MTH 05, Test 2, V. 4b, 10/23/18 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 credit.

1. Solve: $\frac{3x}{7} \leq \frac{15}{14}$

(a) $x < \frac{2}{5}$

(b) $x \leq \frac{5}{2}$

(c) $x \geq \frac{5}{2}$

(d) $x = 5$

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

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

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

(c) $y = 3x + 12$

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

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

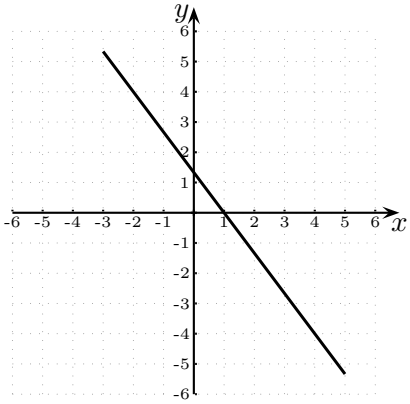
(a) $x = -3$

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

(c) $y = -4$

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

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



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

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

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

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

5. Solve for t in the expression $A = rt - 3$.

(a) $t = Ar + 3$

(b) $t = \dfrac{A+3}{r}$

(c) $t = 3$

(d) $t = \dfrac{r}{A} + 3$

6. Solve for t in the equation $P = \dfrac{t}{4} + a$.

(a) $t = 4a + P$

(b) $t = \dfrac{P - 4a}{2}$

(c) $t = \dfrac{P - a}{4}$

(d) $t = 4(P - a)$

7. What is the slope-intercept form of the equation $5x - 4y = 20$?

(a) $y = 5x + 24$

(b) $y = \dfrac{3}{2}x + 3$

(c) $y = \dfrac{4}{5}x + 4$

(d) $y = \dfrac{5}{4}x - 5$

8. The area A of a trapezoid is given by the formula $A = \dfrac{B+b}{2} \cdot h$. If $A = 90$, $B = 6$, and $b = 3$, what is the value of h?

(a) 20

(b) $\dfrac{99}{2}$

(c) 18

(d) -53

9. Use the formula $F = \frac{9}{5}C + 32$ to find F when $C = 15$.

(a) -4

(b) 37

(c) 59

(d) 81.2

10. Find x-intercept and y-intercept for the graph of the equation $2x - 7y = 14$.

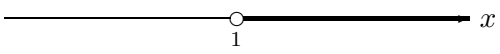
(a) x-intercept: $(-7, 0)$ and y-intercept: $(0, 2)$

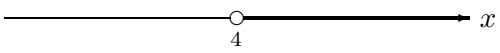
(b) x-intercept: $(7, 0)$ and y-intercept: $(0, -2)$

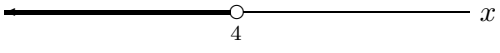
(c) x-intercept: $(-14, 2)$ and y-intercept: $(7, 14)$

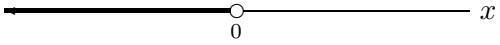
(d) x-intercept: $(0, 0)$ and y-intercept: $(2, 7)$

11. Pick the graph of the solution to the inequality $10x - 10 > 6x + 6$.

(a) 

(b) 

(c) 

(d) 

12. Find the slope and y-intercept for the graph of the equation $3x + 7y = 28$.

(a) Slope $= \frac{3}{7}$ and y-intercept: $(0, -4)$

(b) Slope $= \frac{3}{7}$ and y-intercept: $(4, 0)$

(c) Slope $= -\frac{3}{7}$ and y-intercept: $(0, 4)$

(d) Slope $= -\frac{3}{7}$ and y-intercept: $(0, 28)$

13. What is the slope of the line connecting the points $(4, 10)$ and $(6, 3)$?

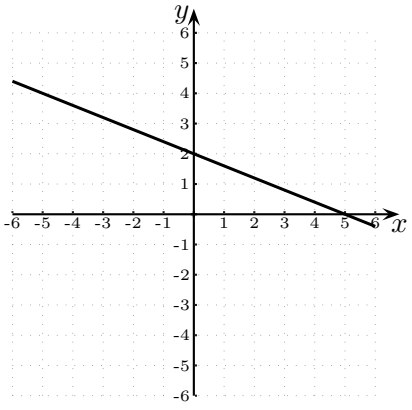
(a) $\dfrac{13}{10}$

(b) 4

(c) $-\dfrac{7}{2}$

(d) $\dfrac{1}{4}$

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



(a) $y = 2$

(b) $5x - y = 2$

(c) $5x - 2y = 10$

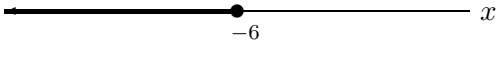
(d) $2x + 5y = 10$

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

15. Solve and graph the solution on the number line: $3 - 5(2x + 5) \geq 2(x + 4) - 7x$.

Solution:

Expand and combine like terms first:
$3 - 5(2x + 5) \geq 2(x + 4) - 7x$
$3 - 10x - 25 \geq 2x + 8 - 7x$
$-10x - 22 \geq -5x + 8$
Subtract 8 from both sides:
$-10x - 30 \geq -5x$
Add $10x$ to both sides:
$-30 \geq 5x$
Divide by 5:
$-6 \geq x$ (or $x \leq -6$).



16. Find an equation for the line passing through the points $(2, 5)$ and $(-2, 7)$.

Solution:

The slope of the line is:

$$m = \frac{7 - 5}{-2 - 2} = \frac{2}{-4} = -\frac{1}{2}.$$

Since it passes through the point $(2, 5)$, we can use the point-slope form to obtain the equation sought:

$$y - 5 = -\frac{1}{2}(x - 2).$$

17. Find the slope and y-intercept of the line with equation $2x + 5y = 15$.

Solution:

Let us write the equation in slope-intercept form. To this end, solve for y: If $2x + 5y = 15$ then, subtracting $2x$ from both sides we get $5y = -2x + 15$, and then dividing both sides by 5 we get
$y = -\frac{2}{5}x + 3$.
Therefore the slope is $-\frac{2}{5}$ and the y-intercept is 3.

18. Find the equation of the line passing through the point $(5, -2)$ and perpendicular to the line $-2x + 5y = 1$.

Solution:

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

$$-2x + 5y = 1 \to 5y = 2x + 1 \to y = \frac{2}{5}x + \frac{1}{5}.$$

Therefore the slope of the given line is $\frac{2}{5}$.

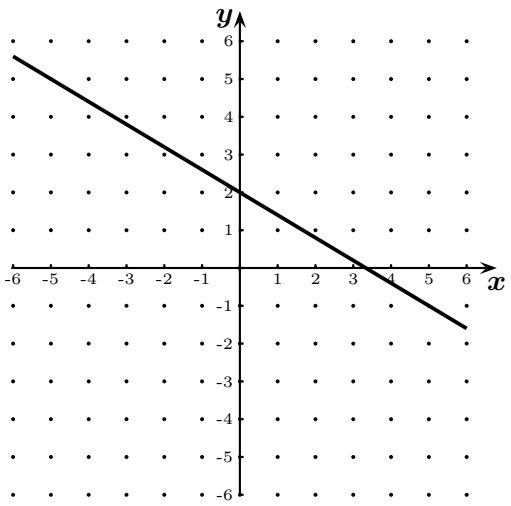
Since the line whose equation we want to find is perpendicular to the given one, its slope has to be the opposite reciprocal of the slope we found above. That is, the slope of the line whose equation we want is

$$m = -\frac{5}{2}.$$

Since it passes through $(5, -2)$, we can use the point-slope form to obtain the equation sought:

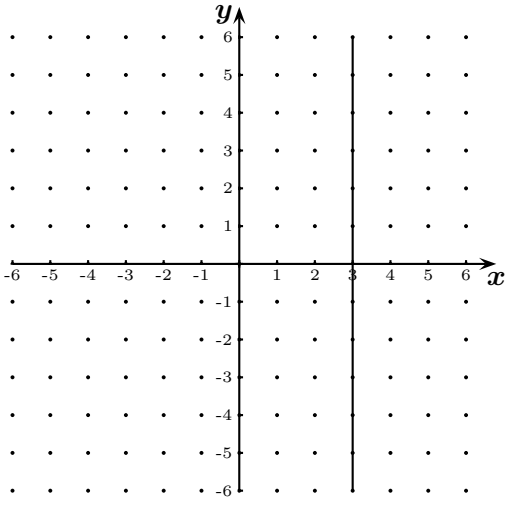
$$y - (-2) = -\frac{5}{2}(x - 5).$$

19. Graph $y = -\frac{3}{5}x + 2$ indicating at least two points.



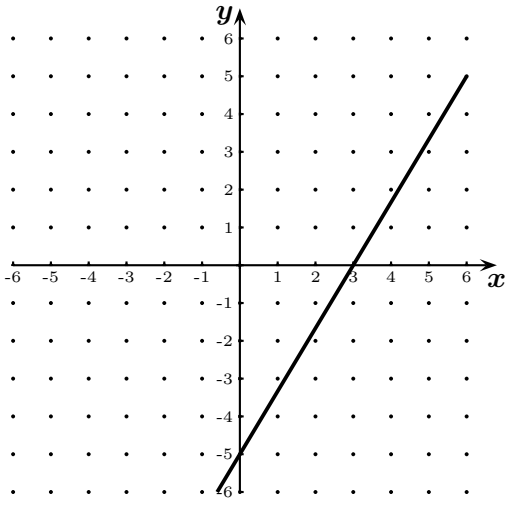
Solution: Two points: $(0, 2)$, $(5, -1)$

20. Graph the equation $x = 3$ indicating at least two points.



Solution: Two points: $(3, 0)$, $(3, 1)$

21. Graph $5x - 3y = 15$ indicating at least two points.



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

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

$$\begin{cases} 3x + 2y = 10 \\ 5x - 3y = 4 \end{cases}$$

Solution:

First multiply the first equation by (-5) and the second by 3 to get $\begin{cases} -15x - 10y = -50 \\ 15x - 9y = 12 \end{cases}$

Add the equations to get $-19y = -38$, which gives $y = 2$.

Now multiply the first equation by 3 and the second by 2 to get $\begin{cases} 9x + 6y = 30 \\ 10x - 6y = 8 \end{cases}$

Add the equations to get $19x = 38$. Divide both sides by 2 to obtain $x = 3$.

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