

476 possible


Name Key
Score out of 100%

Test #2

Directions: Please show all your work since partial credit is given. Answers without the necessary work will receive no credit. And remember, have fun!


1. Solve the following inequalities. Write the solution in *interval notation* and graph it.

[+4] a) $5(y-3) - 7y \leq 4y - 3$
 $[-2, +\infty)$



$$\begin{aligned} 5y - 15 - 7y &\leq 4y - 3 \\ -2y - 15 &\leq 4y - 3 \\ +2y &\quad +2y \\ -15 &\leq 6y - 3 \\ +3 &\quad +3 \\ -12 &\leq 6y \\ \frac{-12}{6} &\quad \frac{6}{6} \\ -2 &\leq y \end{aligned}$$

[+4] b) $-3 < 4x - 3 \leq 5$
 $(0, 2]$



$$\begin{aligned} -3 < 4x - 3 \leq 5 \\ +3 \quad +3 \quad +3 \\ 0 < 4x \leq 8 \\ \frac{0}{4} \quad \frac{4}{4} \quad \frac{8}{4} \\ 0 < x \leq 2 \end{aligned}$$

+3 solving
+1 interval/graph

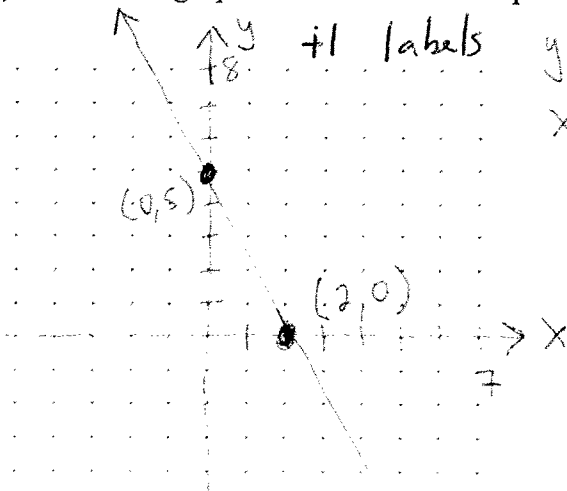
2. The following questions are with regards to the *linear equation* $5x + 2y = 10$.

[+4] a) Find the *x*- and *y*-intercepts of the graph.

x-intercept: $(2, 0)$

y-intercept: $(0, 5)$ • +2 each
• -1pt for no-point
• -1pt switch

[+4] b) Sketch the *graph* and label all intercepts.



x	y	(x, y)
0	5	(0, 5)
2	0	(2, 0)

$$\begin{aligned} 5(0) + 2y &= 10 \\ 2y &= 10 \\ y &= 5 \end{aligned} \quad \left| \quad \begin{aligned} 5x + 2(0) &= 10 \\ 5x &= 10 \\ x &= 2 \end{aligned}$$

x_1, y_1 x_2, y_2

3. Let (10, 7) and (0, 2) be two points on the Cartesian plane.

[+2]

a) Find the slope between these two points. $m = \frac{1}{2}$

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 7}{0 - 10} = \frac{-5}{-10} = \frac{1}{2}$$

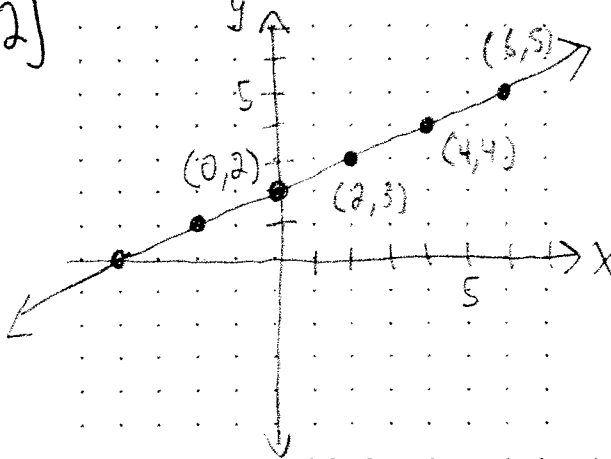
[+2]

b) Find the equation of the line whose graph passes through these two points.

$y = \frac{1}{2}x + 2$ (0, 2) is the y-intercept, $\Rightarrow y = mx + b$
so $b = 2$. $= \frac{1}{2}x + 2$

[+2]

c) Finally, graph the line and label at least two points on your graph.



$$\frac{\text{rise}}{\text{run}} = \frac{1}{2}$$

4. Find the equation of the line through the given point and having the given slope.

[+4]

a) $(1, -5), m = -\frac{2}{5}$ $y = -\frac{2}{5}x - \frac{23}{5}$

b) $(3, -2)$, undefined slope $x = 3$

$$y = mx + b$$

$$y = -\frac{2}{5}x + b$$

Input $(x, y) = (1, -5)$

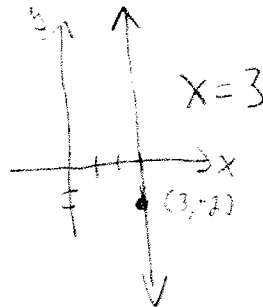
$$-5 = -\frac{2}{5}(1) + b$$

$$-5 = -\frac{2}{5} + b$$

$$-\frac{2}{5} + \frac{2}{5} + \frac{2}{5}$$

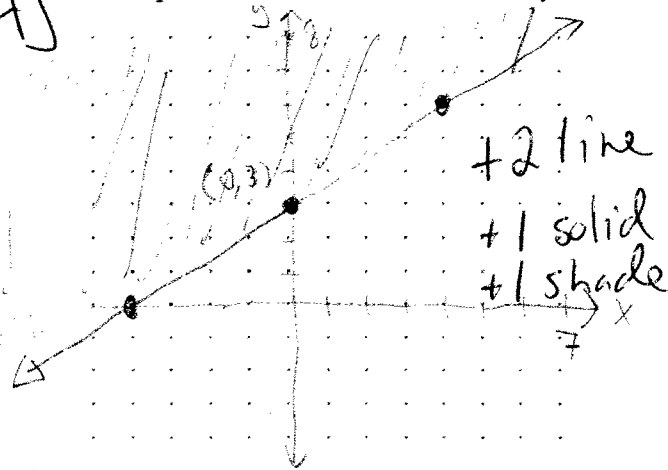
$$-4\frac{3}{5} = -\frac{23}{5} = b$$

Undefined slope \Rightarrow Vertical line



[+4]

5. Graph the solution set of $-3x + 4y \geq 12$. Make sure to clearly label your graph.



$$\begin{aligned} -3x + 4y &\geq 12 \\ +3x &\quad +3x \end{aligned}$$

$$\frac{4y}{4} \geq \frac{3x + 12}{4}$$

$$y \geq \frac{3}{4}x + 3$$

↑ solid line, shade above.

+2 line
+1 solid
+1 shade

[+4]

6. Let $f(x) = x^2 + 2$. Find the following values.

4pt each

a) $f(2) = \underline{6}$

b) $f(0) = \underline{2}$

c) $f(-2) = \underline{6}$

$$\begin{aligned} f(2) &= 2^2 + 2 \\ &= 4 + 2 \\ &= 6 \end{aligned}$$

$$\begin{aligned} f(0) &= 0^2 + 2 \\ &= 0 + 2 \\ &= 2 \end{aligned}$$

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

d) Is f a function (Circle one)? **YES** / NO

[+4]

7. A 90% antifreeze solution is to be mixed with a 75% solution to make 120 Liters of a 78% solution. How many liters of the 90% and 75% solutions will be used? The following table may be helpful.

+1 table

	Liters of Solution	Percent Concentration	Pure Antifreeze
90% Solution	x	0.90	$0.90x$
75% Solution	y	0.75	$0.75y$
78% Solution	120	0.78	$120 \cdot (0.78)$

$$\rightarrow x + y = 120$$

$$\rightarrow 0.90x + 0.75y = 93.6$$

+2 equations

90% Solution: 24 L

75% Solution: 96 L

+1 answer

substitution, $x = 120 - y$

$$0.90(120 - y) + 0.75y = 93.6$$

$$108 - 0.90y + 0.75y = 93.6$$

$$108 - 0.15y = 93.6$$

$$\begin{array}{r} -108 \\ -108 \end{array}$$

$$\begin{array}{r} -0.15y = -14.4 \\ \hline -0.15 \end{array} \Rightarrow y = 96$$

So, $x = 120 - 96$

24

+12

8. Solve the following system of equations by the method of your choice.

[+4] a) $2x + 5y = 4$
 $x + y = -1$

$(-3, 2)$

[+2] b) $x - y = 7$
 $x = -3 + y$

No solution

Elimination

$$\begin{array}{r} 2x + 5y = 4 \\ -2x - 2y = 2 \\ \hline 3y = 6 \\ y = 2 \end{array}$$

$$\begin{array}{r} x + 2 = -1 \\ -2 \quad -2 \\ \hline x = -3 \end{array}$$

Substitution

$$\begin{array}{r} (-3 + y) - y = 7 \\ -3 \neq 7 \end{array}$$

Not possible

9. Simplify the following exponential expressions.

[+2] a) $(2a^2b)(5a^4b^3)$ $10a^6b^4$

$$(2 \cdot 5)(a^2 \cdot a^4) \cdot (b \cdot b^3)$$

$$10a^6b^4$$

[+2] b)

$(6x^{-5}z^3)^{-3}$

$$6^{-3} x^{15} z^{-9} = \frac{x^{15}}{6^3 z^9}$$

$$= \frac{x^{15}}{216 z^9}$$

[+2] c) $\left(\frac{k^4 t^{-1}}{k^3 t^2}\right)^2$ $\frac{k^2}{t^6}$

$$\frac{k^8 t^{-2}}{k^6 t^4}$$

$$\frac{k^2}{t^6}$$

[+2] d) $(-5x^0 y^2)^4$ $625 y^8$

$$(-5y^2)^4$$

$$(-5)^4 \cdot y^8$$

$$625 y^8$$

10. Simplify the following polynomial expressions.

[+4] a) $(16x^3 - x^2 + 3x) + (-12x^3 + 3x^2 + 2x)$ b) $(8ab + 2a - 3b) - (6ab - 2a - 3b)$

$4x^3 + 2x^2 + 5x$

[+4] $2ab + 4a$

$(16x^3 - 12x^3) + (-x^2 + 3x^2) + (3x + 2x)$

$8ab + 2a - 3b - 6ab + 2a + 3b$
 $2ab + 4a$

[+4] c) $(2r+3)(4r^2+3r-7)$

[+4] d) $(8x-3y)^2$

$2r \cdot (4r^2 + 3r - 7) + 3(4r^2 + 3r - 7)$

$64x^2 - 48xy + 9y^2$

$8r^3 + 6r^2 - 14r + 12r^2 + 9r - 21$

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

$8r^3 + 18r^2 - 5r - 21$

$64x^2 - 24xy - 24xy + 9y^2$
 $-48xy$

11. Divide the following polynomials.

[+2] a) $\frac{16a^5 - 12a^4 + 8a^2}{4a^3}$

[+2] b) $\frac{4x^3 - 4x^2 + 5x - 8}{2x - 1}$

$2x^2 - x + 2 + \frac{-6}{2x-1}$

$\frac{16a^5}{4a^3} - \frac{12a^4}{4a^3} + \frac{8a^2}{4a^3}$

$2x-1 \overline{) 4x^3 - 4x^2 + 5x - 8}$
 $\underline{-(4x^3 - 2x^2)}$

$4a^2 - 3a + \frac{2}{a}$

$\underline{-2x^2 + 5x}$
 $\underline{-(-2x^2 + x)}$

$\underline{4x - 8}$
 $\underline{-(4x - 2)}$
 -6

+20 ↘

