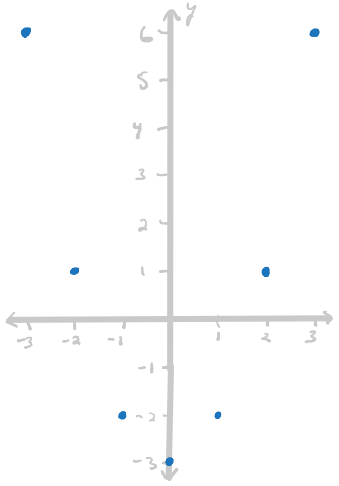
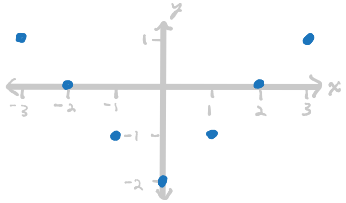
Homework 1 (Solutions)

2)



4)



6) x-int: $(-2,0)$, y-int: $(0,2)$

8) x-int: $(5,0)$, y-int: None

10) ~35%

12) 1990, ~28%

16) Domain: $\{1,2,13\}$, Range: $\{10,500,\pi\}$

18) $2x+y=8$

$y=8-2x$

Yes, y is a function of x. Every x-value input has exactly one y-value output.

20) $2x+y^2=6$

$y^2=6-2x$

$y=\pm\sqrt{6-2x}$

No, y is not a function of x. There is at least one x-value that outputs two y-values.

22) a) $g(0) = 3(0)^2 - 5(0) + 2 = 0 - 0 + 2 = 2$

b) $g(-2) = 3(-2)^2 - 5(-2) + 2 = 12 + 10 + 2 = 24$

c) $g(x-1) = 3(x-1)^2 - 5(x-1) + 2 = 3(x^2 - 2x + 1) - 5x + 5 + 2$

$= 3x^2 - 6x + 3 - 5x + 5 + 2$

$= 3x^2 - 11x + 10$

d) $g(-x) = 3(-x)^2 - 5(-x) + 2 = 3x^2 + 5x + 2.$

26) YES, FUNCTION.

28) NO, NOT A FUNCTION.

30) YES, FUNCTION.

32) a) DOMAIN: $(-\infty, \infty)$ OR $\mathbb{R}$

b) RANGE: $(-\infty, 3]$ OR $\{y \mid y \leq 3\}$

c) x-INT: $(-2, 0)$ AND $(3, 0)$

d) y-INT: $(0, 3)$

e) INCREASING ON $(-\infty, 0)$

DECREASING ON $(0, \infty)$

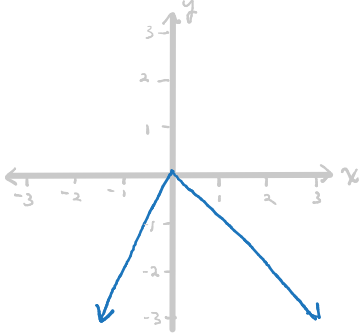
f) $f(-2) = 0$, $f(6) = -3$

34) a) RELATIVE MAX AT $(0, -2)$

b) RELATIVE MINS AT $(-2, -3)$ AND $(3, -5)$

36) ODD

40) a)



b) RANGE: $(-\infty, 0]$ OR $\{y \mid y \leq 0\}$

42) $$\frac{f(x+h)-f(x)}{h} = \frac{-2(x+h)^2+(x+h)+10-(-2x^2+x+10)}{h}$$

$$= \frac{-2(x^2+2xh+h^2)+x+h+10+2x^2-x-10}{h}$$

$$= \frac{-2x^2+4xh+h^2+x+h+10+2x^2-x-10}{h}$$

$$= \frac{4xh+h^2+h}{h}$$

$$= 4x+h+1$$

46) $\frac{y_2-y_1}{x_2-x_1} = \frac{(-4)-(-2)}{(-3)-(-1)} = \frac{-4+2}{-3+1} = \frac{2}{2} = 1$. LINE RISES.

48) $\frac{y_2-y_1}{x_2-x_1} = \frac{(10)-(5)}{(-2)-(-2)} = \frac{10-5}{-2+2} = \frac{5}{0}$ = UNDEFINED. LINE IS VERTICAL.

50) SLOPE $= \frac{y_2-y_1}{x_2-x_1} = \frac{(6)-(2)}{(1)-(-1)} = \frac{6-2}{1+1} = \frac{4}{2} = 2$.

POINT-SLOPE FORM: $(y-2) = 2(x+1)$

$y = 2(x+1)+2 = 2x+2+2 = 2x+4$

SLOPE-INTERCEPT FORM: $y = 2x+4$.

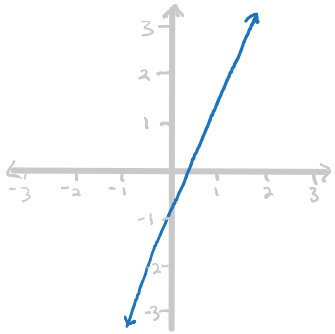
52) SLOPE OF $y = \frac{1}{3}x + 4$ IS $\frac{1}{3}$. PERPENDICULAR SLOPE IS $-1/(\frac{1}{3}) = -3$.

POINT-SLOPE FORM: $(y-6) = -3(x+3)$

$y = -3(x+3) + 6 = -3x - 9 + 6 = -3x - 3$

SLOPE-INTERCEPT FORM: $y = -3x - 3$

54) SLOPE: $\frac{2}{5}$, y-INT: $(0, -1)$



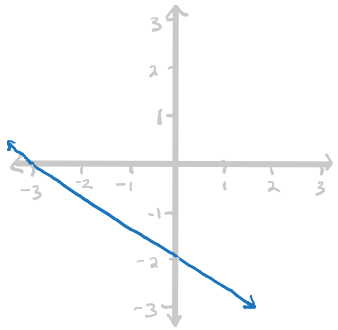
56) $2x + 3y + 6 = 0$

$3y = -2x - 6$

$y = -\frac{2}{3}x - \frac{6}{3}$

$y = -\frac{2}{3}x - 2$

SLOPE: $-\frac{2}{3}$, y-INT: $(0, -2)$



62) $\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{f(9) - f(5)}{9-5} = \frac{((9)^2 - 4(9)) - ((5)^2 - 4(5))}{4}$

$= \frac{81 - 36 - 25 + 20}{4} = \frac{40}{4} = 10.$

AVG ROC = 10.