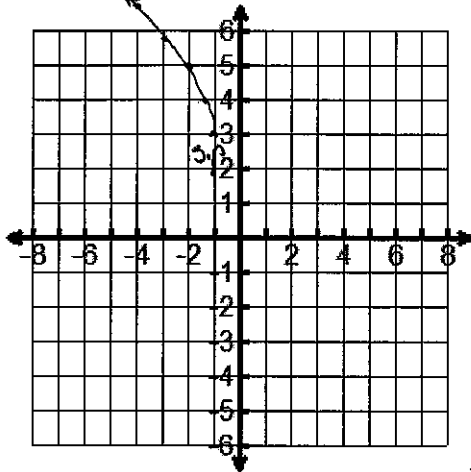


Name Solution Key

Date 03/08/2019

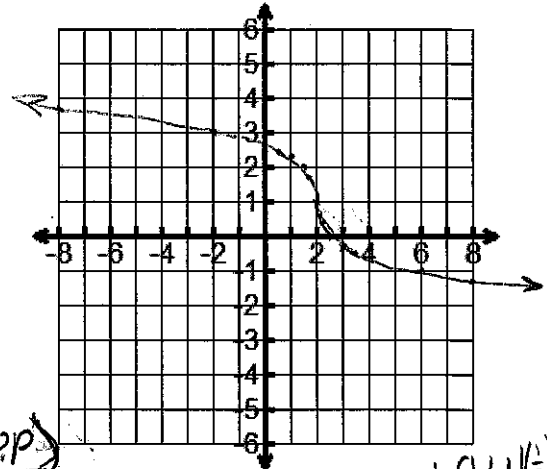
Graph each function.

1.  $f(x) = 2\sqrt{-(x+1)} + 3$



Transformations  
 Vert stretch of 2  
 refl across y-axis  
 trans left 1 unit  
 trans up 3 units  
 Graph each function.

2.  $f(x) = \sqrt[3]{-2(x-2)} + 1$

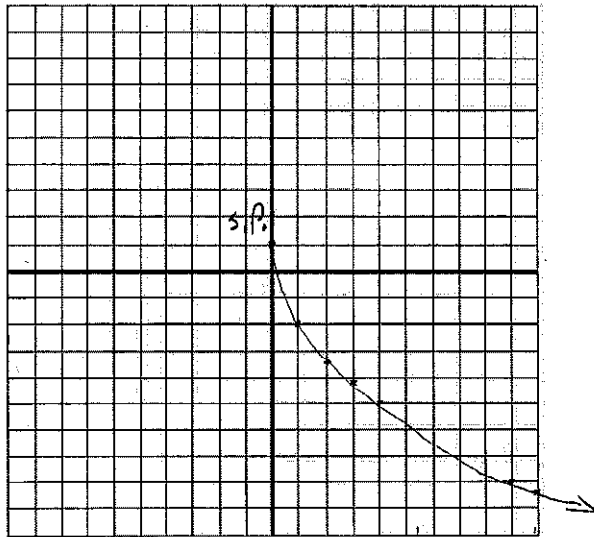


| left | up  | 2(up) |
|------|-----|-------|
| 1/4  | 1/2 | 1     |
| 1    | 1   | 2     |
| 2    | 1.4 | 2.8   |
| 3    | 1.7 | 3.4   |
| 4    | 2   | 4     |

Transformations  
 refl across y-axis  
 Horiz comp of 1/2  
 Trans rt 2 units  
 trans up 1 unit

| left/rt | (1/2) left/rt | up dn |
|---------|---------------|-------|
| 1/2     | 1/4           | 1.8   |
| 1       | 1/2           | 1     |
| 2       | 1             | 1.3   |
| 3       | 1.5           | 1.4   |
| 4       | 2             | 2     |
| 20      | 10            | 2.7   |
| 12      | 6             | 2.3   |

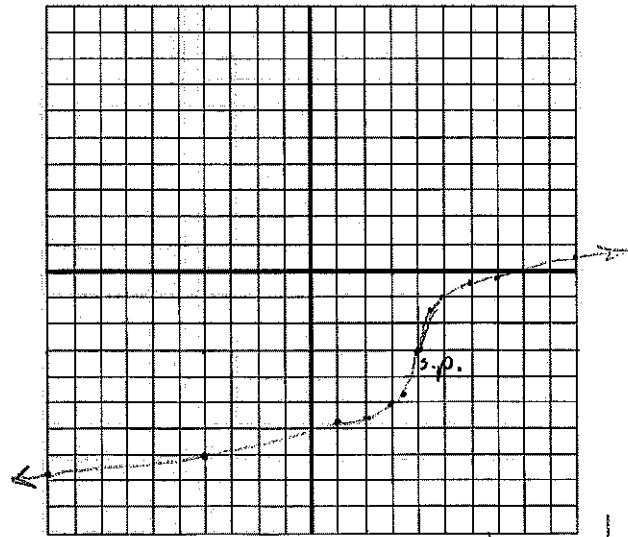
3.  $f(x) = -3\sqrt{x} + 1$



Transformations  
 refl across x-axis  
 Vert stretch of 3  
 trans up 1 unit

| rt | dn  | 3(dn) |
|----|-----|-------|
| 1  | 1   | 3     |
| 2  | 1.4 | 4.2   |
| 3  | 1.7 | 5.1   |
| 4  | 2   | 6     |
| 9  | 3   | 9     |
| 10 | 3.2 | 9.5   |

4.  $f(x) = 2\sqrt[3]{x-4} - 3$



Transformations  
 Vert stretch of 2  
 trans rt 4 units  
 trans dn 3 units

| rt  | up  | 2 up |
|-----|-----|------|
| 1/2 | .8  | 1.6  |
| 1   | 1   | 2    |
| 2   | 1.3 | 2.6  |
| 3   | 1.4 | 2.8  |
| 4   | 2   | 4    |
| 14  | 1.8 | 3.6  |
| 14  | 2.9 | 4.8  |

Using the graph of  $f(x) = \sqrt{x}$  as a guide, describe the transformation.

5.  $g(x) = \sqrt{-3(x-5)} + 2$

refl across y-axis  
 horiz comp of  $\frac{1}{3}$   
 trans rt 5 units  
 trans up 2 units

6.  $g(x) = 4\sqrt{\frac{1}{2}x} - 12$

vert stretch of 4  
 Horiz stretch of 2  
 trans dn 12 units

Use the description to write the square root function g.

7. The parent function  $f(x) = \sqrt{x}$  is reflected across the x-axis, vertically compressed by a factor of  $\frac{1}{2}$ , and translated 6 units up.

$g(x) = -\frac{1}{2}\sqrt{x} + 6$

8. The parent function  $f(x) = \sqrt{x}$  is translated 2 units right, compressed horizontally by a factor of  $\frac{1}{2}$ , and reflected across the x-axis.

$g(x) = -\sqrt{2(x-2)}$

9. The parent function  $f(x) = \sqrt{x}$  is translated 8 units left, reflected across the y-axis, and stretched horizontally by a factor of 3.

$g(x) = \sqrt{-\frac{1}{3}(x+8)}$

Solve each equation or inequality. For 10 and 11 solve algebraically or graphically.

10.  $\sqrt[3]{4x+1} - 5 = 0$

$\sqrt[3]{4x+1} = 5$

$(\sqrt[3]{4x+1})^3 = 5^3$

$4x+1 = 125$

$4x = 124$

$x = 31$

| L.H.S.                      | R.H.S. |
|-----------------------------|--------|
| $\sqrt[3]{4(31)+1} - 5 = 0$ | $= 0$  |
| $= \sqrt[3]{124+1} - 5$     |        |
| $= \sqrt[3]{125} - 5$       |        |
| $= 5 - 5$                   |        |
| $= 0$                       |        |

11.  $3\sqrt{x-11} = 18$

$\sqrt{x-11} = 6$

$(\sqrt{x-11})^2 = 6^2$

$x-11 = 36$

$x = 47$

| L.H.S.              | R.H.S. |
|---------------------|--------|
| $= 3\sqrt{(47)-11}$ | $= 18$ |
| $= 3\sqrt{36}$      |        |
| $= 3(6)$            |        |
| $= 18$              |        |

12.  $\sqrt{-14x+2} = x-3$   
 $(\sqrt{-14x+2})^2 = (x-3)^2$   
 $-14x+2 = x^2 - 6x + 9$   
 $+14x \quad -2 \qquad +14x \quad -2$   
 $x^2 + 8x + 7 = 0$   
 $(x+7)(x+1) = 0$   
 $x = -7 \quad x = -1$  no solution  
*extraneous extraneous*

13.  $\sqrt[3]{3x} = \sqrt[3]{2x+9}$

|                         |               |
|-------------------------|---------------|
| L.H.S.                  | R.H.S.        |
| $= \sqrt[3]{-14(-7)+2}$ | $(-7)-3$      |
| $= \sqrt[3]{100}$       | $= -10$       |
| $= 10$                  | $\times$      |
| L.H.S.                  | R.H.S.        |
| $\sqrt[3]{-14(-1)+2}$   | $(-1)-3$      |
| $\sqrt[3]{16} = 4$      | $\times = -4$ |

$(\sqrt[3]{3x})^3 = (\sqrt[3]{2x+9})^3$   
 $3x = 2x+9$   
 $-2x \quad -2x$   
 $x = 9$

|                    |                      |
|--------------------|----------------------|
| L.H.S.             | R.H.S.               |
| $= \sqrt[3]{3(9)}$ | $= \sqrt[3]{2(9)+9}$ |
| $= \sqrt[3]{27}$   | $= \sqrt[3]{27}$     |
| $= 3$              | $= 3$                |

14.  $x+2 = \sqrt{3x+6}$   
 $(x+2)^2 = (\sqrt{3x+6})^2$   
 $x^2 + 4x + 4 = 3x + 6$   
 $-x \quad -6 \quad -3x \quad -6$   
 $x^2 + x - 2 = 0$   
 $(x+2)(x-1) = 0$   
 $x = -2 \quad x = 1$

|            |                   |
|------------|-------------------|
| L.H.S.     | R.H.S.            |
| $= (-2)+2$ | $\sqrt{3(-2)+6}$  |
| $= 0$      | $= \sqrt{0}$      |
| $= 0$      | $= 0$             |
| L.H.S.     | R.H.S.            |
| $(1)+2$    | $= \sqrt{3(1)+6}$ |
| $= 3$      | $= \sqrt{9}$      |
| $= 3$      | $= 3$             |

15.  $(10x-25)^{\frac{1}{2}} = x$   
 $((10x-25)^{\frac{1}{2}})^2 = x^2$   
 $10x-25 = x^2$   
 $x^2 - 10x + 25 = 0$   
 $(x-5)^2 = 0$   
 $x = 5$

|                            |              |
|----------------------------|--------------|
| L.H.S.                     | R.H.S.       |
| $(10(5)-25)^{\frac{1}{2}}$ | $= (5)$      |
| $= 25^{\frac{1}{2}}$       | $= 5$        |
| $= 5$                      | $\checkmark$ |

16.  $\frac{5(6x+1)^{\frac{1}{4}}}{5} = \frac{10}{5}$

|                              |              |
|------------------------------|--------------|
| L.H.S.                       | R.H.S.       |
| $= 5(6(15)+1)^{\frac{1}{4}}$ | $= 10$       |
| $= 5(15+1)^{\frac{1}{4}}$    |              |
| $= 5(16)^{\frac{1}{4}}$      |              |
| $= 5(2)$                     |              |
| $= 10$                       | $\checkmark$ |

$(6x+1)^{\frac{1}{4}} = 2$   
 $(6x+1)^{\frac{1}{2}} = 2^2$   
 $6x+1 = 16$   
 $-1 \quad -1$   
 $6x = 15$   
 $x = \frac{5}{2}$

17.  $\frac{4(7x+18)^{\frac{1}{2}}}{4} = \frac{4x}{4}$   
 $(7x+18)^{\frac{1}{2}} = x$   
 $((7x+18)^{\frac{1}{2}})^2 = x^2$   
 $7x+18 = x^2$   
 $x^2 - 7x - 18 = 0$   
 $(x+2)(x-9) = 0$   
 $x = -2 \quad x = 9$   
*extraneous*

|                               |              |
|-------------------------------|--------------|
| L.H.S.                        | R.H.S.       |
| $= 4(7(-2)+18)^{\frac{1}{2}}$ | $= 4(-2)$    |
| $= 4(4)^{\frac{1}{2}}$        | $= -8$       |
| $= 4(2) = 8$                  | $\times$     |
| L.H.S.                        | R.H.S.       |
| $= 4(7(9)+18)^{\frac{1}{2}}$  | $= 4(9)$     |
| $= 4(81)^{\frac{1}{2}}$       | $= 36$       |
| $= 4(9)$                      | $\checkmark$ |
| $= 36$                        |              |

18.  $(x+4)^{\frac{1}{2}} = 6$   
 $((x+4)^{\frac{1}{2}})^2 = 6^2$   
 $x+4 = 36$   
 $x = 32$

|                            |              |
|----------------------------|--------------|
| L.H.S.                     | R.H.S.       |
| $= ((32)+4)^{\frac{1}{2}}$ | $= 6$        |
| $= 36^{\frac{1}{2}}$       |              |
| $= 6$                      | $\checkmark$ |

19.  $\frac{4(x-12)^{\frac{1}{3}}}{4} = \frac{-16}{4}$   
 $(x-12)^{\frac{1}{3}} = -4$   
 $((x-12)^{\frac{1}{3}})^3 = (-4)^3$   
 $x-12 = -64$   
 $+12 \quad +12$   
 $x = -52$

|                             |              |
|-----------------------------|--------------|
| L.H.S.                      | R.H.S.       |
| $= 4(-52-12)^{\frac{1}{3}}$ | $= -16$      |
| $= 4(-64)^{\frac{1}{3}}$    |              |
| $= 4(-4)$                   |              |
| $= -16$                     | $\checkmark$ |