

$$\frac{\Gamma - \Gamma + \mu -}{\Gamma - \Gamma - 5 - 2 -} = \frac{(\Gamma -) - (\mu -)}{(\Gamma -) - (\Gamma -)}$$

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 05
Nikos Apostolakis

Exam 2
October 9, 2016

Name: KEY

Directions: Write your answers in the provided space. To get full credit you *must* show all your work. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. Each question is worth 4 points

1. Evaluate: $20 - 2^3 \div 4 \cdot 2 = 20 - 8 \div 4 \cdot 2 = 20 - 2 \cdot 2 = 20 - 4 = 16$
 A. 19 B. 16 C. 6 D. -6

2. Write a mathematical statement that represent the following English statement:
 Eleven less than seven times a number is 59.

$$7x - 11 = 59$$

3. Find the number that satisfies the statement in Question 2.

$$7x - 11 = 59 \Leftrightarrow 7x = 70 \Leftrightarrow x = \frac{70}{7} \Rightarrow x = 10$$

4. Evaluate $a^2 - b^2$, when $a = 3$ and $b = -3$.
 A. 18 B. -18 C. 0 D. 12

$$(3)^2 - (-3)^2 = (9) - (9) = 0$$

5. Evaluate the expression $x^2 - xy + y^2$, when $x = -2$ and $y = 3$.

$$\begin{aligned} (-2)^2 - (-2)(3) + (3)^2 &= (4) - (-2)(3) + (9) \\ &= (4) - (-6) + (9) \\ &= 4 + 6 + 9 \\ &= 19 \end{aligned}$$

$$\frac{(-14) - (-7)}{(-5) - (-2)} = \frac{-14+7}{-5-2} = \frac{-7}{-7} = 1$$

6. Evaluate the expression $\frac{y_2 - y_1}{x_2 - x_1}$, when $x_1 = 2$, $x_2 = -5$, $y_1 = -7$, and $y_2 = -14$.

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

7. Solve for b: $3(5 - 2b) = 1 - 20b$

- A. $b = 1$ **B. $b = -1$** C. $b = -\frac{7}{9}$ D. $b = \frac{7}{13}$

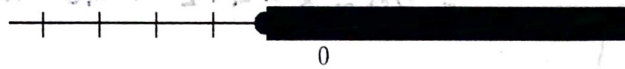
$$\begin{aligned} 15 - 6b &= 1 - 20b \iff 14 = -14b \\ 7 + 6b &\iff b = \frac{14}{-14} \\ &\iff b = -1 \end{aligned}$$

8. If n represents a number, which equation is correct translation of the sentence?

12 is 7 less than 3 times a number.

- A. $12 = 7 - 3n$ B. $12 = 3(n - 7)$ **C. $12 = 3n - 7$** D. $12 = 3(7 - n)$

9. The following is the graph of the solution set of a linear inequality.

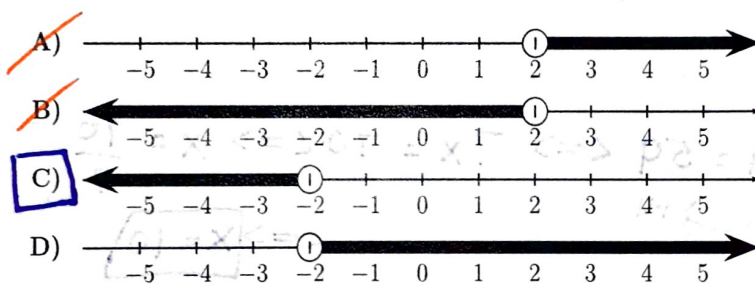


The inequality is:

- A. $x + 2 < 1$ B. $x + 2 > 1$ C. $x + 2 \leq 1$ **D. $x + 2 \geq 1$**

$x \leq 0$ $x \geq -1$ ✓

10. Find the graph of the solution to the inequality $5x - 3 > 6x - 1$



Border Value:

$$\begin{aligned} 5x - 3 &= 6x - 1 \\ -x - 3 &= -1 \\ -2 &= x \end{aligned}$$

Test $x = 0$
 $5 \cdot 0 - 3 > 6 \cdot 0 - 1$
 $\iff -3 > -1$
FALSE

11. Solve for z : $3x - 5z = 7 - 2y$

- A. $z = -5(3x + 2y - 7)$
 B. $z = \frac{7 - 3x - 2y}{5}$
 C. $z = \frac{3x - 2y + 7}{5}$
D. $z = \frac{3x + 2y - 7}{5}$

$$\begin{aligned} 3x - 5z &= 7 - 2y \iff -5z = 7 - 2y - 3x \\ z &= \frac{7 - 2y - 3x}{-5} \cdot \frac{-1}{-1} \\ z &= \frac{-7 + 2y + 3x}{5} \end{aligned}$$

12. Evaluate the expression $\sqrt{b^2 - 4ac}$, when $a = 6$, $b = -7$, $c = -3$.

$$\sqrt{(-7)^2 - 4(6)(-3)} = \sqrt{49 - (-72)} = \sqrt{49 + 72} = \sqrt{121} = 11$$

$$d = \sqrt{b^2 - 4ac}$$

13. Solve the equation: $\frac{x-2}{6} + \frac{2-x}{3} = \frac{x}{2}$

LCD = 6

$$6 \cdot \frac{x-2}{6} + 6 \cdot \frac{2-x}{3} = 6 \cdot \frac{x}{2} \Leftrightarrow x-2 + 4-2x = 3x$$

$$\Leftrightarrow -x + 2 = 3x$$

$$\Leftrightarrow 2 = 4x$$

$$\Leftrightarrow \frac{2}{4} = x \Leftrightarrow x = \frac{1}{2}$$

14. Solve the equation:

$$-2(3x-1) = 5(x+2) - 11x - 8$$

$$\Leftrightarrow -6x + 2 = 5x + 10 - 11x - 8$$

$$\Leftrightarrow -6x + 2 = -6x + 2$$

$$\Leftrightarrow 0 = 0$$

Always true!

All numbers are solutions

15. Find b if when $x = -3$, $y = 2$, and $m = -3$, the following equation is true:

$$y = mx + b$$

$$(2) = (-3)(-3) + b \Leftrightarrow 2 = 9 + b$$

$-9 \leftarrow$

$$\Leftrightarrow \boxed{-7 = b}$$

16. Solve the following equation:

$$3(x+7) - 8 = x + 9$$

$$\Leftrightarrow 3x + 21 - 8 = x + 9$$

$$\Leftrightarrow 3x + 13 = x + 9$$

$\xrightarrow{-13}$

$$\Leftrightarrow 2x = -4$$

$$\Leftrightarrow x = \frac{-4}{2}$$

$$\Leftrightarrow \boxed{x = -2}$$

17. Solve the following inequality, and graph the solution set in the provided graph.

$$-7x - 3 \leq 9 - 2(2x + 3)$$

Border value

$$-7x - 3 = 9 - 2(2x + 3) \Leftrightarrow -7x - 3 = 9 - 4x - 6$$

$$\Leftrightarrow -7x - 3 = 3 - 4x$$

$$\Leftrightarrow -3x = 6$$

$$\Leftrightarrow x = \frac{6}{-3}$$

$$\Leftrightarrow \boxed{x = -2}$$

Test $x = 0$

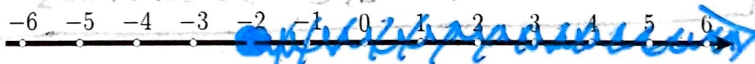
$$-3 \leq 9 - 2(+3)$$

$$\Leftrightarrow -3 \leq 9 - 6$$

$$\Leftrightarrow -3 \leq 3 \quad \underline{\text{TRUE}}$$

So side that contains 0 is solution

The graph of the solution set is:



$$\underline{\underline{x \geq -2}}$$

18. Solve the equation:

$$\text{LCD} = 6$$

$$3. \quad \cancel{6} \cdot \frac{3x}{\cancel{2}} + 6 \cdot 1 = \cancel{6} \cdot \frac{x}{\cancel{3}} \Leftrightarrow 9x + 6 = 2x$$

$$\Leftrightarrow 6 = -7x$$

$$\Leftrightarrow \frac{6}{-7} = x \Leftrightarrow \boxed{-\frac{6}{7} = x}$$

19. Find x so that when $y = -2$ the following equation is true:

$$3x - 5y = 7$$

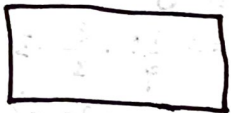
$$3x - 5(-2) = 7 \Leftrightarrow 3x + 10 = 7$$

$$\Leftrightarrow 3x = -3$$

$$\Leftrightarrow x = \frac{-3}{3}$$

$$\Leftrightarrow \boxed{x = -1}$$

20. The length of a rectangle is 2 inches less than twice its width. Find the dimensions of the rectangle if its perimeter is 26 inches.



$$2x - 2$$

Let the length be x . Then width is $2x - 2$

$$\text{Perimeter} = 2x + 2(2x - 2) = 2x + 4x - 4 = 6x - 4$$

$$\text{So } 6x - 4 = 26 \Leftrightarrow 6x = 26 + 4 \Leftrightarrow 6x = 30 \Leftrightarrow \boxed{x = 5}$$

Length is 5 inches, Width is $2 \cdot 5 - 2 = 8$ inches

21. Solve for h : $V = lwh - 3$.

$$\Leftrightarrow \frac{V+3}{lw} = \frac{lwh}{lw}$$

$$\Leftrightarrow \boxed{h = \frac{V+3}{lw}}$$

22. The sum of two consecutive integers is 63. Find the integers.

The integers are $x, x+1$. Their sum is $x + (x+1) = 2x+1$
 So we have $2x+1 = 63 \Leftrightarrow 2x = 62 \Leftrightarrow \underline{x = 31}$

So the integers are 31, 32

23. Recall that the formula that converts degrees Fahrenheit F to degrees Celsius C :

$$C = \frac{5}{9}(F - 32)$$

One day the temperature measured in degrees Fahrenheit was the same as the temperature measured in degrees Celsius. What was the temperature that day?

If $C = F$ we have $9 \cdot F = 9 \cdot \frac{5}{9} (F - 32) \Leftrightarrow 9F = 5(F - 32)$

$$\Leftrightarrow 9F = 5F - 160$$

$$\Leftrightarrow 4F = -160$$

$$\Leftrightarrow \boxed{F = -40}$$

24. $\frac{2}{3}$ is a solution of the equation $4x^2 - 4x - 3 = 0$

A. True B. False

$$4\left(\frac{2}{3}\right)^2 - 4\left(\frac{2}{3}\right) - 3 = 0$$

$$\Leftrightarrow 4 \cdot \frac{4}{9} - \frac{8}{3} - 3 = 0 \Leftrightarrow \frac{16}{9} - \frac{8}{3} - 3 = 0$$

$$\Leftrightarrow \frac{16 - 24 - 27}{9} = 0$$

FALSE.

25. For a linear equation with one unknown 0 and -7 are solutions while -4 isn't. Which of the following must necessarily be true?

- A. There are no other solutions.
- B. 7 is also a solution.
- C. We can't know all solutions.
- D. This can't happen with a linear equation with one unknown.

For a linear equation with one unknown there are only three possibilities.

- Only one solution
- No solutions
- All numbers are solutions.