

Math 129 - Test 2A
March 11, 2020

Name key Score _____

Show all work to receive full credit. Supply explanations where necessary. Label your axes when graphing.

1. (5 points [11]) Solve for x : $\sqrt[3]{2x+3} - 2 = 1$

$$\sqrt[3]{2x+3} = 3$$

$$2x+3 = 27$$

$$2x = 24$$

$$x = 12$$

2. (5 points [11]) Solve for t : $(4t+1)^{2/3} - 8 = 17$

$$(4t+1)^{2/3} = 25$$

$$4t+1 = 25^{3/2}$$

$$4t+1 = 125$$

$$4t = 124$$

$$t = 31$$

$$25^{3/2} = (\sqrt{25})^3 = 125$$

3. (3 points [11]) Solve for r : $(r+7)^{1/4} = -2$

$$\sqrt[4]{r+7} = -2$$

No solution

AN EVEN-INDEXED RADICAL
CANNOT BE
NEGATIVE.

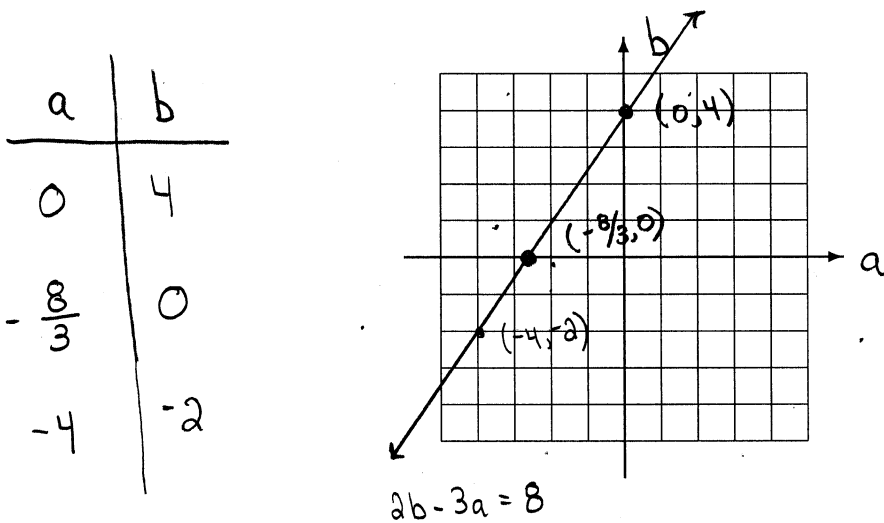
4. (2 points [7,11]) The equation $(x^2+7x)^2 - 6(x^2+7x) + 5 = 0$ is "quadratic in form."
What u -substitution will reduce the equation to quadratic? Do not solve the equation.

$$u = x^2 + 7x$$

THIS MAKES

$$u^2 - 6u + 5 = 0$$

5. (6 points [2,4]) Find two solutions of the equation $2b - 3a = 8$. Plot your solutions as ordered pairs, and then sketch the graph of the equation. Label your axes.



6. (9 points [9,10]) The points $(3, 2)$ and $(-6, 4)$ are the endpoints of a diameter of a circle.

(a) Find the center of the circle.

$$\left(\frac{3 + (-6)}{2}, \frac{2 + 4}{2} \right) = \left(-\frac{3}{2}, 3 \right)$$

(b) Compute the length of the diameter.

$$d = \sqrt{(-6 - 3)^2 + (4 - 2)^2} = \sqrt{(-9)^2 + (2)^2} = \sqrt{85}$$

(c) Write the standard form equation for the circle.

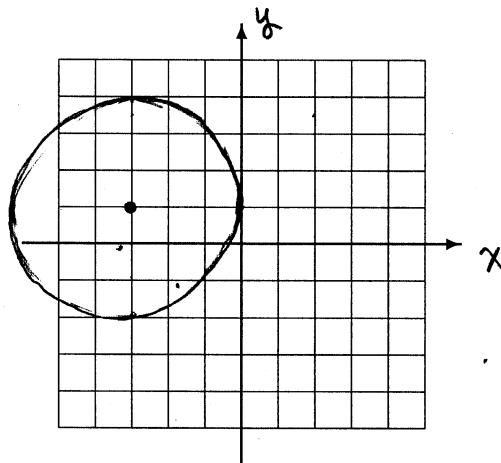
$$(h, k) = \left(-\frac{3}{2}, 3 \right)$$

$$r = \frac{\sqrt{85}}{2}$$

$$r^2 = \frac{85}{4}$$

$$\left(X + \frac{3}{2} \right)^2 + (y - 3)^2 = \frac{85}{4}$$

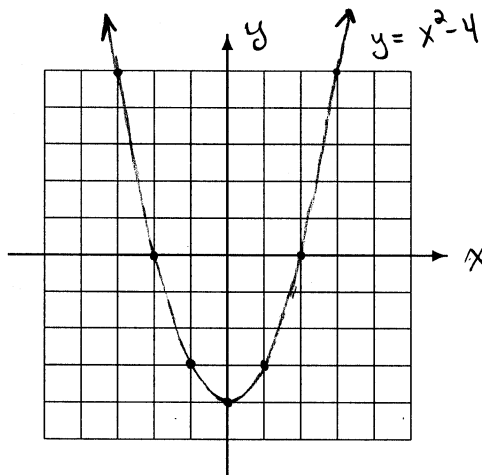
7. (4 points [9,10]) Sketch the graph of the equation $(x + 3)^2 + (y - 1)^2 = 9$.



CIRCLE,
CENTER $(-3, 1)$
RADIUS 3

8. (6 points [1,9,10]) Make a table that shows five points on the graph of the equation $y = x^2 - 4$. Then plot your points and sketch the graph. (Label your axes.)

| x | y |
|----|----|
| 0 | -4 |
| 1 | -3 |
| -1 | -3 |
| 2 | 0 |
| -2 | 0 |
| 3 | 5 |



9. (5 points [2,3,4]) The line L passes through the points $(3, 7)$ and $(3, -5)$. Find an equation of the line perpendicular to L and passing through $(-6, -9)$.

L IS THE VERTICAL
LINE $x = 3$.

A PERPENDICULAR LINE
IS HORIZONTAL,
AND THROUGH $(-6, -9)$
WOULD BE

$y = -9$

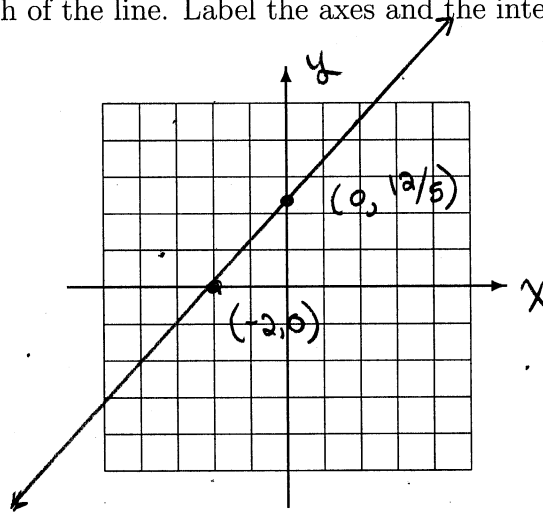
10. (6 points [3]) Find the x - and y -intercepts of the line described by $-6x + 5y = 12$. Then sketch the graph of the line. Label the axes and the intercepts.

x -INT...

$$y = 0 \Rightarrow -6x = 12$$

$$\Rightarrow x = -2$$

$(-2, 0)$ x -INT



y -INT...

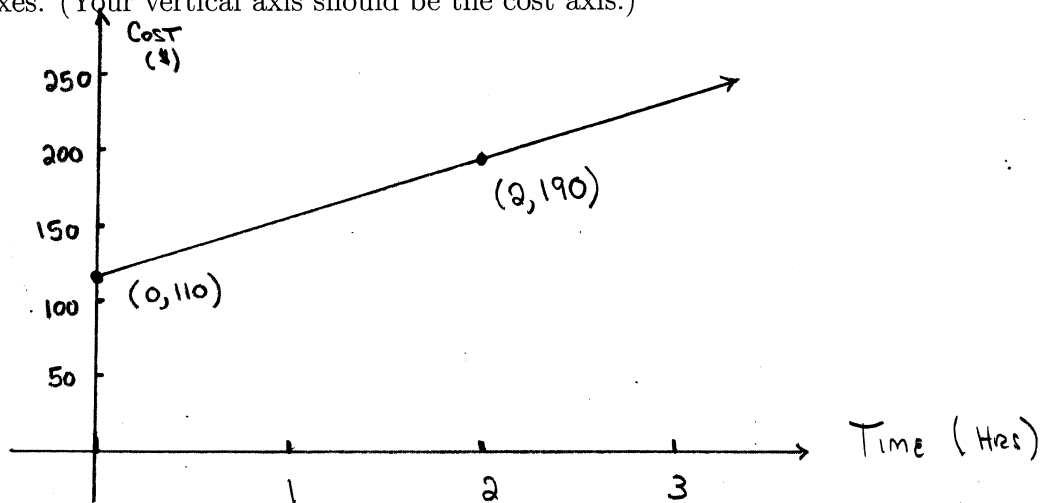
$$x = 0 \Rightarrow 5y = 12$$

$$\Rightarrow y = \frac{12}{5}$$

$(0, \frac{12}{5})$ y -INT

11. (8 points [2,3,4]) Bartlep's Heating and Cooling charges a flat fee of \$110 to make a house call, but then charges a constant hourly rate on top of that. A technician recently made a house call to fix a furnace and ended up billing the client \$190 after 2 hours of work.

- (a) Sketch the graph that shows client cost (in dollars) versus time (in hours). Label your axes. (Your vertical axis should be the cost axis.)



- (b) Which single word or phrase in the problem situation indicates that the graph should be a line?

CONSTANT HOURLY RATE

- (c) Compute the slope of the graph. What does the slope of the graph represent?

$$\frac{190 - 110}{2 - 0} = \frac{80}{2} = 40$$

Hourly rate is \$40

12. (6 points [2,4]) Find an equation of the line that passes through the points (2, 5) and (-3, -1). Write your final answer in slope-intercept form.

$$m = \frac{5 - (-1)}{2 - (-3)} = \frac{6}{5}$$

POINT (2, 5)

$$y - 5 = \frac{6}{5}(x - 2)$$

$$y - 5 = \frac{6}{5}x - \frac{12}{5}$$

$$y = \frac{6}{5}x + \frac{13}{5}$$

13. (4 points [2,3,4]) Determine equations of the horizontal and vertical lines that pass through (-2, 7). Label which is which.

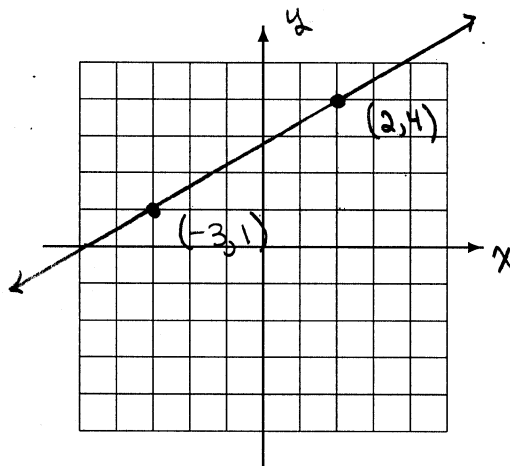
HORIZONTAL

$$y = 7$$

VERTICAL

$$x = -2$$

14. (6 points [2,4]) A line with slope $\frac{3}{5}$ passes through the point (2, 4). Use the point and slope to graph the line. Briefly explain how you did so. (Label your axes.)



$$m = \frac{3}{5} = \frac{\text{RISE}}{\text{RUN}}$$

I USED $\frac{-3}{-5}$ AND WENT

3 DOWN AND

5 LEFT

FROM (2, 4)

15. (8 points [2,4]) Find an equation of the line that passes through the point $(3, -4)$ and is parallel to the line described by $6x + 2y = 7$. Write your final answer in standard form.

$$6x + 2y = 7$$

$$2y = -6x + 7$$

$$y = -3x + \frac{7}{2}$$

$$m = -3$$

$$m_{\text{parallel}} = -3$$

$$\text{Slope} = -3$$

$$\text{Point } (3, -4)$$

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

or

$$3x + y = 5$$

16. (6 points [2,3,4]) An event planner is determining the cost to host a party at a certain venue. For 100 people, the cost is \$1755.00, and for 150 people, the cost is \$2242.50. Assume that the number of people and the cost satisfy a linear equation. Find that linear equation. Write your final answer in slope-intercept form.

| People, x | Cost, y |
|--------------|------------|
| 100 | 1755 |
| 150 | 2242.50 |

$$m = \frac{2242.50 - 1755}{150 - 100} = \frac{487.50}{50} = 9.75$$

$$\text{Using } (100, 1755) \dots y - 1755 = 9.75(x - 100)$$

or

$$y = 9.75x + 780$$

17. (8 points [11]) Solve for w : $\sqrt{3w+9} - 2 = w + 1$

$$\sqrt{3w+9} = w + 3$$

$$3w + 9 = (w + 3)^2$$

$$3w + 9 = w^2 + 6w + 9$$

$$0 = w^2 + 3w$$

$$w(w + 3) = 0$$

$$w = 0 \text{ or } w = -3$$

BOTH CHECK OUT.

18. (3 points [9,10]) The graph of the equation $x^2 + y^2 = 1$ is a circle. Determine the center and radius of the circle.

$$(x - 0)^2 + (y - 0)^2 = 1^2$$

$$\text{Center } (0, 0)$$

$$r = 1$$