Math 3

Get out your homework. I will come around to collect it.

Warm-Up:

Solve the following systems of equations for problems 1–3. Use 3 decimal points of accuracy when reporting your answer if an exact answer cannot be found.

1. $\begin{cases} f(x) = -3|x+1| \\ g(x) = x^2 - 6x + 5 \end{cases}$ $\varnothing$

2. $\begin{cases} f(x) = 3 \cdot 2^x - 2 \\ g(x) = 2|x| + 2 \end{cases}$ $\{(1, 4)\}$

3. $\begin{cases} f(x) = x^2 - 2x - 3 \\ g(x) = \ln(x-2) + 2 \end{cases}$ $\{(3.536, 2.429)\}$

What is a piecewise? A function which is defined by multiple sub-functions

( ) $>, <$ ● $\geq, \leq$ [ ]

Questions 1 – 6, graph each of the piecewise functions. Then list the domain and range

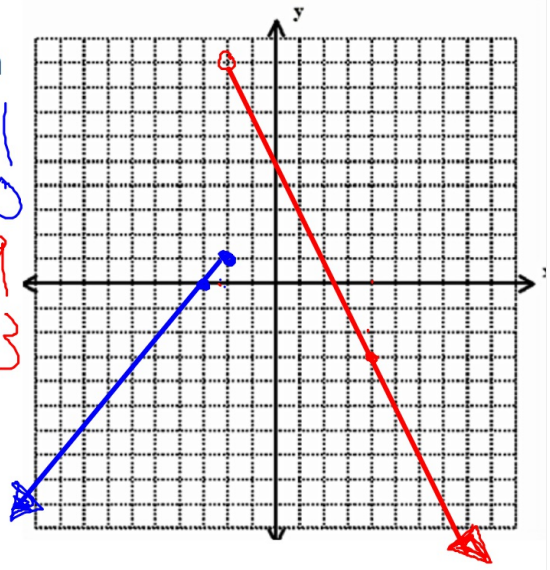
1. $f(x) = \begin{cases} x + 3, & x \leq -2 \\ -2x + 5, & x > -2 \end{cases}$

① $-2+3=1$

② $-3+3=0$

$-2(-2)+5=9$

$-2(4)+5=-3$



Domain: $(-\infty, \infty)$

Range: $(-\infty, 9)$

2. . $f(x) = \begin{cases} 2x - 4, & x < 4 \\ -\frac{3}{4}x + 11, & x \geq 4 \end{cases}$ ① ②

$2(4) - 4 = 4$

$2(3) - 4 = 2$

$-\frac{3}{4}(4) + 11 = 8$

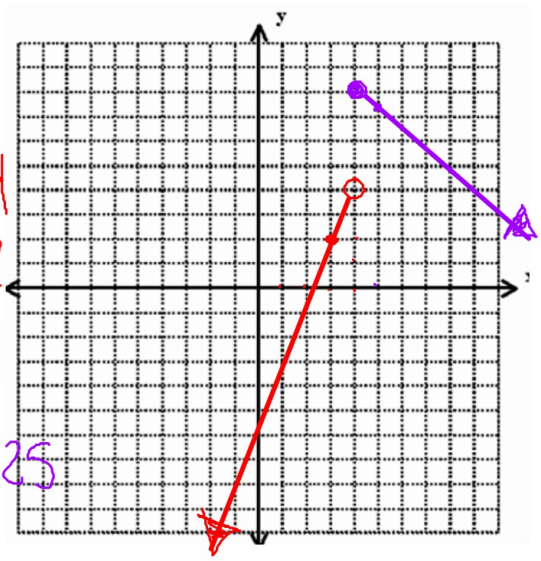
$-\frac{3}{4}(5) + 11 = 7.25$

Domain:

$(-\infty, \infty)$

Range:

$(-\infty, 8]$



3. $D(x) = \begin{cases} -2, & x \leq -5 \\ x + 5, & -3 \leq x < 3 \\ (x-5)^2 + 1, & x > 3 \end{cases}$ ① ② ③

$-3 + 5 = 2$

$3 + 5 = 8$

$(3-5)^2 + 1 = 5$

$(4-5)^2 + 1 = 2$

$(5-5)^2 + 1 = 1$

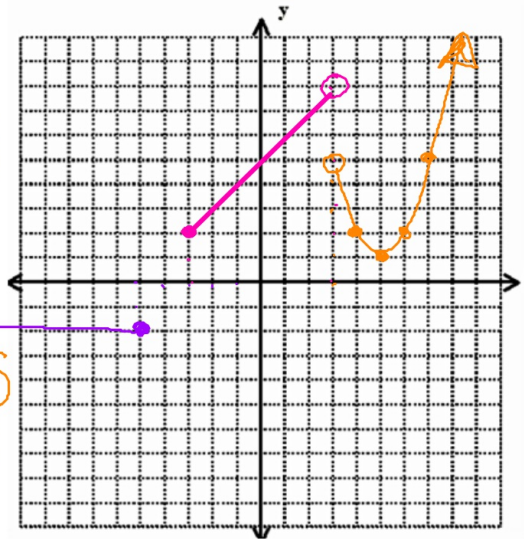
$(6-5)^2 + 1 = 2$

Domain:

$(-\infty, -5] \cup [-3, 3) \cup (3, \infty)$

Range:

$[-2] \cup [1, \infty)$



4. $g(x) = \begin{cases} 3x + 12, & x \le -3 \\ |x|, & -3 < x < 3 \\ -3x + 12, & x \ge 3 \end{cases}$ ① ② ③

$3(-3)+12=3$

$3(-4)+12=0$

$|-3|=3$

$|3|=3$

$-3(3)+12=3$

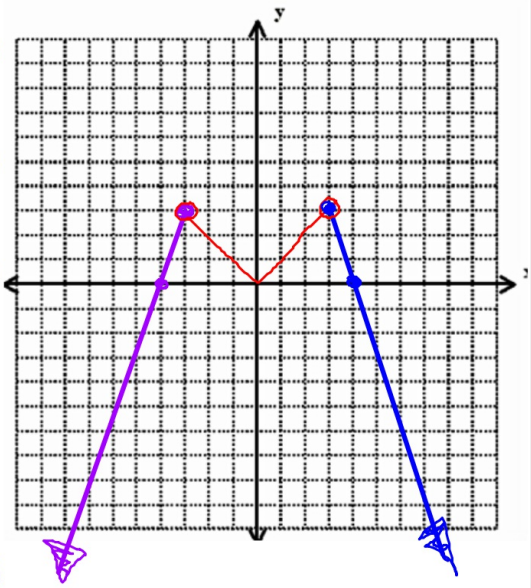
$-3(4)+12=0$

Domain:

$(-\infty, \infty)$

Range:

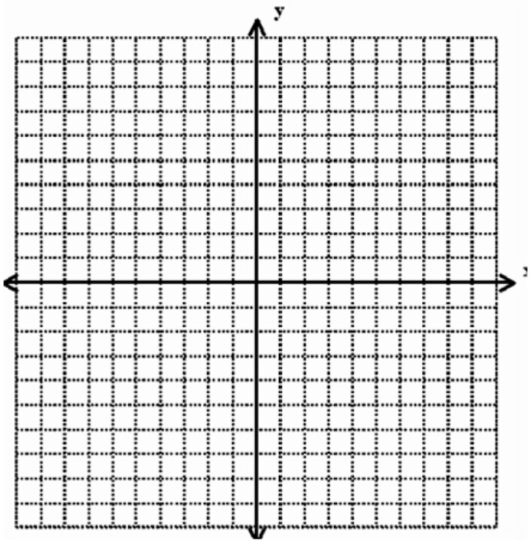
$(-\infty, 3]$



5. $k(x) = \begin{cases} 2, & x \ge 5 \\ -2x, & -2 \le x < 3 \\ 2 - x^2, & x < -2 \end{cases}$

Domain:

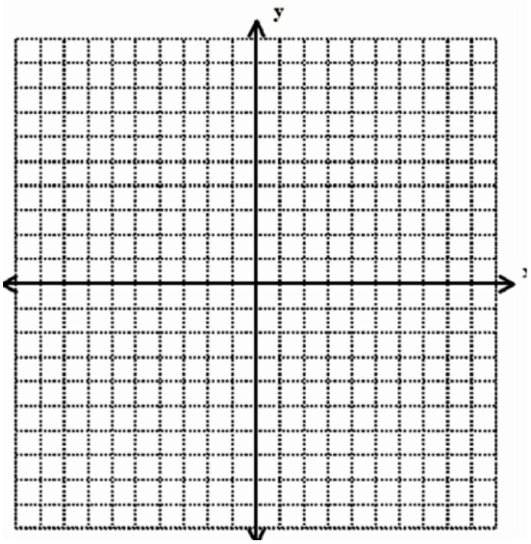
Range:



6. $f(x) = \begin{cases} x + 5, & x < -2 \\ x^2 + 2x + 3, & x \geq -2 \end{cases}$

Domain:

Range:



Questions 7 – 9, evaluate the piecewise functions

7. $f(x) = \begin{cases} x + 3, & x \leq -2 \\ -2x + 5, & x > -2 \end{cases}$ (1) (2)

$f(2) =$ $-2(2)+5$

$-4+5 =$ (1)

$f(4) =$ $-2(4)+5$

$-8+5 =$ (-3)

$f(-2) =$ $-2+3 =$ (1)

8. $f(x) = \begin{cases} -x, & x \leq -3 \\ 3x+2, & -3 < x \leq 1 \\ -\frac{2}{3}x + \frac{5}{3}, & x > 1 \end{cases}$

$f(1) =$

$f(4) =$

$f(-3) =$

$f(0) =$

$f(7) =$

9. $h(x) = \begin{cases} \sqrt{-(x+1)} - 1, & x < -1 \\ (x-1)^2 + 2, & -1 < x \leq 3 \\ 1, & x > 3 \end{cases}$

$h(0) =$

$h(-4) =$

$h(4) =$

$h(-1) =$

$h(2) =$

$h(-5) =$

$h(7) =$