

Review 2

1. Find the domain and zeros of the following:

a) $f(x) = \frac{3x+4}{2x+3}$

Domain: $2x+3 \neq 0$
 $2x \neq -3$
 $x \neq -\frac{3}{2}$
 $(-\infty, -\frac{3}{2}) \cup (-\frac{3}{2}, \infty)$

Zero: $3x+4=0$
 $3x = -4$
 $x = -\frac{4}{3}$

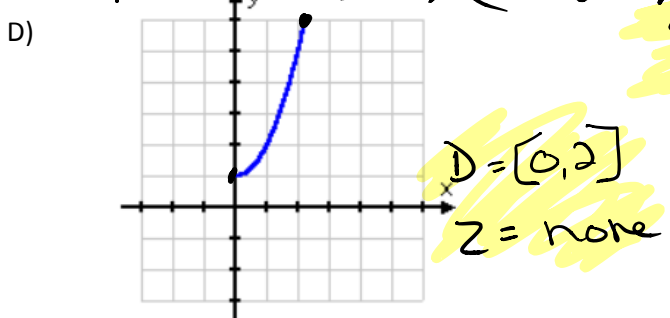
b) $f(x) = \sqrt{x+5} - 2$

$x+5 \geq 0$ $x \geq -5$
 $D = [-5, \infty)$
 $Z = -1$

$\sqrt{x+5} - 2 = 0$
 $\sqrt{x+5} = 2$
 $x+5 = \frac{4}{5}$
 $x = -1$

c) $f(x) = x^3 + 3x^2 - 3x - 9$

$x^2(x+3) - 3(x+3)$ $(x^2-3)(x+3)$
 $Z = \pm\sqrt{3}, -3$
 $D = (-\infty, \infty)$



2. Graph the piecewise functions. Then find the domain, range,

a) $f(x) = \begin{cases} -3, & -4 < x \leq 0 \\ x^2 - 1, & x > 0 \end{cases}$

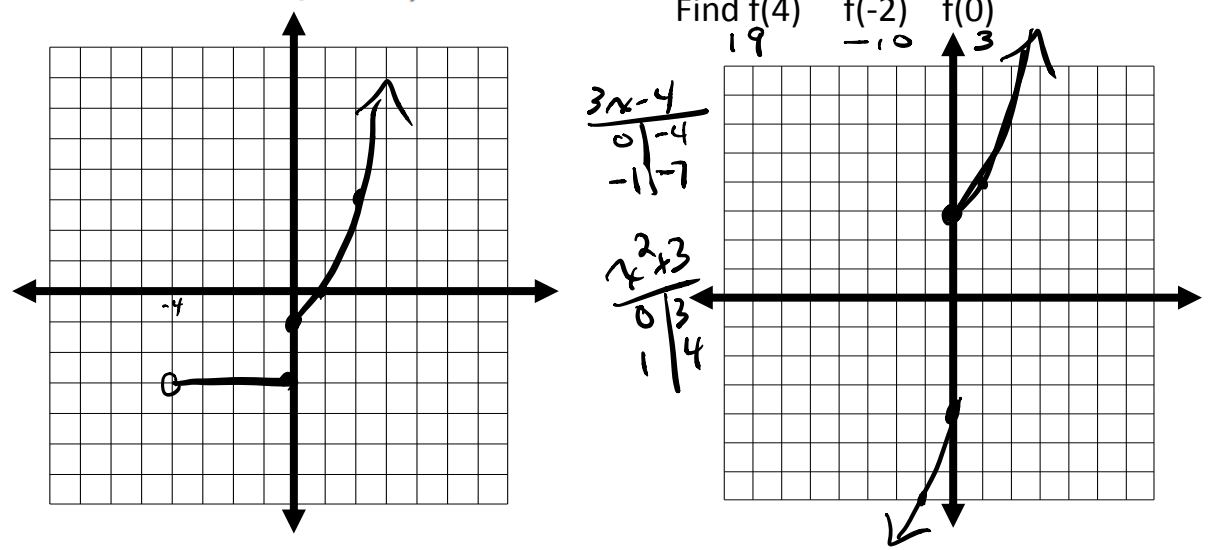
Find $f(1)$ $f(-2)$ $f(0)$
 $1^2 - 1 = 0$ -3 -3

$x^2 - 1$
 $0 \mid -1$
 $-1 \mid 0$
 $2 \mid 3$

Domain: $[-4, \infty)$
 Range: $[-2] \cup [-1, \infty)$

b) $g(x) = \begin{cases} 3x - 4, & x < 0 \\ x^2 + 3, & x \geq 0 \end{cases}$

Find $f(4)$ $f(-2)$ $f(0)$
 $4^2 + 3 = 19$ -10 3

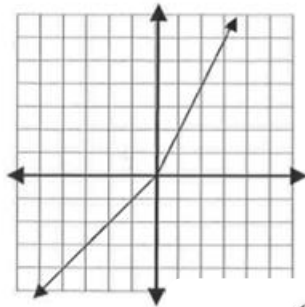


3. In a certain country, income tax is assessed by using the function below, where $f(x)$ is the percentage of the income that must be paid as tax, and x is the amount of income.

$$f(x) = \begin{cases} 0 & \text{if } x \leq \$15,000 \\ 12\% & \text{if } \$15,000 < x \leq \$30,000 \\ 18\% & \text{if } x > \$30,000 \end{cases}$$

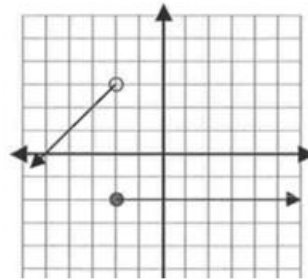
- a. If your income is \$28,000, what amount of tax will you pay? $.12(28,000) = \$3360$
- b. If your income is \$14,500, what amount of tax will you pay? 0
- c. Your income last year was \$25,000 and your friend's income was \$32,000. How much more did your friend pay in taxes than you? $(25,000)(.12) = 3000$ and $32,000(.18) = 5760$. Difference: $5760 - 3000 = \$2760$

4,5 Write equations for the piecewise functions whose graphs are shown below. Assume that the units are 1 for every tick mark.



$$f(x) = \begin{cases} x & x \leq 0 \\ 2x & x > 0 \end{cases}$$

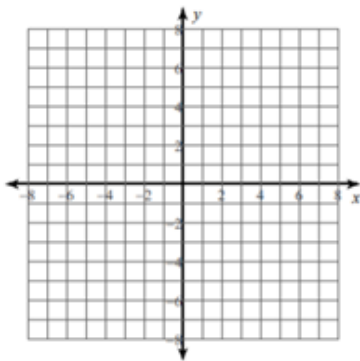
6,7



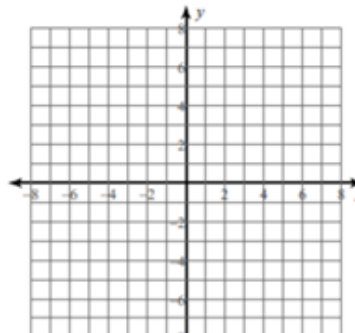
$$f(x) = \begin{cases} -x + 5 & x < -2 \\ -2 & x \geq -2 \end{cases}$$

Sketch the graph of each function.

$$f(x) = \begin{cases} -2x - 1, & x \leq 2 \\ -x + 4, & x > 2 \end{cases}$$

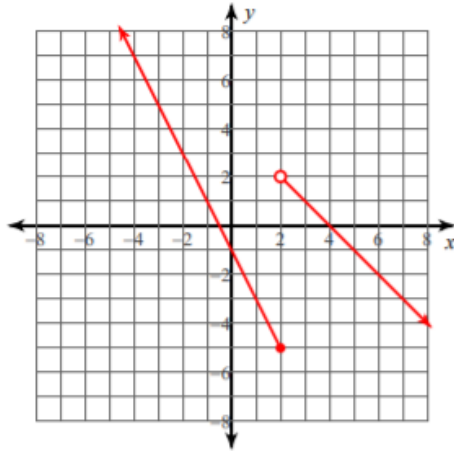


$$f(x) = \begin{cases} -4, & x \leq -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \geq 2 \end{cases}$$



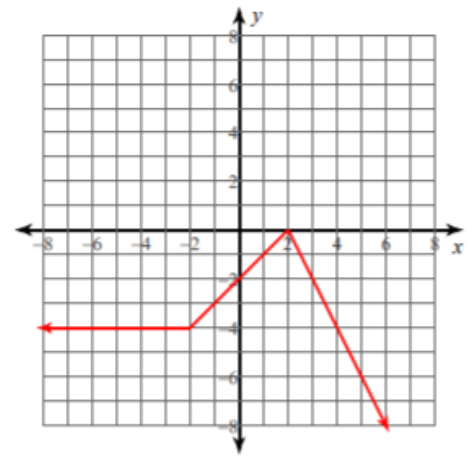
See below for answer

$$1) f(x) = \begin{cases} -2x - 1, & x \leq 2 \\ -x + 4, & x > 2 \end{cases}$$



$$f(x) = \begin{cases} x & x \leq 0 \\ 2x & x > 0 \end{cases}$$

$$2) f(x) = \begin{cases} -4, & x \leq -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \geq 2 \end{cases}$$



$$f(x) = \begin{cases} x + 5 & x < -2 \\ -2 & x \geq -2 \end{cases}$$