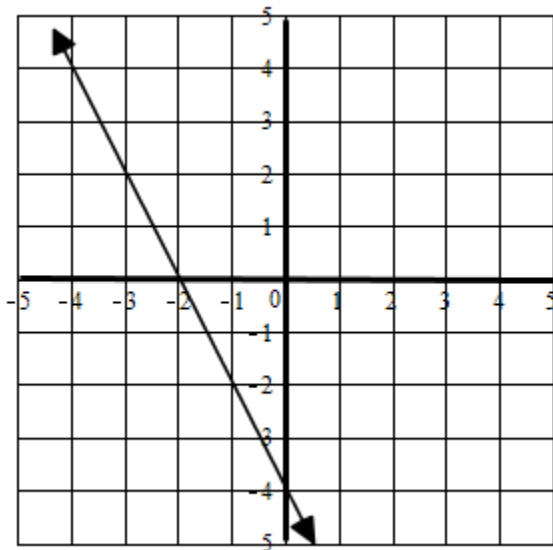
A)



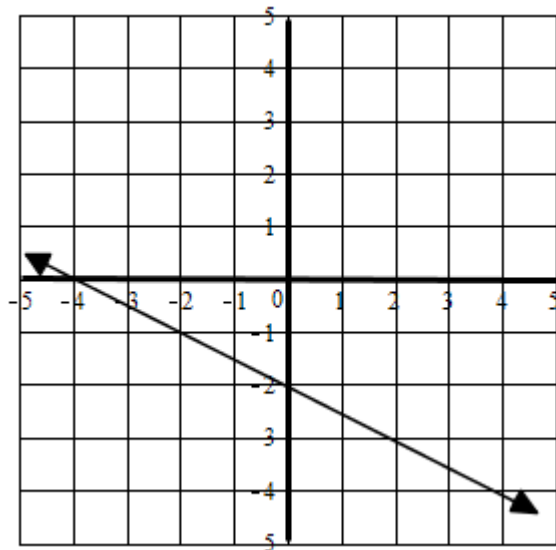
B)



C)



D)



Answer Key - Problem Set II

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

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Solution Guide to Problem Set II

1. Simplify. $\frac{(5\sqrt{24})(3\sqrt{45})}{\sqrt{6}}$

Solution:

$$\begin{aligned} &= \frac{(5\sqrt{4 \cdot 6})(3\sqrt{9 \cdot 5})}{\sqrt{6}} = \frac{(5\sqrt{4 \cdot \sqrt{6}})(3\sqrt{9 \cdot \sqrt{5}})}{\sqrt{6}} \\ &= \frac{(5 \cdot 2 \cdot \sqrt{6})(3 \cdot 3 \cdot \sqrt{5})}{\sqrt{6}} \\ &= \frac{(10 \cdot \sqrt{6})(9 \cdot \sqrt{5})}{\sqrt{6}} = \frac{(10 \cdot 9)\sqrt{6} \cdot \sqrt{5}}{\sqrt{6}} \end{aligned}$$

Rationalize the denominator.

$$\begin{aligned} &= \frac{90\sqrt{30}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{90\sqrt{180}}{6} \\ &= \frac{90\sqrt{36 \cdot 5}}{6} = \frac{90\sqrt{36} \cdot \sqrt{5}}{6} = \frac{90 \cdot 6 \cdot \sqrt{5}}{6} \\ &= 90 \cdot (1) \cdot \sqrt{5} = 90\sqrt{5} \end{aligned}$$

Choice C

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

Solution:

$$\begin{aligned} &= -5\sqrt{3} - \sqrt{4 \cdot 2} + 4\sqrt{9 \cdot 2} - 2\sqrt{4 \cdot 3} \\ &= -5\sqrt{3} - \sqrt{4} \cdot \sqrt{2} + 4\sqrt{9} \cdot \sqrt{2} - 2\sqrt{4} \cdot \sqrt{3} \\ &= -5\sqrt{3} - 2\sqrt{2} + 4 \cdot 3\sqrt{2} - 2 \cdot 2\sqrt{3} \\ &= -5\sqrt{3} - 2\sqrt{2} + 12\sqrt{2} - 4\sqrt{3} \\ &= (-2 + 12)\sqrt{2} + (-5 - 4)\sqrt{3} \\ &= 10\sqrt{2} - 9\sqrt{3} \end{aligned}$$

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:

$$\begin{aligned} &= \frac{24 \cdot 2}{3} \times \frac{10^5 \cdot 10^3}{10^{-4}} \\ &= 16 \times \frac{10^{5+3}}{10^{-4}} \\ &= 16 \times \frac{10^8}{10^{-4}} \\ &= 16 \times 10^{8-(-4)} = 16 \times 10^{8+4} \\ &= 16 \times 10^{12} \end{aligned}$$

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:

$$\begin{aligned} &= \frac{2^3 \cdot y^3 \cdot y^4}{8^2 \cdot y^2} \\ &= \frac{8 \cdot y^{3+4}}{64 \cdot y^2} = \frac{8 \cdot y^7}{64 \cdot y^2} \\ &= \frac{1 \cdot y^{7-2}}{8} = \frac{y^5}{8} \end{aligned}$$

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.** $(-5a^2 + 3a - 6) - (4a^2 + 2a - 3)$

Solution:

$$\begin{aligned} &= -5a^2 + 3a - 6 - 4a^2 - 2a + 3 \\ &= -5a^2 - 4a^2 + 3a - 2a - 6 + 3 \\ &\text{Add the coefficients of like terms.} \\ &= (-5 - 4)a^2 + (3 - 2)a + (-6 + 3) \\ &= -9a^2 + a - 3 \end{aligned}$$

Choice D

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

Solution:

Use the Distributive Property.

$$\begin{aligned} &= 3x \cdot (4x^2 - 2x - 1) + 2 \cdot (4x^2 - 2x - 1) \\ &= 3x \cdot 4x^2 - 3x \cdot 2x - 3x \cdot 1 + 2 \cdot 4x^2 - 2 \cdot 2x - 2 \cdot 1 \\ &= 12x^{1+2} - 6x^{1+1} - 3x + 8x^2 - 4x - 2 \\ &= 12x^3 - 6x^2 - 3x + 8x^2 - 4x - 2 \\ &= 12x^3 + (-6 + 8)x^2 + (-3 - 4)x - 2 \\ &= 12x^3 + 2x^2 - 7x - 2 \end{aligned}$$

Choice A

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

Solution:

Divide each term in the numerator by the denominator.

$$\begin{aligned} &= \frac{-24n^6}{6n^2} + \frac{18n^4}{6n^2} + \frac{6n^2}{6n^2} \\ &= -4n^{6-2} + 3n^{4-2} + 1n^{2-2} \\ &= -4n^4 + 3n^2 + 1n^0 \\ &\text{Note: If } x \neq 0, \text{ then } x^0 = 1. \\ &= -4n^4 + 3n^2 + 1(1) \\ &= -4n^4 + 3n^2 + 1 \end{aligned}$$

Choice C

10. **Factor Completely.** $32x^3y - 18xy^3$

Solution:

Factor the Greatest Common Factor (GCF) from each term.

$$\begin{aligned} &= 2xy(16x^2 - 9y^2) \\ &\text{Use the Difference of Two Squares.} \\ &= 2xy[(4x)^2 - (3y)^2] \\ &= 2xy[(4x + 3y)(4x - 3y)] \\ &= 2xy(4x + 3y)(4x - 3y) \end{aligned}$$

Choice A

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

Solution:

Factor by grouping.

$$\begin{aligned} a \cdot c &= (6) \cdot (-3) = -18 \\ &\text{Find the factors of } -18 \text{ whose sum is } b = 17. \\ (18) \cdot (-1) &= -18 \text{ and } (18) + (-1) = 17 \\ &\text{Rewrite } 17z \text{ as } 18z - 1z \\ &= 6z^2 + 18z - 1z - 3 \\ &= (6z^2 + 18z) + (-1z - 3) \\ &= 6z(z + 3) - 1(z + 3) \\ &= (z + 3)(6z - 1) \end{aligned}$$

The factors are $(z + 3)$ and $(6z - 1)$.

Choice C

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

Solution:

Factor by grouping.

$$\begin{aligned} &= (15xy - 10xq) + (-6py + 4pq) \\ &\text{Factor the Greatest Common Factor (GCF) from each set of parentheses.} \\ &= 5x(3y - 2q) - 2p(3y - 2q) \\ &= (3y - 2q)(5x - 2p) \end{aligned}$$

The factors are $(3y - 2q)$ and $(5x - 2p)$.

Choice B

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)

$$4x = 2(x - 3)$$

$$4x = 2 \cdot x - 2 \cdot 3$$

$$4x = 2x - 6$$

$$4x - 2x = 2x - 2x - 6$$

$$2x = -6 \rightarrow \frac{2x}{2} = \frac{-6}{2}$$

$$x = -3$$

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 .

$$5x - 2x + 12 = 2x - 2x - 9$$

$$3x + 12 = -9$$

$$3x + 12 - 12 = -9 - 12$$

$$3x = -21 \rightarrow \frac{3x}{3} = \frac{-21}{3}$$

$$x = -7$$

Choice A

16. What is the value of the y -coordinate of the solution to the following system of equations?

(1) $-4x + 8y = 10$

(2) $3x - 4y = -8$

Solution:

Eliminate the x variable.

Multiply equation (1) by 3 and equation (2) by 4

$$3(-4x + 8y = 10)$$

$$-12x + 24y = 30 \rightarrow \text{new equation (1)}$$

$$4(3x - 4y = -8)$$

$$12x - 16y = -32 \rightarrow \text{new equation (2)}$$

Add the new equations (1) and (2)

$$-12x + 24y = 30$$

$$+ \quad 12x - 16y = -32$$

$$\hline 8y = -2$$

$$\frac{8y}{8} = \frac{-2}{8} \rightarrow y = -\frac{1}{4}$$

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.

Line 1	Line 2
$-2x + y = 4$	$4x + 2y = 8$
y-intercept : let $x = 0$	y-intercept: let $x = 0$
$-2(0) + y = 4$	$4(0) + 2y = 8$
	$\frac{2y}{2} = \frac{8}{2}$
$y = 4$	$y = 4$
y-intercept: $(0, 4)$	y-intercept: $(0, 4)$
x-intercept : Let $y = 0$	x-intercept: Let $y = 0$
$-2x + 0 = 4$	$4x + 2(0) = 8$
$\frac{-2x}{-2} = \frac{4}{-2}$	$\frac{4x}{4} = \frac{8}{4}$
$x = -2$	$x = 2$
x-intercept: $(-2, 0)$	x-intercept: $(2, 0)$
<u>Points on Line 1:</u>	<u>Points on Line 2:</u>
$(0, 4)$ and $(-2, 0)$	$(0, 4)$ and $(2, 0)$

Choice A

18. Solve for w . $P = 2l + 2w$

Solution:

$$P - 2l = 2l - 2l + 2w$$

$$P - 2l = 2w$$

$$\frac{P - 2l}{2} = \frac{2w}{2}$$

$$\frac{P - 2l}{2} = w \quad \text{or} \quad w = \frac{P - 2l}{2}$$

Choice B

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.

$$\sqrt{t^2} = \sqrt{24}$$

$$t = \pm\sqrt{24}$$

$$t = \pm\sqrt{4 \cdot 6}$$

$$t = \pm\sqrt{4} \cdot \sqrt{6}$$

$$t = \pm 2\sqrt{6}$$

$$t = 2\sqrt{6} \text{ or } t = -2\sqrt{6}$$

Choice D

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.

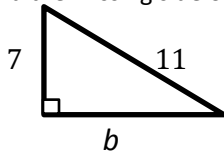
$$4x(2x - 9) = 0$$

Set each factor equal to zero and solve.

$4x = 0$	$2x - 9 = 0$
$\frac{4x}{4} = \frac{0}{4}$	$2x - 9 + 9 = 0 + 9$
$x = 0$	$2x = 9$
	$\frac{2x}{2} = \frac{9}{2}$
	$x = \frac{9}{2}$

Choice B

21. Find the missing side of the right triangle.



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.

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

$$-10x + 5x - 15 > -4x - 8$$

$$-5x - 15 > -4x - 8$$

$$-5x + 4x - 15 > -4x + 4x - 8$$

$$-1x - 15 > -8$$

$$-1x - 15 + 15 > -8 + 15$$

$$-1x > 7 \rightarrow \frac{-1x}{-1} < \frac{7}{-1}$$

$$x < -7$$

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

$$\text{slope formula: } m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$(x_1, y_1) = (-2, 3)$$

$$(x_2, y_2) = (1, -9)$$

$$m = \frac{(-9) - (3)}{(1) - (-2)} = \frac{-12}{3} = -4$$

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 $(0, b)$

$$3x - 3x - 6y = -3x + 48$$

$$-6y = -3x + 48$$

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

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

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: $y - y_1 = m(x - x_1)$

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

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

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

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

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

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

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

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 .

$$\frac{3}{4}x = (2) \cdot (6) \rightarrow \frac{3}{4}x = 12$$

Multiply both sides of the equation by the reciprocal of

$$\text{the coefficient of } x: \frac{4}{3} \cdot \frac{3}{4}x = \frac{4}{3} \cdot 12$$

$$x = 16 \text{ cupcakes}$$

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:

$$\text{Total Salary} = \text{Annual Salary} + \text{Bonus}$$

$$\text{Bonus} = 30\% \text{ of } \$55,000$$

$$\text{Bonus} = \frac{30}{100} \cdot \$55,000 = \frac{3}{10} \cdot \$55,000 = 3 \cdot \$5,500$$

$$\text{Bonus} = \$16,500$$

$$\text{Total Salary} = \$55,000 + \$16,500$$

$$\text{Total Salary} = \$71,500$$

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	y-intercept
x-intercept: let $y = 0$	y-intercept: let $x = 0$
$-10x - 5(0) = 20$	$-10(0) - 5y = 20$
$-10x - 0 = 20$	$0 - 5y = 20$
$-10x = 20$	$-5y = 20$
$\frac{-10x}{-10} = \frac{20}{-10}$	$\frac{-5y}{-5} = \frac{20}{-5}$
$x = -2$	$y = -4$
x-intercept: $(-2, 0)$	y-intercept: $(0, -4)$

Choice C