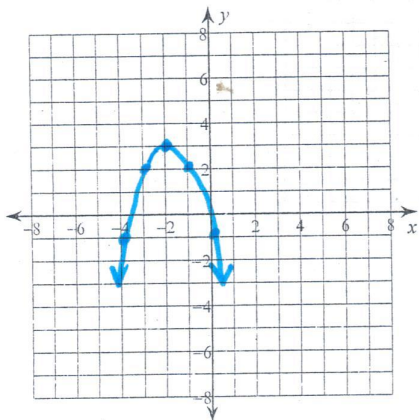


Families of Functions Review

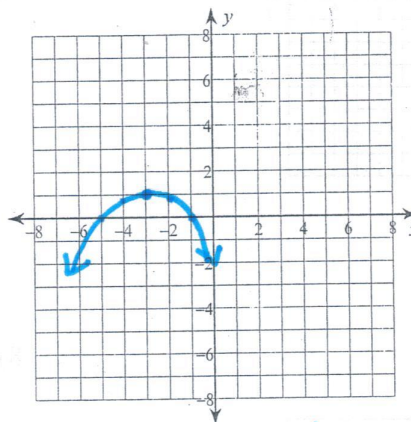
Graph each equation. Describe all transformations

1) $y = -(x + 2)^2 + 3$



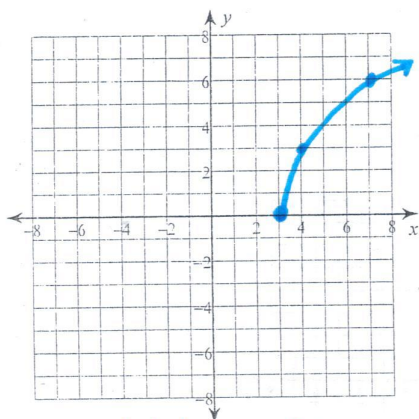
flip, L2, up 3

2) $y = -\frac{1}{4}(x + 3)^2 + 1$



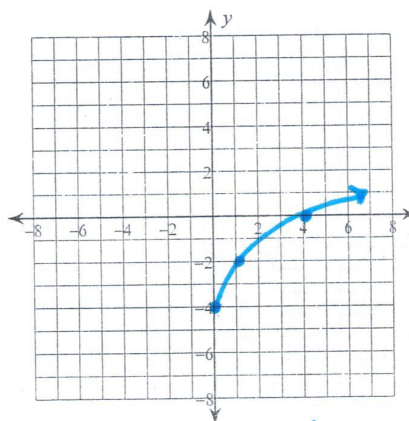
flip, shrink by 1/4, L3, up 1

3) $y = 3\sqrt{x - 3}$



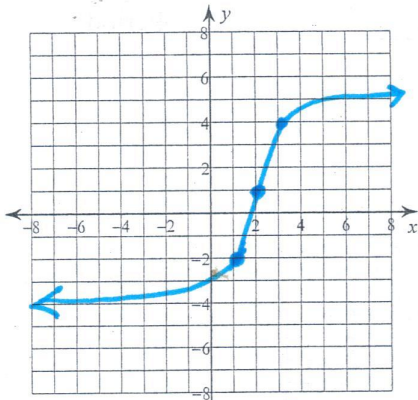
stretch by 3, R3

4) $y = 2\sqrt{x} - 4$



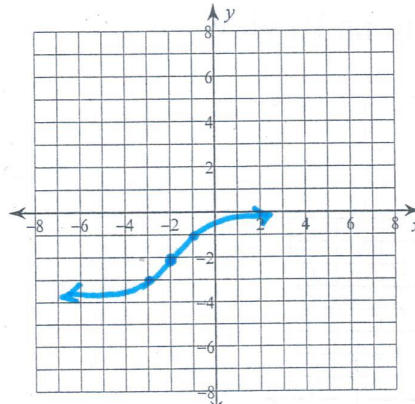
stretch by 2, down 4

5) $y = 3\sqrt[3]{x-2} + 1$



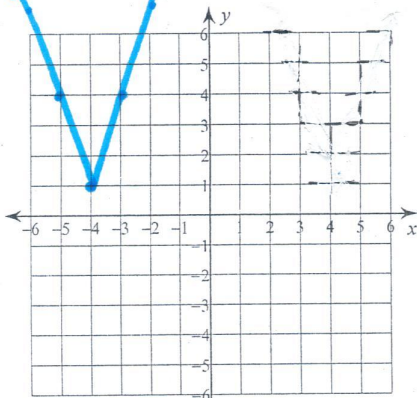
stretch by 3, R2, up1

6) $y = \sqrt[3]{x+2} - 2$



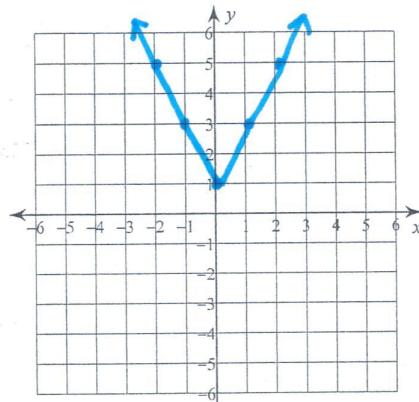
L2, down 2

7) $y = 3|x+4| + 1$



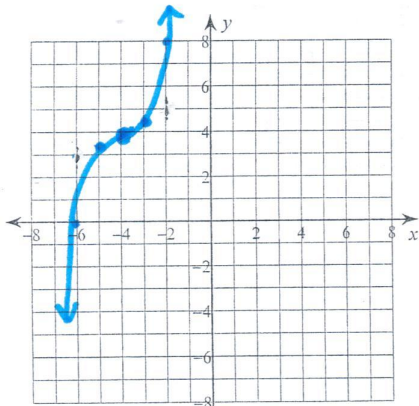
stretch by 3, L4, up1

8) $y = 2|x| + 1$



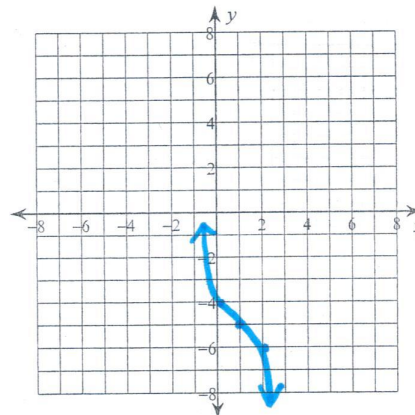
stretch by 2, up1

9) $y = \frac{1}{2}(x+4)^3 + 4$



shrink by 1/2, L4, up4

10) $y = -(x-1)^3 - 5$

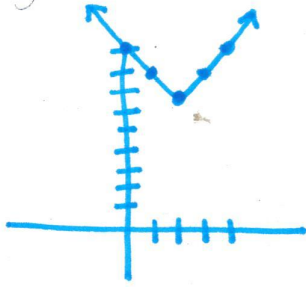


flip, R1, down 5

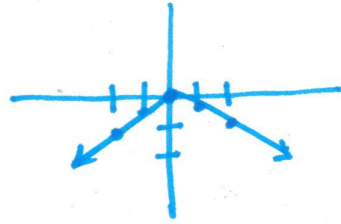
Absolute Value Equations (5-5)

Graph each equation and describe the transformations.

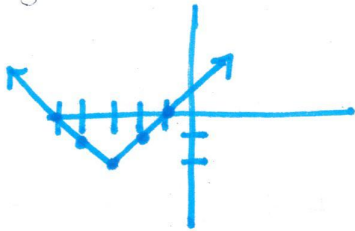
11) $y = |x-2| + 7$ R2, up 7



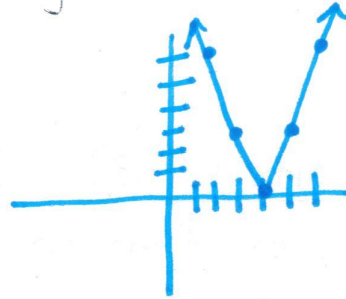
12) $y = -\frac{1}{2}|x|$ flip, shrink by $\frac{1}{2}$



3) $y = |x+3| - 2$ L3, down 2



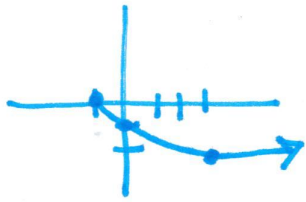
14) $y = 3|x-4|$ stretch by 3, R4



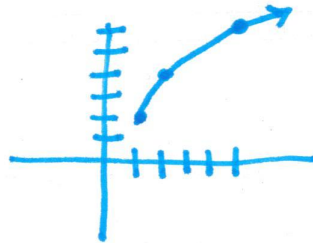
Radical Equations (4-2)

Graph each equation and describe the transformations.

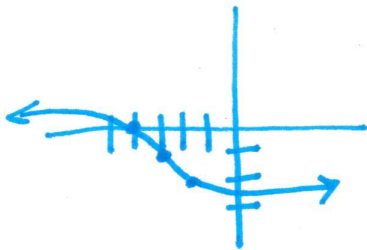
5) $y = -\sqrt{x+1}$ flip, L1



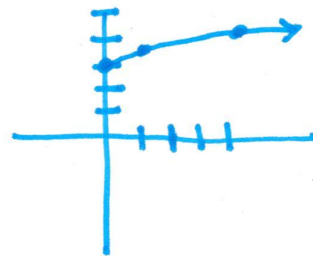
16) $y = 2\sqrt{x-1} + 2$ stretch by 2, R1, up 2



7) $y = -\sqrt[3]{x+3} - 1$ flip, L3, down 1



18) $y = \frac{1}{2}\sqrt[3]{x} + 3$ shrink by $\frac{1}{2}$, up 3



Rewrite the function to make it easy to graph using transformations. Describe the graph.

$$19) y = \sqrt{16x-32} = \sqrt{16(x-2)} \\ = 4\sqrt{x-2}$$

stretch by 4, R2

$$20) y = \sqrt{9x-63} + 4 \\ = \sqrt{9(x-7)} + 4 \\ = 3\sqrt{x-7} + 4$$

stretch by 3
R7, up 4

$$21) y = \sqrt[3]{8x} + 3 \\ = 2\sqrt[3]{x} + 3$$

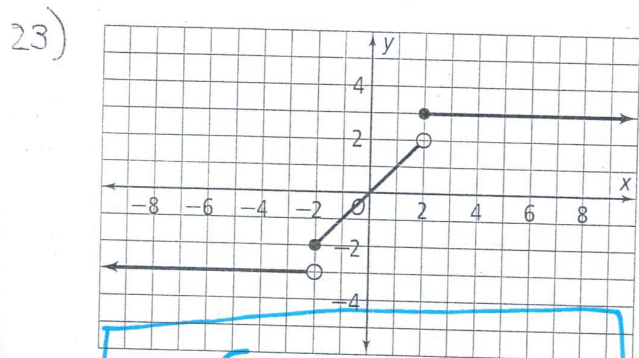
stretch by 2, up 3

$$22) y = \sqrt[3]{27x+54} - 5 \\ = \sqrt[3]{27(x+2)} - 5 \\ = 3\sqrt[3]{x+2} - 5$$

stretch by 3
L2, down 5

Piecewise Functions (4-3)

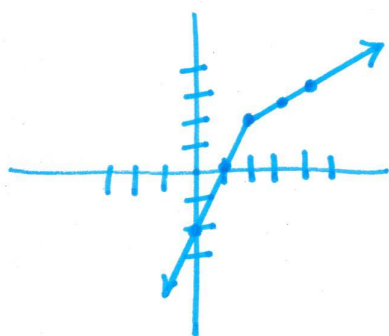
Write the piecewise function that is represented by the graph.



$$y = \begin{cases} -3; & x < -2 \\ x; & -2 \leq x < 2 \\ 3; & x \geq 2 \end{cases}$$

Graph each piecewise function.

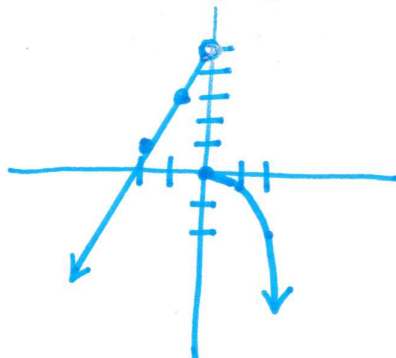
$$25) f(x) = \begin{cases} 2x-2 & \text{for } x < 2 \\ \frac{1}{2}x+1 & \text{for } x \geq 2 \end{cases}$$



x	y
2	2
1	0
0	-2

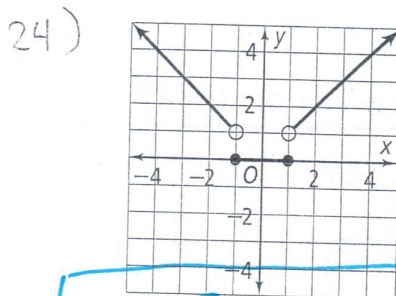
x	y
2	2
3	2.5
4	3

$$26) f(x) = \begin{cases} 2x+5 & \text{for } x < 0 \\ -\frac{1}{2}x^2 & \text{for } x \geq 0 \end{cases}$$



x	y
0	5
-1	3
-2	1

x	y
0	0
1	-1/2
2	-2



$$y = \begin{cases} -x; & x < -1 \\ 0; & -1 \leq x \leq 1 \\ x; & x > 1 \end{cases}$$

Review of Solving Quadratic Equations

Solve each equation by taking square roots.

27) 1) $3x^2 + 5 = -8$

$$\frac{3x^2}{3} = \frac{-13}{3}$$

$$\sqrt{x^2} = \sqrt{-13/3}$$

No real solution!

Solve each equation by factoring.

28) 2) $x^2 + 9x + 8 = 0$

$$(x+8)(x+1) = 0$$

$$x = -8, -1$$

Solve each equation by completing the square.

29) 3) $m^2 + 14m - 98 = -5$

$$m^2 + 14m + 49 = 93 + 49$$

$$\frac{14}{2} = (7)^2$$

$$\sqrt{(m+7)^2} = \sqrt{142}$$

$$m+7 = \pm\sqrt{142}$$

$$m = -7 \pm \sqrt{142}$$

Find the discriminant of each quadratic equation then state the number and type of solutions.

30) 4) $9m^2 - 5m + 2 = 0$

$$a = 9$$

$$b = -5$$

$$c = 2$$

$$b^2 - 4ac$$

$$(-5)^2 - 4(9)(2)$$

$$25 - 72$$

$$= -47$$

\therefore No real roots, 2 imag. sol.

Solve each equation with the quadratic formula.

31) 5) $3x^2 + 10x + 7 = 0$

$$a = 3$$

$$b = 10$$

$$c = 7$$

$$x = \frac{-10 \pm \sqrt{(10)^2 - 4(3)(7)}}{2(3)} = \frac{-10 \pm \sqrt{100 - 84}}{6} = \frac{-10 \pm \sqrt{16}}{6} = \frac{-10 \pm 4}{6}$$

$$\rightarrow \frac{-10+4}{6} = \frac{-6}{6}$$

$$\rightarrow \frac{-10-4}{6} = \frac{-14}{6}$$

$$x = -1, \frac{7}{3}$$

Combining Functions Review

Date _____ Period _____

Perform the indicated operation.

1) $f(x) = -3x + 3$
 $g(x) = -3x - 5$
 Find $(f + g)(x)$

$$-6x - 2$$

2) $g(t) = 3t - 2$
 $f(t) = 4t - 3$
 Find $(g + f)(t)$

$$7t - 5$$

3) $g(n) = n + 5$
 $h(n) = 4n + 3$
 Find $(g - h)(n)$

$$-3n + 2$$

4) $h(n) = -4n + 1$
 $g(n) = n + 2$
 Find $(h - g)(5)$

$$-26$$

5) $f(x) = -2x - 5$
 $g(x) = 4x - 2$
 Find $(f - g)(1)$

$$-9$$

6) $f(t) = 4t + 1$
 $g(t) = 3t + 5$
 Find $(f + g)(-1)$

$$-1$$

7) $f(x) = 3x + 1$
 $g(x) = -2x - 4$
 Find $(f \cdot g)(x)$

$$-6x^2 - 14x - 4$$

8) $h(x) = x + 3$
 $g(x) = 4x + 2$
 Find $\left(\frac{h}{g}\right)(x)$

$$\frac{x + 3}{4x + 2}; x \neq -\frac{1}{2}$$

9) $g(n) = 2n + 2$
 $h(n) = 3n + 4$
 Find $(g \cdot h)(-1)$

$$0$$

10) $h(n) = n + 3$
 $g(n) = 2n + 2$
 Find $\left(\frac{h}{g}\right)(3)$

$$\frac{3}{4}$$