ACMAT117 Fall 2024
Professor Manguba-Glover
Sections 1.2-1.3 Classwork (CW 1) Name: _____

Complete as many of the following problems as you can with your group. You do not have to go in order. Each group will be given a specific problem that they must complete and present to either Professor MG or to Stefanie before they leave.

If **your entire table** finishes early, and you have presented your given problem, you may leave early.

1. Find the mean of the numbers $-3, -4, 6, 9$

   Solution

$$\begin{aligned}\text{Mean} &= \frac{-3-4+6+9}{4}\\ &= \frac{8}{4}\\ &= \boxed{2}\end{aligned}$$

□

2. Find the median of the set $2, 3, 6, 9, 11$

   Solution To find the median, we first have to order the numbers, either from least to greatest or from greatest to least. Since these are already in order, we need to find the middle number, which is $\boxed{6}$

□

3. Find the domain and range of the relation $S = \{(1,3), (2,5), (1,6)\}$

   Solution The domain is the set of all x-values.

$$\text{Domain} = \boxed{\{1,2\}}$$

   The range is the set of all y-values

$$\text{Range} = \boxed{\{3,5,6\}}$$

□

4. Find the midpoint of the line segment that connects $(4,3)$ and $(-2,5)$

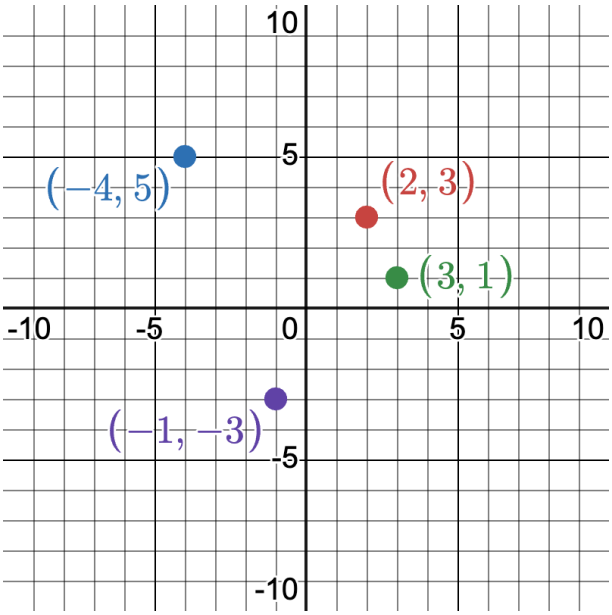
   Solution

$$\begin{aligned}\text{Midpoint} &= \left(\frac{4-2}{2}, \frac{3+5}{2}\right)\\ &= \left(\frac{2}{2}, \frac{8}{2}\right)\\ &= \boxed{(1,4)}\end{aligned}$$

□

5. Graph the following coordinates: $(2,3)$, $(-4,5)$, $(3,1)$, and $(-1,-3)$

Solution



□

6. Find the center and radius of the following circle: $x^2 - 6x + y^2 + 4y + 4 = 0$

Solution We have to complete the square for both the x's and the y's

$$\begin{aligned} x^2 - 6x + y^2 + 4y + 4 = 0 &\Leftrightarrow (x^2 - 6x) + (y^2 + 4y) = -4 \\ &\Leftrightarrow \left(x^2 - 6x + \left(\frac{-6}{2}\right)^2\right) + \left(y^2 + 4y + \left(\frac{4}{2}\right)^2\right) = -4 + \left(\frac{-6}{2}\right)^2 + \left(\frac{4}{2}\right)^2 \\ &\Leftrightarrow (x^2 - 6x + 9) + (y^2 + 4y + 4) = -4 + 9 + 4 \\ &\Leftrightarrow (x-3)^2 + (y+2)^2 = 9 \end{aligned}$$

So the center is $\boxed{(3,-2)}$ and the radius is $\sqrt{9} = \boxed{3}$

□

7. Find the distance between $(1, 3)$ and $(5, -1)$

Solution

$$\begin{aligned}\text{Distance} &= \sqrt{(5-1)^2 + (-1-3)^2} \\ &= \sqrt{4^2 + (-4)^2} \\ &= \sqrt{16+16} \\ &= \sqrt{32} \\ &= \sqrt{16 \cdot 2} \\ &= 4\sqrt{2}\end{aligned}$$

□

8. Write each verbal function representation in its symbolic representation. Then simplify the expression. Let x represent the number:

   (a) y is six more than the product of negative four and a number

   (b) Divide a number by 6 then add 5 to produce y

   (c) y is equal to 3 less than a number multiplied by itself

   Solution

   (a) The word "more" indicates addition, the word "product" indicates multiplication, and the words "a number" indicate a variable (most often, we use x). Putting this together, we get

   $$\boxed{y = -4x + 6}$$

   (b) The word "divide" indicates division, the words "a number" indicate a variable (most often, we use x), the word "add" indicates addition, and the word "produce" indicates an equal sign. Putting this together, we get

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

   (c) The words "is equal" indicates an equal sign, the word "less" indicates subtraction, the words "a number" indicates a variable (most often, we use x), and the words "multiplied by itself" indicate squaring (i.e. ^{2}). Putting this together we get

   $$\boxed{y = x^2 - 3}$$

□

9. Write the following in interval notation:

   (a) $\{x : 6 < x \leq 10\}$ (b) $\{x : x < -6\}$

   Solution Use parentheses for $<$ and $>$, and brackets for $\leq$ and $\geq$.

   (a) $\boxed{(6, 10]}$

   (b) $\boxed{(-\infty, 6)}$

□

Note: We did not get to the material for problems 8 and 9 in class, so you may skip them.

Key:

1. 2
2. 6
3. $D = \{1, 2\}$, $R = \{3, 5, 6\}$
4. $(1, 4)$
5. Check with a graphing utility
6. Center: $(3, -2)$, Radius: 3
7. $4\sqrt{2}$
8. (a) $y = -4x + 6$
   (b) $y = \frac{x}{6} + 5$
   (c) $y = x^2 - 3$
9. (a) $(6, 10]$
   (b) $(-\infty, -6)$