

Show all your work to get full/ partial credit. Each problem is worth 5 points.

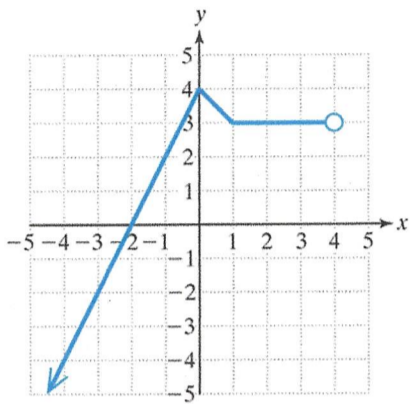
1) Determine if the relation is a function and state its domain:

$$y = \sqrt{2x + 3}$$

Relation is a function

Domain:  $[-\frac{3}{2}, \infty)$

2) State the domain and range:



Domain:  $(-\infty, 4)$

Range:  $(-\infty, 4]$

3) On the interval  $[-4, 3]$  what is the minimum and/or maximum?

Minimum:  $-4$  (at point  $(-4, -4)$ )

Maximum:  $4$  (at point  $(0, 4)$ )

4) State when the function is increasing, decreasing, and constant.

Increasing:  $(-\infty, 0)$

Decreasing:  $(0, 1)$

Constant:  $(1, 4)$

- 5) Write the equation of the line in slope intercept form and state the y-intercept and slope:  $-2x + y = 4$

$$y = 2x + 4$$

slope: 2  
y-intercept: (0, 4)

- 6) Write the equation in slope intercept form of the line that passes through the points (4, -7) and (2, -1)

$$m = \frac{-1 - (-7)}{2 - 4} = \frac{6}{-2} = -3$$

$$y - (-1) = -3(x - 2)$$

[from point slope formula]

$$y + 1 = -3x + 6$$

$$y = -3x + 5$$

- 7) Write the equation in slope intercept form of the line that is parallel to the line  $y = 3x + 5$  and passes through the point (3, 7).

$$m = 3$$

[slope is same as slope of || line]

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

$$y - 7 = 3x - 9$$

$$y = 3x - 2$$

Given  $f(x) = x^2 - 3x + 2$

8) Evaluate  $f(2)$

$$\begin{aligned} f(2) &= 2^2 - 3(2) + 2 \\ &= 4 - 6 + 2 = \boxed{0} \end{aligned}$$

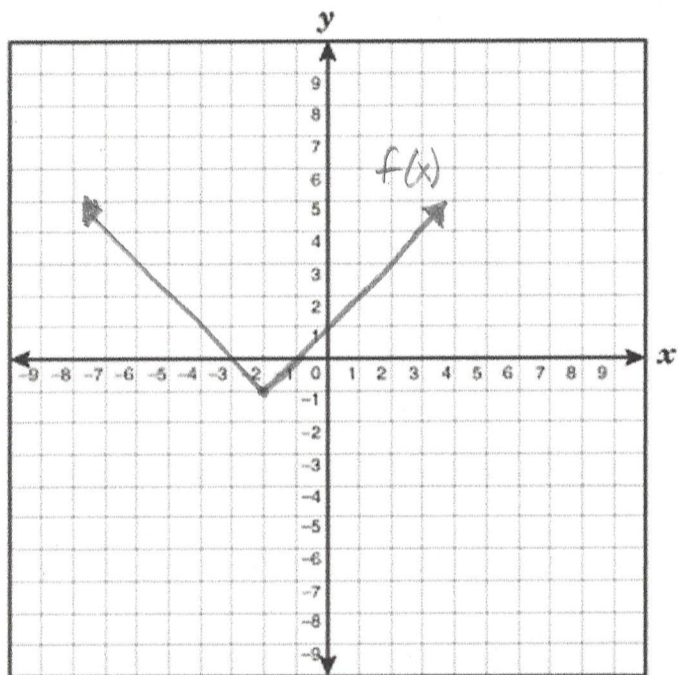
9) Evaluate  $f(-3)$

$$\begin{aligned} f(-3) &= (-3)^2 - 3(-3) + 2 \\ &= 9 + 9 + 2 = \boxed{20} \end{aligned}$$

10) A sales person makes a base salary of \$400 per week plus 12% commission on sales. Write a linear function to model the sales person's weekly salary  $S(x)$  for  $x$  dollars in sales.

$$S(x) = 0.12x + 400$$

11) Use transformations to graph the equation:  $f(x) = |x + 2| - 1$



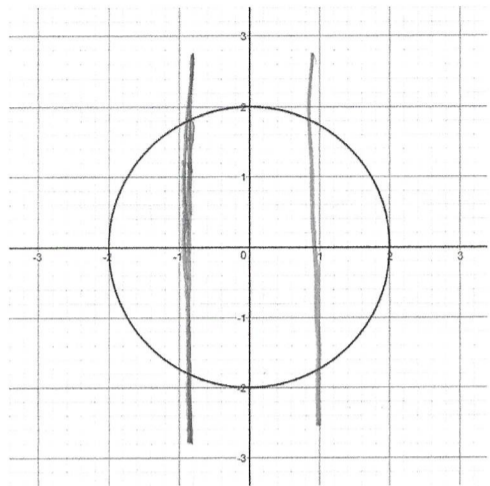
horizontal shift: left 2 units  
vertical shift: down 1 unit

12) Determine whether the graph of the equation is symmetric with respect to the y-axis, the x-axis, origin, or none of these:  $x^2 + y^2 = 4$

- y-axis:  $(-x)^2 + y^2 = 4$   
 $x^2 + y^2 = 4$  ✓
- x-axis:  $x^2 + (-y)^2 = 4$   
 $x^2 + y^2 = 4$  ✓
- origin:  $(-x)^2 + (-y)^2 = 4$   
 $x^2 + y^2 = 4$  ✓

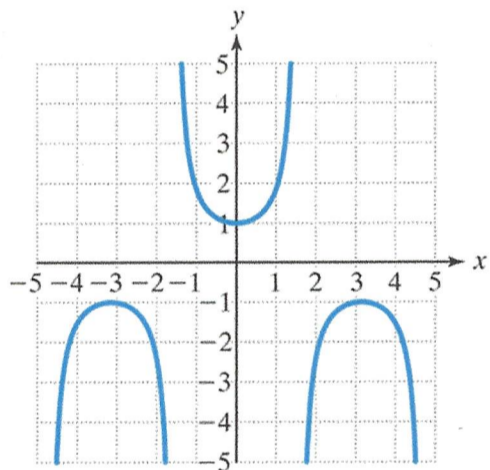
The graph is symmetric wrt x-axis, y-axis and the origin.

13) Determine whether the graph passes the vertical line test.



No: a vertical line passes through the the graph at more than one point.

14) Determine whether the function is even, odd, or neither.



Even (y-axis symmetry)

Given

$$r(x) = \begin{cases} x + 2 & \text{for } x \leq 0 \\ -x^2 & \text{for } x > 0 \end{cases}$$

15) Evaluate  $r(0)$

$$r(0) = 0 + 2 = \boxed{2}$$

16) Evaluate  $r(5)$

$$r(5) = -(5)^2 = \boxed{-25}$$

17) Given  $f(x) = -2x$  and  $g(x) = |x + 4|$ , evaluate  $(f - g)(3)$ .

$$\begin{aligned} (f - g)(3) &= f(3) - g(3) = -2(3) - |3 + 4| \\ &= -6 - 7 = \boxed{-13} \end{aligned}$$

18) Given  $f(x) = x^2 + 3$  and  $g(x) = 3x + 2$ , evaluate  $(g \circ f)(x)$ .

$$\begin{aligned} (g \circ f)(x) &= g(f(x)) \\ &= g(x^2 + 3) \\ &= 3(x^2 + 3) + 2 \\ &= \boxed{3x^2 + 11} \end{aligned}$$

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19) Write the function in vertex form:  $h(x) = 2x^2 - 4x + 3$

$$\begin{aligned} h(x) &= 2(x^2 - 2x) + 3 \\ &= 2(x^2 - 2x + 1) + 3 - 2 \\ &= \boxed{2(x-1)^2 + 1} \end{aligned}$$

20) Graph the equation from ~~19~~ #19

