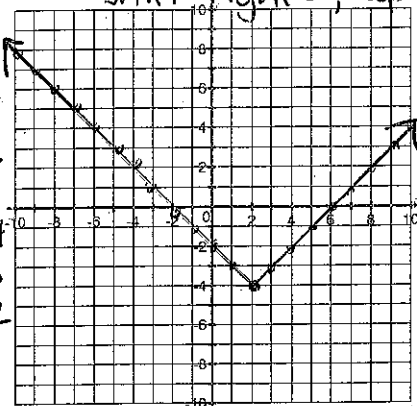


Graphing Absolute Value Functions

1) $f(x) = |x - 2| - 4$

shift right 2, down 4

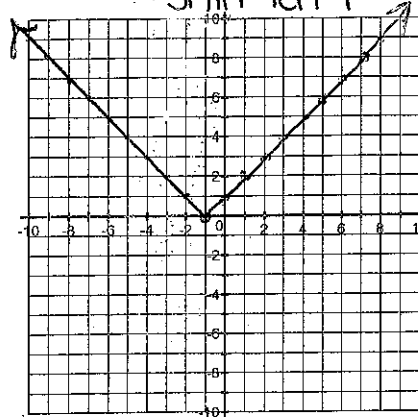


-2	2	0	-2
-1	1	1	-3
0	0	2	-4
1	1	3	-3
2	2	4	-2

Vertex: (2, -4) AoS: $x = 2$
 Domain: $(-\infty, \infty)$ Range: $[-4, \infty)$
 Max: none Min: (2, -4)
 Int of Inc: (2, ∞) Int of Dec: $(-\infty, 2)$
 X-Int: (-2, 0) (6, 0) Y-Int: (0, -2)
 End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow \infty$
 As $x \rightarrow \infty, f(x) \rightarrow \infty$

2) $g(x) = |x + 1|$

shift left 1

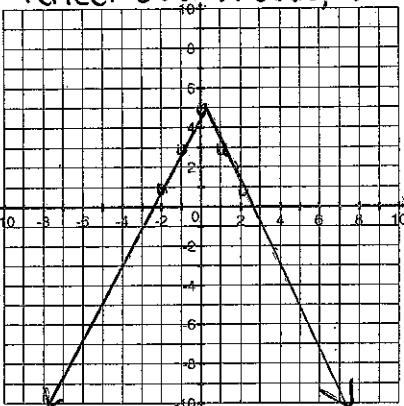


x	y	x	y
-2	2	-3	2
-1	1	-2	1
0	0	-1	0
1	1	0	1
2	2	1	2

Vertex: (-1, 0) AoS: $x = -1$
 Domain: $(-\infty, \infty)$ Range: $[0, \infty)$
 Max: none Min: (-1, 0)
 Int of Inc: (-1, ∞) Int of Dec: $(-\infty, -1)$
 X-Int: (-1, 0) Y-Int: (0, 1)
 End Behavior: As $x \rightarrow -\infty, g(x) \rightarrow \infty$
 As $x \rightarrow \infty, g(x) \rightarrow \infty$

3) $h(x) = -2|x| + 5$

reflect over x-axis, v. stretch of 2 up 5

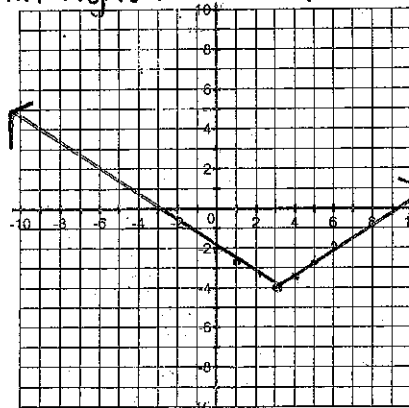


x	y	x	y
-2	2	-2	1
-1	1	-1	3
0	0	0	5
1	1	1	3
2	2	2	1

Vertex: (0, 5) AoS: $x = 0$
 Domain: $(-\infty, \infty)$ Range: $(-\infty, 5]$
 Max: (0, 5) Min: none
 Int of Inc: $(-\infty, 0)$ Int of Dec: $(0, \infty)$
 X-Int: $(-\frac{5}{2}, 0)$ $(\frac{5}{2}, 0)$ Y-Int: (0, 5)
 End Behavior: As $x \rightarrow -\infty, h(x) \rightarrow -\infty$
 As $x \rightarrow \infty, h(x) \rightarrow -\infty$

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

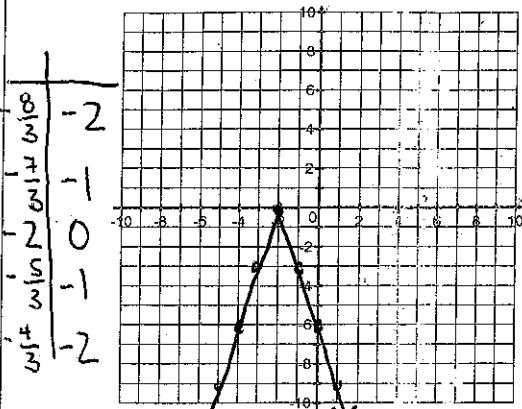
shift right 3 · v. comp. $\frac{2}{3}$ · shift down 4



x	y	x	y
-2	2	1	3
-1	1	2	1
0	0	3	-1
1	1	4	-3
2	2	5	-5

Vertex: (3, -4) AoS: $x = 3$
 Domain: $(-\infty, \infty)$ Range: $[-4, \infty)$
 Max: none Min: (3, -4)
 Int of Inc: (3, ∞) Int of Dec: $(-\infty, 3)$
 X-Int: (-3, 0) (9, 0) Y-Int: (0, -2)
 End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow \infty$
 As $x \rightarrow \infty, f(x) \rightarrow \infty$

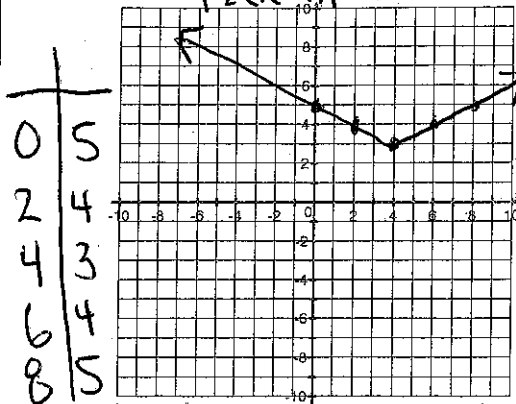
$$5) g(x) = -|3x + 6| = -|3(x+2)|$$



Vertex: $(-2, 0)$ AoS: $x = -2$
 Domain: $(-\infty, \infty)$ Range: $(-\infty, 0]$
 Max: $(-2, 0)$ Min: none
 Int of Inc: $(-\infty, -2)$ Int of Dec: $(-2, \infty)$
 X-Int: $(-2, 0)$ Y-Int: $(0, -6)$
 End Behavior: AS $x \rightarrow -\infty, g(x) \rightarrow -\infty$
 AS $x \rightarrow \infty, g(x) \rightarrow -\infty$

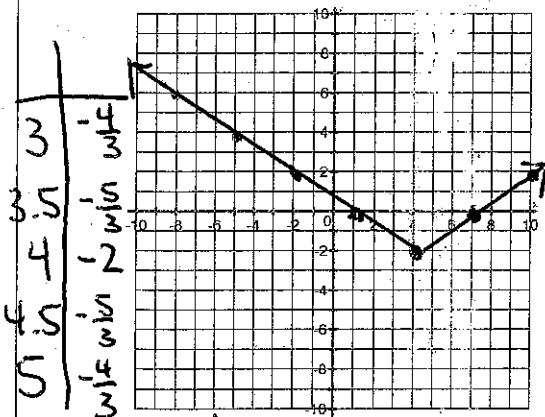
$$6) h(x) = \left| \frac{1}{2}x - 2 \right| + 3$$

$$= \left| \frac{1}{2}(x-4) \right| + 3$$



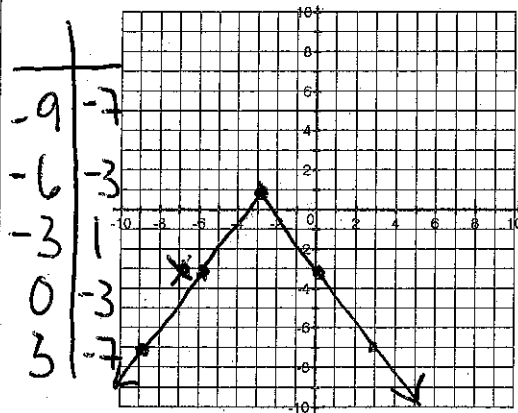
Vertex: $(4, 3)$ AoS: $x = 4$
 Domain: $(-\infty, \infty)$ Range: $[3, \infty)$
 Max: none Min: $(4, 3)$
 Int of Inc: $(4, \infty)$ Int of Dec: $(-\infty, 4)$
 X-Int: none Y-Int: $(0, 5)$
 End Behavior: AS $x \rightarrow -\infty, h(x) \rightarrow \infty$
 AS $x \rightarrow \infty, h(x) \rightarrow \infty$

$$7) m(x) = \frac{1}{3}|2x - 8| - 2 = \frac{1}{3}|2(x-4)| - 2$$



Vertex: $(4, -2)$ AoS: $x = 4$
 Domain: $(-\infty, \infty)$ Range: $[-2, \infty)$
 Max: none Min: $(4, -2)$
 Int of Inc: $(4, \infty)$ Int of Dec: $(-\infty, 4)$
 X-Int: $(7, 0)$ $(1, 0)$ Y-Int: $(0, \frac{2}{3})$
 End Behavior: AS $x \rightarrow -\infty, m(x) \rightarrow \infty$
 AS $x \rightarrow \infty, m(x) \rightarrow \infty$

$$8) z(x) = -4 \left| \frac{1}{3}x + 1 \right| + 1 = -4 \left| \frac{1}{3}(x+3) \right| + 1$$



Vertex: $(-3, 1)$ AoS: $x = -3$
 Domain: $(-\infty, \infty)$ Range: $(-\infty, 1]$
 Max: $(-3, 1)$ Min: none
 Int of Inc: $(-\infty, -3)$ Int of Dec: $(-3, \infty)$
 X-Int: $(-\frac{9}{4}, 0)$ $(-\frac{15}{4}, 0)$ Y-Int: $(0, -3)$
 End Behavior: AS $x \rightarrow -\infty, z(x) \rightarrow -\infty$
 AS $x \rightarrow \infty, z(x) \rightarrow -\infty$

$$0 = \frac{1}{3}|2x - 8| - 2$$

$$2 = \frac{1}{3}|2x - 8|$$

$$6 = 2x - 8$$

$$14 = 2x$$

$$7 = x$$

$$-6 = 2x - 8$$

$$2 = 2x$$

$$1 = x$$

$$0 = -4 \left| \frac{1}{3}x + 1 \right| + 1$$

$$\frac{1}{4} = \left| \frac{1}{3}x + 1 \right|$$

$$\frac{1}{4} = \frac{1}{3}x + 1$$

$$-\frac{3}{4} = \frac{1}{3}x$$

$$x = -\frac{9}{4}$$

$$-\frac{1}{4} = \frac{1}{3}x + 1$$

$$-\frac{5}{4} = \frac{1}{3}x$$

$$x = -\frac{15}{4}$$