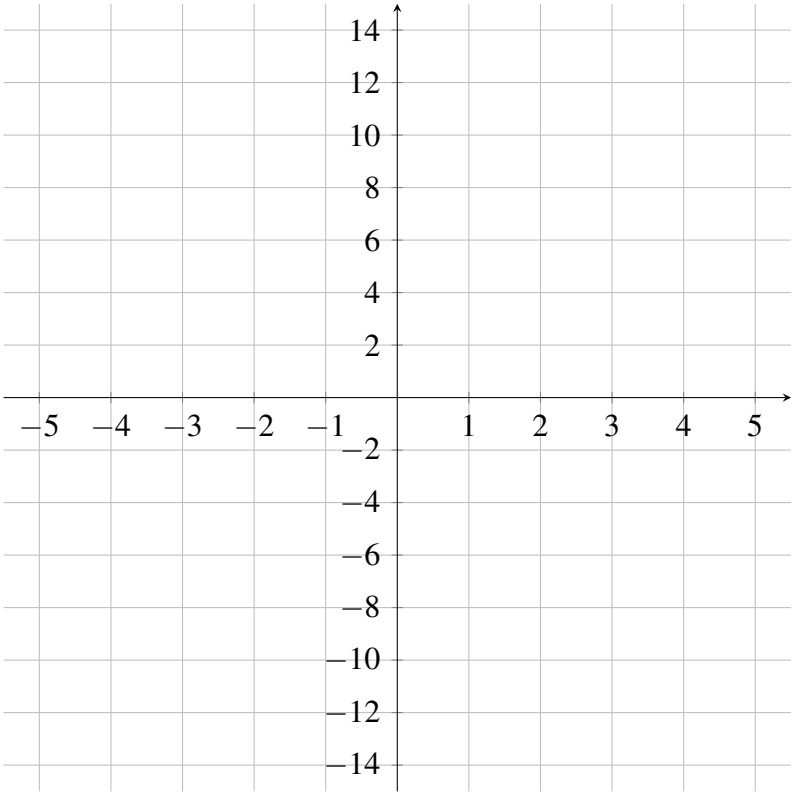
Name: _____ _____ **/ 40**

Assessment 2 Instructions:

- The AS-2 is 10 problems and is worth 40 points.
- You will have 1 hour to complete AS-2.
- The AS-2 is closed book and closed notes.
- **Calculators are allowed only for the problem # 10** on the AS-2.
- Show all your work for full credit and box your final answer.

1. [4 points]

Find the equation of the straight line that passes through the point $(2,5)$ and is **perpendicular** to the line $2(y+x)-3(x-y)=-9$. Graph the line $2(y+x)-3(x-y)=-9$ and the obtained perpendicular line below.

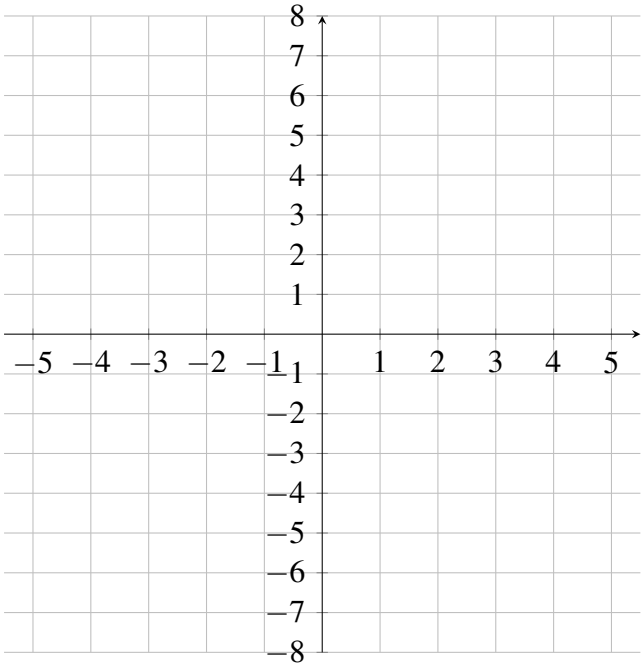


2. [4 points] Given the two points $(5,-4)$ and $(4,3)$:

a. find the length of the line segment (distance) between the points

b. find the midpoint of the segment

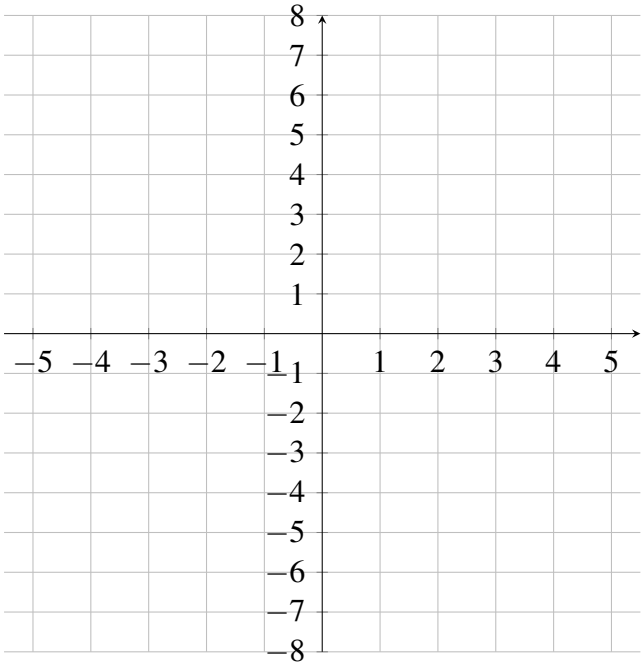
3. [4 points] Solve the linear inequality $|y-3x| \leq 2$ by graphing its solution set



4. [4 points] Find the standard form for the equation of the circle

$$x^2+y^2-8x+12y+43=0$$

Precisely state the coordinates of the center point and the radius. Graph the obtained circle.



5. [4 points] For each of the following relations, determine the **domain** and **range**:

a. $R = \{(3,3),(-4,3),(3,8),(3,-2)\}$

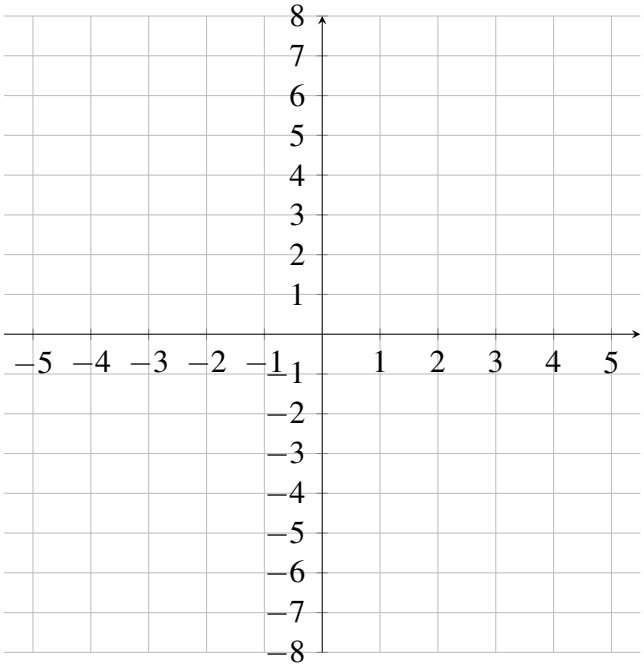
b. $y = 7\pi^2$

6. [4 points] Determine the implied domain of the following function

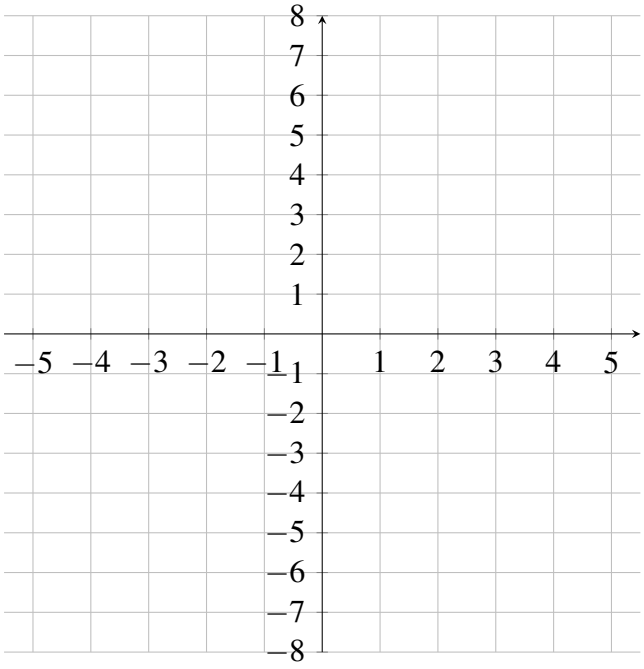
$$f(x) = \frac{5}{\sqrt[3]{3-x^2}}$$

7. [4 points] Graph the following quadratic function and **state the coordinates of its vertex**.

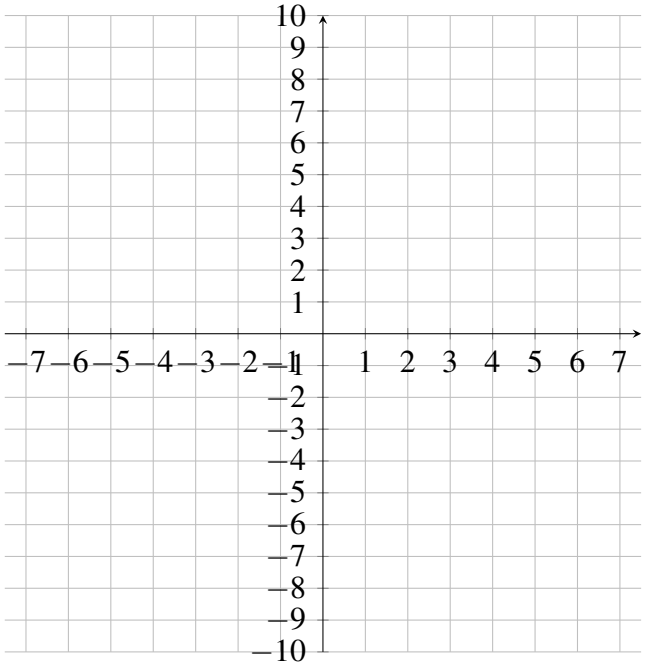
$$y = (x+3)^2 - 2$$



8. [4 points] Graph the following linear function $f(x) = 3\left(1 - \frac{1}{3}x\right) + x$. **State** precisely its **slope** and y**-intercept point**.

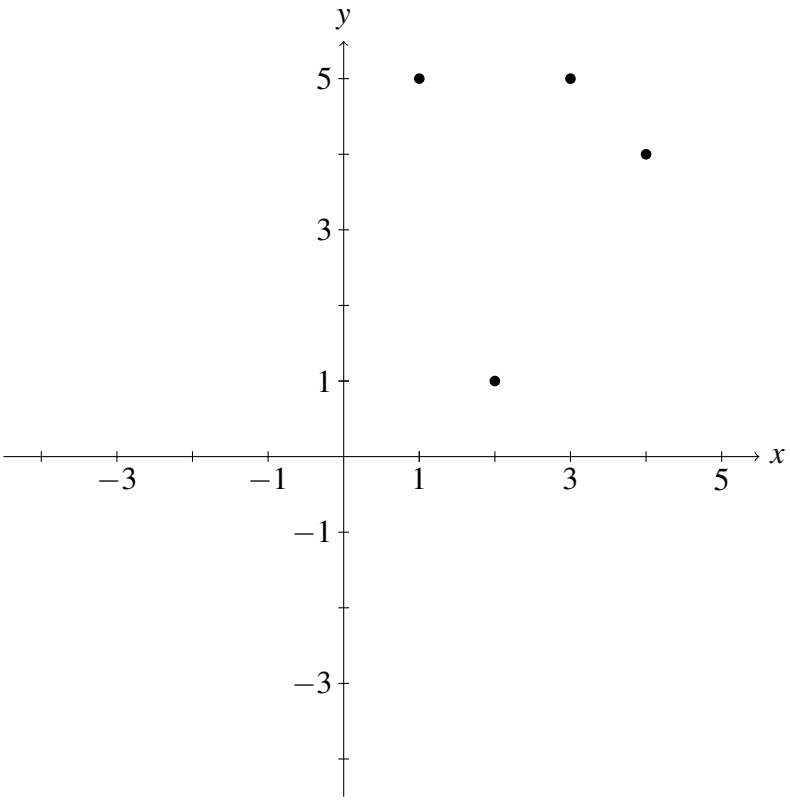


9. [4 points] Among all pairs of numbers with a difference of 6, find the pair whose product is minimum. **Write your answer in the form:** $x = \cdots, y = \cdots, x \cdot y = min\ product$. (***Hint:*** *you need to create a quadratic function, graph it with indicating its vertex coordinates*)



10. [4 points] The coordinates of the four graphed points are

$$\{(1,5),(2,1),(3,5),(4,4)\}.$$



We also know the following information:

- $\bar{x} = 2.5$, $\bar{y} = 3.75$
- $\sum(\Delta x)^2 = 5$, $\sum \Delta x \Delta y = 0.5$, $\sum(\Delta y)^2 = 10.75$

a. Using the following formulas

$$m = \frac{\sum \Delta x \Delta y}{\sum(\Delta x)^2} \quad \text{and} \quad b = \bar{y} - m\bar{x}$$

find the equation of the line $y = mx + b$ of the best fit. Sketch the obtained straight line on the coordinate plane given above.

b. Using the following formula

$$r = \frac{\sum \Delta x \Delta y}{\sqrt{\sum (\Delta x)^2}\sqrt{\sum (\Delta y)^2}}$$

calculate the Pearson correlation coefficient r. Make a conclusion about the linear dependence of the variable y on the variable x.