Name: Solutions _____ / 20

No aids (calculator, notes, text, etc.) are permitted. Show all work for full credit and box your final answer.

1. [3 points]

a. State the **distance** formula between two points (x_1, y_1) and (x_2, y_2) in the Cartesian plane.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

b. State the **midpoint** formula between two points (x_1, y_1) and (x_2, y_2) in the Cartesian plane.

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

c. State the **standard form** of the equation for a circle of radius r and center (a, b).

$$(x-a)^2 + (y-b)^2 = r^2$$

2. [2 points]

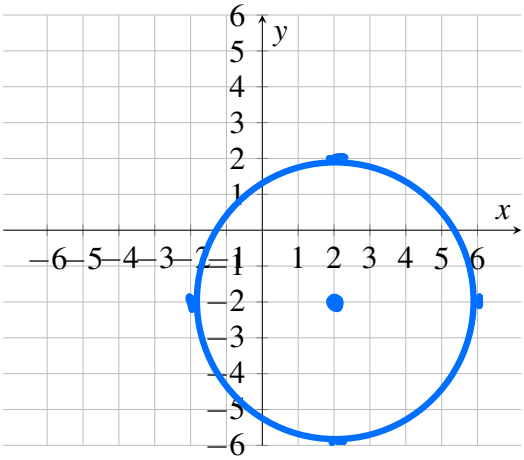
a. Determine the distance between the following pairs of points $(8,8)$ and $(-2,-2)$. **Fully** simplify your answer.

$$d = \sqrt{(-2-8)^2 + (-2-8)^2} = \sqrt{10^2 + 10^2} = \sqrt{2 \cdot 100} = 10\sqrt{2}$$

b. Determine the midpoint of the line segment joining the pair of points $(8,8)$ and $(-2,-2)$.

$$M\left(\frac{-2+8}{2}, \frac{-2+8}{2}\right) = M(3,3)$$

3. [3 points] Find the **standard form** of the equation of the circle $x^2 + y^2 - 4x + 4y - 8 = 0$. Sketch a graph of the obtained equation and find the center and radius of the circle.



$$x^2 + y^2 - 4x + 4y - 8 = 0$$
$$(x^2 - 4x) + (y^2 + 4y) = 8$$
$$(x-2)^2 + (y+2)^2 = 16 = 4^2$$

center: $(a,b) = (2,-2)$

radius: $r = 4$

4. [3 points] Find the x- and y-intercepts of the given equation

$$3y+7x=7(3+x)$$

$3y+7x = 21+7x \Rightarrow 3y = 21 \Rightarrow y = 7$

x-intercept : None

y-intercept : $(0,7)$

5. [2 points] Determine the slope of the line passing through the points $(-3,-5)$ and $(-2,8)$.

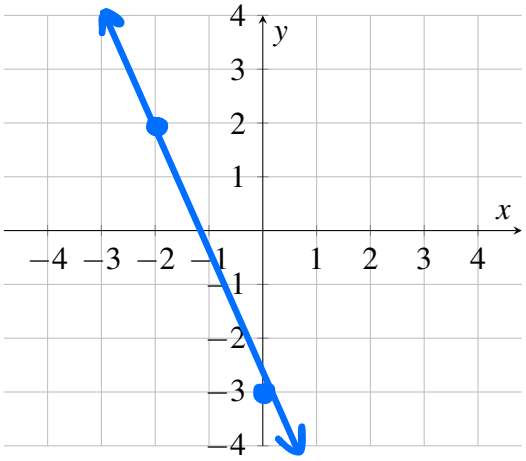
$$m = \frac{8+5}{-2+3} = \frac{13}{1} = \boxed{13}$$

6. [4 points]

a. Find the equation, **in slope-intercept form**, of the line with y-intercept $(0,-3)$ and slope of $-\frac{5}{2}$.

$y = mx+b \Rightarrow \boxed{y = -\frac{5}{2}x - 3}$

b. Graph the obtained straight line.



7. [3 points] Determine the slope of the line defined by the following equation:

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

$$y = \boxed{\frac{1}{15}}x + \frac{2}{3}$$

$m = \frac{1}{15}$