MTH 05, Test 2, V. 2, 10/19/17 Luis Fernández

NAME: SOLUTION

There are twenty-two questions, each worth 5 points. For multiple-choice questions, circle your answer. For free-response questions, SHOW ALL WORK to receive full credit.

1. What is the slope-intercept form of the equation $6x + 4y = 12$?

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

(b) $y = -6x + 3$

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

(d) $y = 6x + 12$

2. Use the formula $F = \frac{9}{5}C + 32$ to find F when $C = -20$.

(a) 21

(b) -4

(c) -112

(d) 4

3. What is the slope of the line connecting the points $(4, 13)$ and $(6, 5)$?

(a) -4

(b) $\frac{1}{4}$

(c) 4

(d) $-\frac{1}{4}$

4. Find x-intercept and y-intercept for the graph of the equation $x + 3y = 6$.

(a) x-intercept: $(0, 0)$ and y-intercept: $(1, 4)$

(b) x-intercept: $(6, 0)$ and y-intercept: $(0, -2)$

(c) x-intercept: $(6, 0)$ and y-intercept: $(0, 2)$

(d) x-intercept: $(-6, 0)$ and y-intercept: $(0, 2)$

5. Solve for t in the expression $A = rt$.

(a) $t = Ar$

(b) $t = \dfrac{A}{r}$

(c) $t = \dfrac{r}{A}$

(d) $t = 2$

6. The volume V of a pyramid is given by the equation $V = \dfrac{1}{3}Bh$. If $V = 100$ and $h = 5$, what is the value of B?

(a) $\dfrac{23}{2}$

(b) 200

(c) -53

(d) 60

7. Solve for t in the equation $P = 2t + a$.

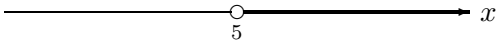
(a) $a = P + 2t$

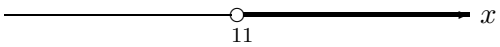
(b) $t = 2$

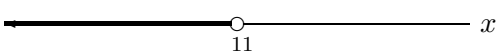
(c) $t = 2P - a$

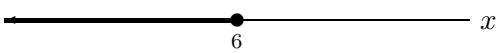
(d) $t = \dfrac{P - a}{2}$

8. Pick the graph of the solution to the inequality $7x - 5 > 6x + 6$.

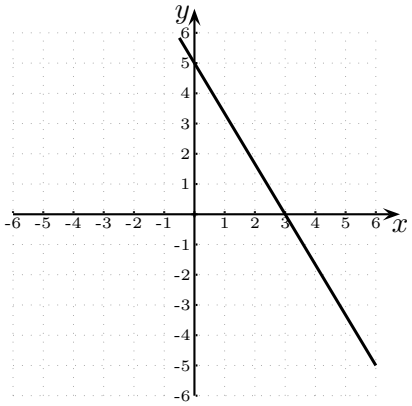
(a) 

(b) 

(c) 

(d) 

9. Choose the equation of the line in the graph.



(a) $-5x + 3y = 15$

(b) $5x + 3y = 15$

(c) $3x - 5y = 15$

(d) $5x - 3y = 15$

10. Find the slope and y-intercept for the graph of the equation $2x - 5y = 15$.

(a) Slope $= \frac{2}{5}$ and y-intercept: $(0, 15)$

(b) Slope $= -\frac{2}{5}$ and y-intercept: $(0, 3)$

(c) Slope $= -\frac{2}{5}$ and y-intercept: $(0, -3)$

(d) Slope $= \frac{2}{5}$ and y-intercept: $(0, -3)$

11. Find the x-coordinate of the solution of the following system of equations.

$$\begin{cases} 2x + 3y = 2 \\ -x - 3y = 2 \end{cases}$$

(a) -4

(b) 4

(c) 2

(d) -2

12. Find the equation of the vertical line passing through the point $(-3, -4)$.

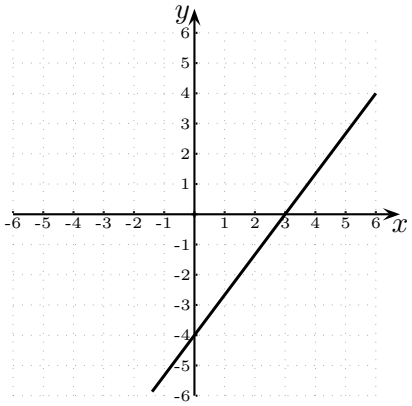
(a) $y = \frac{3}{4}x$

(b) $x = -3$

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

(d) $y = -4$

13. What is the slope of the line in the graph?



(a) $\frac{4}{3}$

(b) $-\frac{3}{4}$

(c) $-\frac{4}{3}$

(d) $\frac{3}{4}$

14. Which equation's graph is parallel to that of $y = -3x - 14$?

(a) $y = \frac{1}{3}x + 7$

(b) $y = -3x + 8$

(c) $y = -\frac{1}{3}x - 11$

(d) $y = 3x + 12$

Free response questions start here. SHOW ALL WORK!!!

15. Find the equation of the line passing through the point $(3, -4)$ and perpendicular to the line $2x + 3y = 5$.

Solution:

The slope of the given line is found by solving for y and finding the number that multiplies x:

$$2x+3y = 5 \to 3y = -2x+5 \to y = -\frac{2}{3}x+\frac{5}{3}.$$

Therefore the slope of the given line is $-\frac{2}{3}$.

Since the line whose equation we want to find is perpendicular to the given one, its slope has to be the opposite reciprocal of the slope we found above. That is, the slope of the line whose equation we want is

$$m = \frac{3}{2}.$$

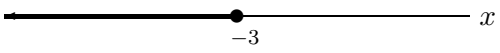
Since it passes through $(3, -4)$, we can use the point-slope form to obtain the equation sought:

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

16. Solve and graph the solution on the number line: $2 - 4(2x + 5) \geq 5(x + 3) - 2x$.

Solution:

Expand and combine like terms first:
$2 - 4(2x + 5) \geq 5(x + 3) - 2x$
$2 - 8x - 20 \geq 5x + 15 - 2x$
$-8x - 18 \geq 3x + 15$
Subtract 15 from both sides:
$-8x - 33 \geq 3x$
Add $8x$ to both sides:
$-33 \geq 11x$
Divide by 11:
$-3 \geq x$ (or $x \leq -3$).



17. Find an equation for the line passing through the points $(3, 8)$ and $(-3, 6)$.

Solution:

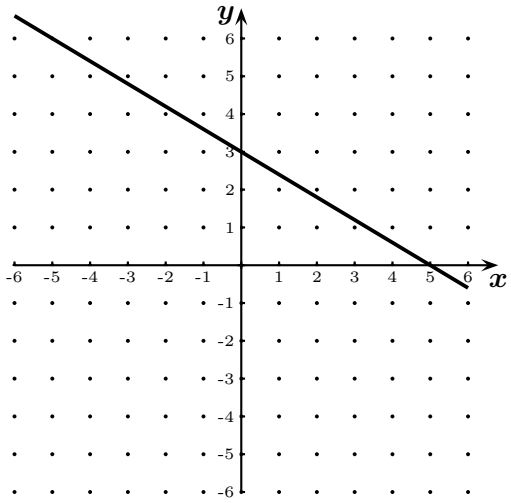
The slope of the line is:

$$m = \frac{6-8}{-3-3} = \frac{-2}{-6} = \frac{1}{3}.$$

Since it passes through the point $(3, 8)$, we can use the point-slope form to obtain the equation sought:

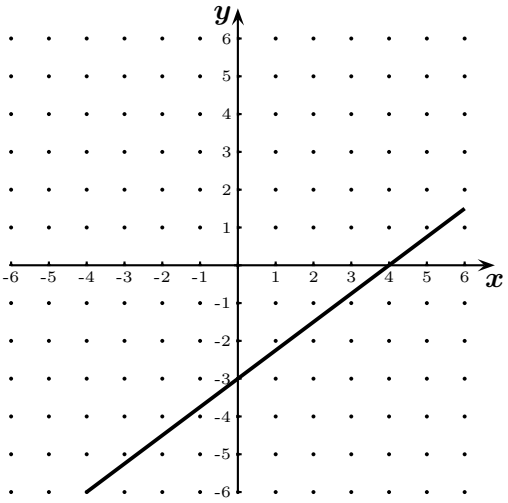
$$y - 8 = \frac{1}{3}(x - 3).$$

18. Graph $3x + 5y = 15$ indicating at least two points.



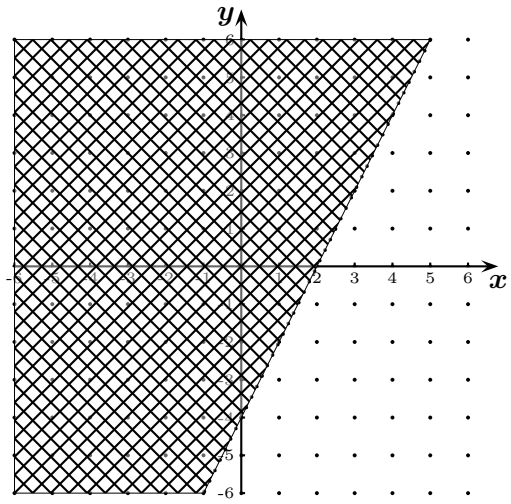
Solution: Two points: $(0, 3)$, $(5, 0)$

19. Graph $y = \frac{3}{4}x - 3$ indicating at least two points.



Solution: Two points: $(0, -3)$, $(4, 0)$

20. Graph the solution of the inequality $2x - y < 4$.



Solution: The shaded region.

21. Solve the following system of equations. If there is no unique solution, say whether the system has *no solutions* or *infinitely many solutions*.

$$\begin{cases} 3x + 5y = 1 \\ 2x + 4y = 2 \end{cases}$$

Solution:

First multiply the first equation by (-2) and the second by 3 to get $\begin{cases} -6x - 10y = -2 \\ 6x + 12y = 6 \end{cases}$

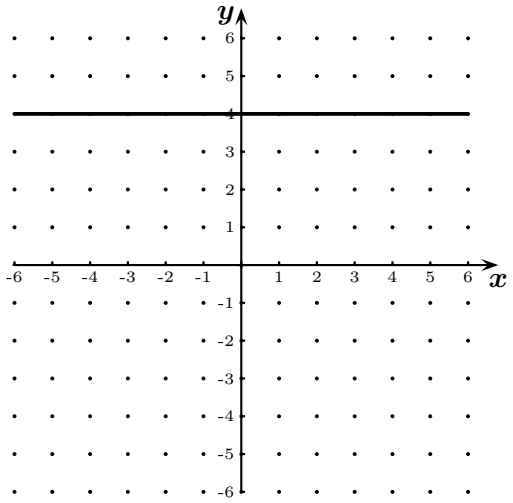
Add the equations to get $2y = 4$, which gives $y = 2$.

Now multiply the first equation by (-4) and the second by 5 to get $\begin{cases} -12x - 20y = -4 \\ 10x + 20y = 10 \end{cases}$

Add the equations to get $-2x = 6$. Divide both sides by (-2) to obtain $x = (-3)$.

Therefore the solution is $(-3, 2)$.

22. Graph $y = 4$ indicating at least two points.



Solution: Two points: $(0, 4)$, $(1, 4)$