Given: $y = a(x - h)^2 + k$

1. Describe the effect of **a** on the graph.

   compress or stretch

2. Describe the effect of **h** on the graph.

   Left or (Right)

3. Describe the effect of **k** on the graph.

   (up) or down

Identify the parent function name and describe the transformations for each function.

4. $g(x) = 3(x - 1)^2 - 6$ Name: *Quadratic*

   Transformations: *Stretch by 3, Right 1, down 6*

5. $f(x) = 5(x - 2)^3 - 11$ Name: *Cubic*

   Transformations: *Stretch by 5, Right 2, down 11*

6. $h(x) = \frac{2}{3}|x + 6|$ Name: *Absolute value*

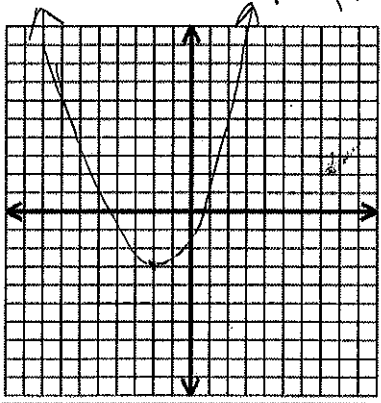   Transformations: *Compressed by 2/3, Left 6*

7. $f(x) = -\sqrt{x - 3}$ *$-f(x)$ not $f(-x)$*   Name: *Square Root*

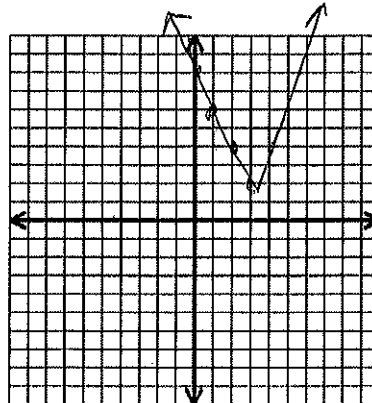   Transformations: *Reflected across x, Right 3*

8. What is the effect on the graph of the function $y = x^2 + 2$ when it is changed to $y = x^2 - 3$?

   Down 5

Name the Parent Function. List the transformations. Graph each equation.

9. $y = (x + 2)^2 - 3$

   Parent: *Quadratic* x^2

   Transformations: *Left 2, down 3*

10. $y = 2|x - 3| + 2$

   Parent: *Absolute value |x|*

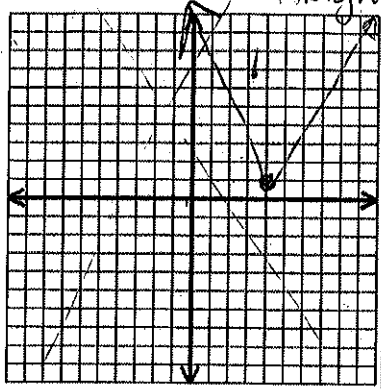   Transformations: *stretch 2, Right 3, up 2*

Name the Parent Function. List the transformations. Graph each equation.

11. $y = 2^{x-1} - 3$ [crossed out] $2|x-4|+1$
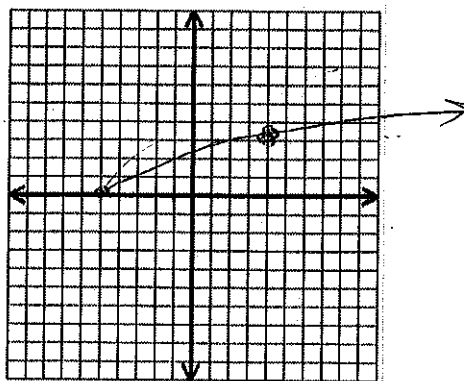
   Parent: Abs Value

   Transformations: Stretch 2, Right 4, Up 1

12. $y = \sqrt{x+5}$

   Parent: Square root

   Transformations: Left 5

13. Write the function $f(x)$ for each of these transformations:

   a) quadratic – right 3 units $(x-3)^2$

   b) absolute value – left 5 units, down 2 units $|x+5| - 2$

   c) square root – vertical stretch by 4, up 5 units $4\sqrt{x} + 5$

   d) cube root – right 11 units, up 8 units $\sqrt[3]{x-11} + 8$

   e) exponential base 2 – left 1 unit 2^{x+1}

   f) cubic – vertical compression by ⅔, down 5 units

   $\frac{2}{3}x^3 - 5$

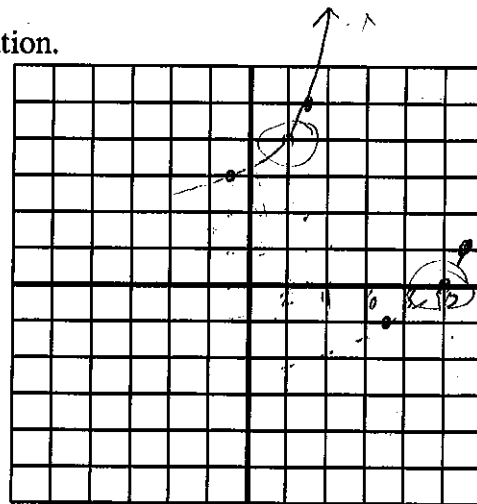14. Below are tables of points for two functions. Describe the transformation.
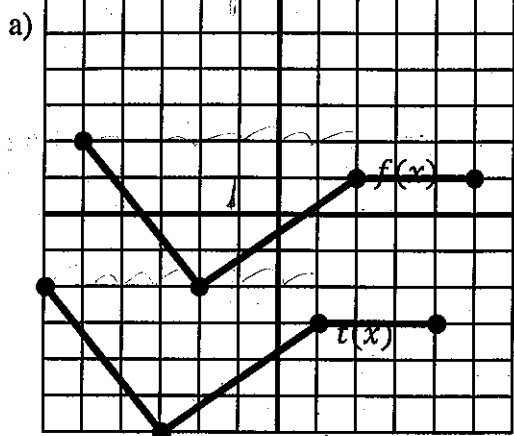
Parent function

x	y
-1	3
3	5
2	4

Translated function

x	y
7	-1
11	1
10	0

Down 4
Right 8

15. Describe each transformation. Then write an equation for $t(x)$ in terms of $f(x)$.

4 spaces

a)

No stretch or compression

$f(x) \to t(x)$ went down 4, Left 1

$t(x) = f(x+1) - 4$

What is the domain and range of f(x)?
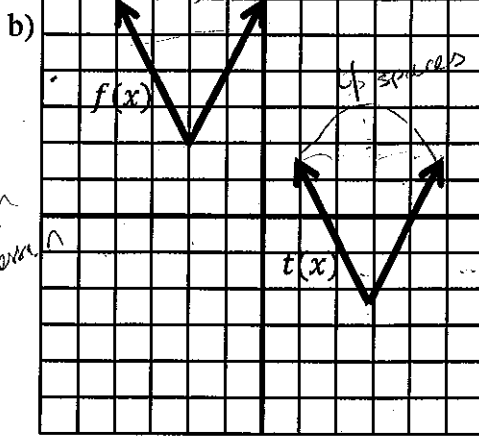
D: $[-5, 5]$

R: $[-2, 2]$

What is the domain and range of t(x)?

D: $[-6, 4]$

R: $[-6, -2)$

b)

4 spaces

$f(x) \to t(x)$ went down 4.5, Right 5

$t(x) = f(x-5) - 4.5$

What is the domain and range of f(x)?

D: $(-\infty, \infty)$

R: $[2, \infty)$

What is the domain and range of t(x)?

D: $(-\infty, \infty)$

R: $[-2.5, \infty)$

↑ this #

Find the domain and range for each function. Then describe the end behavior, if it

16. $y = -(x-5)^3$ Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$

End Behavior: As X→∞, y→-∞   Inc/Dec   Inc: —
                X→-∞, y→∞   Dec: $(-\infty, \infty)$

Guen or odd
Neither

17. $y = -3\sqrt{x+2}$ Domain: $[-2, \infty)$ Range: $[-1, -\infty)$

End Behavior: As X→∞, y→-∞   Inc: —
                X→-2, y→-1   Dec: $(-2, \infty)$

Neither

18. $y = 3^{x+2}$ Domain: $(-\infty, \infty)$ Range: $(0, \infty)$

End Behavior: As X→∞, y→∞   Inc: -∞,∞
                X→-∞, y→0   Dec: —

Neither

19. $y = \frac{1}{2}(x+1)^2$ Domain: $(-\infty, \infty)$ Range: $[0, \infty)$

minimum farther left one

End Behavior: X→∞, y→∞   Inc: $(-1, \infty)$
                X→-∞, y→∞   Dec: $(-\infty, -1)$

Neither

20. $y = \sqrt[3]{x+4} - 2$ Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$

End Behavior: X→∞, y→∞   Inc: $(-\infty, \infty)$
                X→-∞, y→-∞   Dec: —

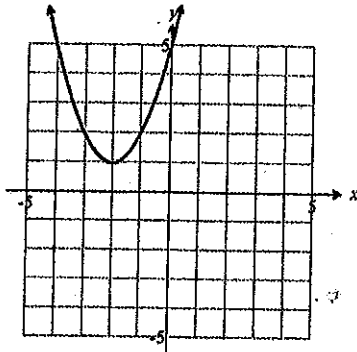Neither

Each graph is the result of applying a sequence of transformations to the graph of one of the parent functions (see Page 2). Identify the parent function, describe the transformation, and write an equation for the given graph.

21).
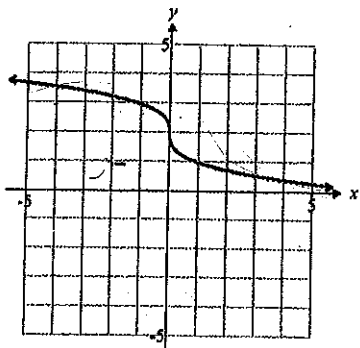
a. Name of parent function: Quadratic

b. Describe transformation:
up 1, left 2
(,)

c. Equation: $(x+2)^2+1$

22)
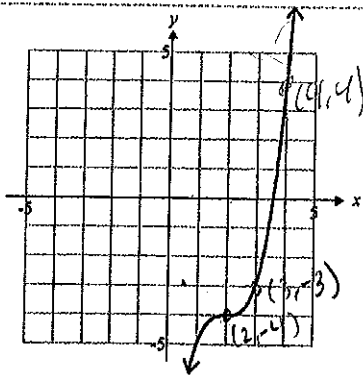
a. Name of parent function: Cube Root

b. Describe transformation:
Up 2, Flipped across y

c. Equation: $\sqrt[3]{x}+2$ or $-\sqrt[3]{x}+2$

23)

a. Name of parent function: Cubic
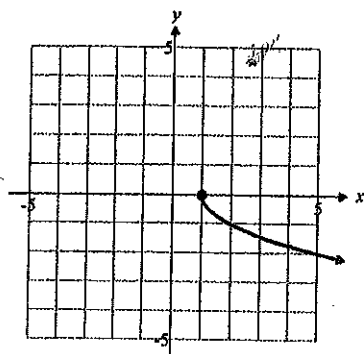
b. Describe transformation:
Down 4, Right 2

c. Equation: $(x-2)^3-4$

24).

a. Name of parent function: Square Root

b. Describe transformation:
Right one, flipped over x

c. Equation: $-\sqrt{x-1}$