

Extra Examples:

27. (8 points) The relationship between stopping distance, d (in feet) and the speed of the car, v (in mph) is $d = 1.2v + 0.05v^2$ on dry level concrete.

a) How many feet will it take a car traveling at 60 mph to stop on dry, level concrete?

$$d = 1.2(60) + 0.05(60)^2 = \boxed{252 \text{ ft.}}$$

b) If an accident occurs 275 feet ahead of you, what is the maximum speed you should be traveling to avoid being involved? Round your answer to the nearest two decimal places.

$$0 = 0.05v^2 + 1.2v - 275$$

$$\boxed{v = 63.13 \text{ mph}}$$

$$v = \frac{-1.2 \pm \sqrt{(1.2)^2 - 4(0.05)(-275)}}{2(0.05)}$$

$$v = \frac{-1.2 \pm \sqrt{56.44}}{0.1}$$

28. (8 points) Solve the equation. $-8 + |x - 2| = -4$

$$+8 \qquad +8$$

$$|x - 2| = 4$$

$$x - 2 = 4$$

$$x - 2 = -4$$

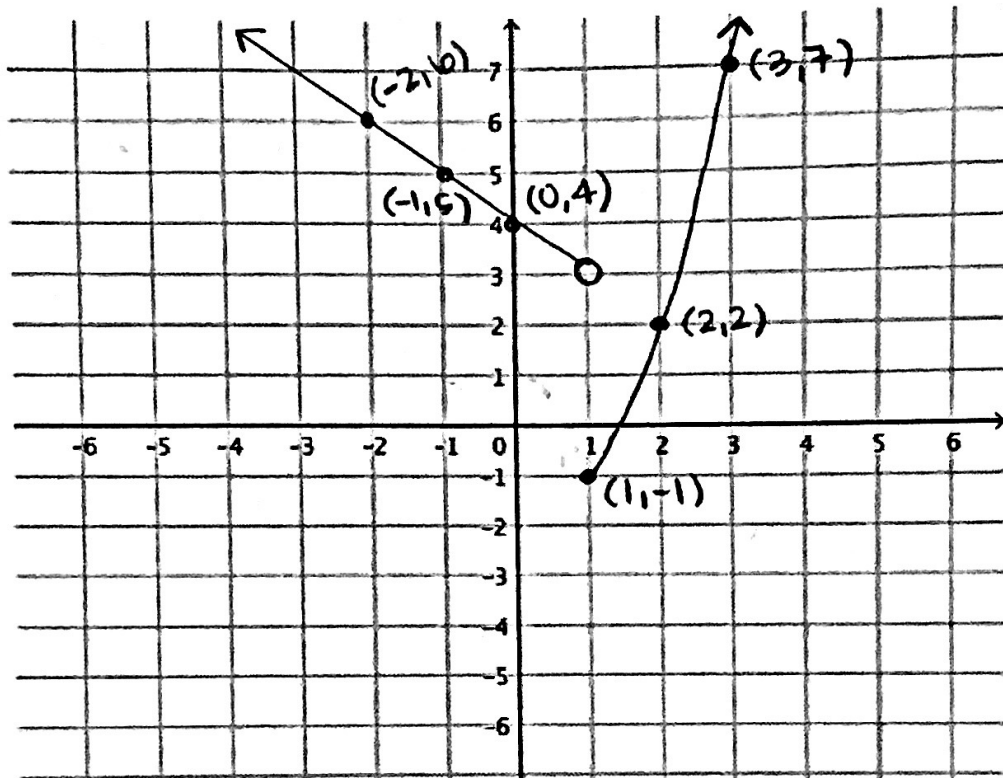
$$x = 6$$

$$x = -2$$

$$\boxed{\{-2, 6\}}$$

29. (8 points) Consider the piece-wise function $f(x) = \begin{cases} -x + 4 & \text{if } x < 1 \\ x^2 - 2 & \text{if } x \geq 1 \end{cases}$

Graph the function. Be sure to mark and label three points for each piece of the function.



x	Y
1	-1
2	2
3	7

30. (8 points) Solve the inequality. State the solution in interval notation.

$$\frac{2}{x-2} \geq \frac{1}{3x+1}$$

$$\frac{5x+4}{(x-2)(3x+1)} \geq 0$$

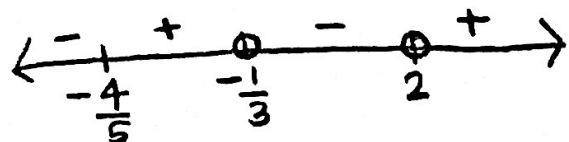
$$\frac{2}{x-2} - \frac{1}{3x+1} \geq 0$$

$$x \neq 2, -\frac{1}{3}$$

$$\frac{2(3x+1) - (x-2)}{(x-2)(3x+1)} \geq 0$$

$$x\text{-int} = -\frac{4}{5}$$

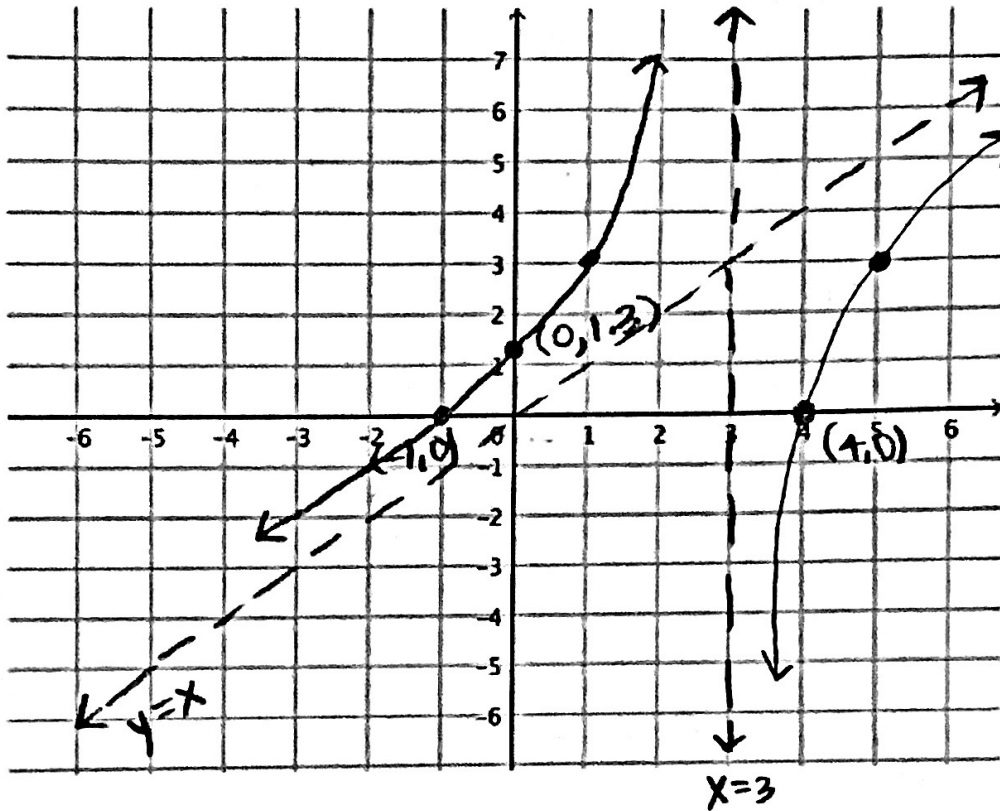
$$\frac{6x+2-x+2}{(x-2)(3x+1)} \geq 0$$



$$\boxed{\left[-\frac{4}{5}, -\frac{1}{3}\right) \cup (2, +\infty)}$$

$$\frac{x(x-3)-4}{x-3} = \frac{x^2-3x-4}{x-3}$$

31. (9 points) Graph the rational function $f(x) = x - \frac{4}{x-3}$. Your graph should clearly show and label all x and y -intercepts and asymptotes.



$$\begin{array}{r} 3 \overline{) 1-3 \quad 4} \\ \underline{-3 \quad 3} \\ 1 \quad 0 \quad -1 \end{array}$$

32. (3 points) Consider the piece-wise function $g(x) = \begin{cases} x+5 & \text{if } x < 3 \\ (x-2)^2 & \text{if } x \geq 3 \end{cases}$

The x -intercept(s) of $g(x)$ is (are) $(-5, 0)$. Write your answer(s) as ordered pair(s)

$$\begin{array}{ll} 0 = x + 5 & 0 = (x-2)^2 \\ x = -5 & x = 2 \end{array}$$

33. (2 points) Consider the piece-wise function $g(x) = \begin{cases} -4x + 6 & \text{if } x \leq 3 \\ x^2 - 7 & \text{if } x > 3 \end{cases}$

Evaluate the following.

- a) $f(0) = \underline{6}$ $f(0) = -4(0) + 6$
 b) $f(3) = \underline{-6}$ $f(3) = -4(3) + 6 = -12 + 6$
 c) $f(5) = \underline{18}$ $f(5) = 5^2 - 7 = 25 - 7$

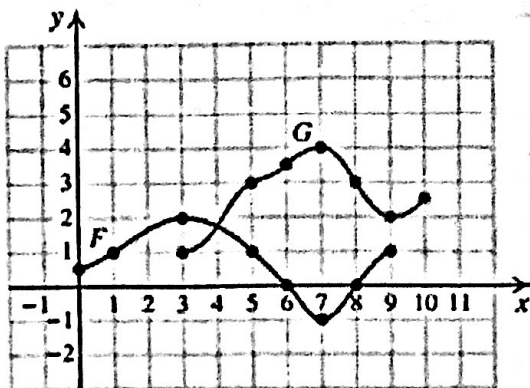
34. (3 points) Given the function $f(x) = \frac{x^2 - 10x + 25}{-2x + 13}$

- a) Identify the domain of $f(x)$: $\{x \mid x \neq 13/2\}$
 b) Identify the x -intercept(s) of $f(x)$: $(5, 0)$ $0 = x^2 - 10x + 25$
 c) Identify the y -intercept of $f(x)$: $(0, 25/13)$ $0 = (x - 5)(x - 5)$

35. (4 points) Write the difference quotient $DQ = \frac{f(x+h) - f(x)}{h}$ for $f(x) = \frac{1}{7x+1}$. Do not simplify.

$$\frac{\frac{1}{7(x+h)+1} - \frac{1}{7x+1}}{h}$$

36. (3 points) Given the graph shown. Evaluate $(g - f)(7) = \underline{5}$



$$g(7) - f(7) = 4 - (-1) = 5$$