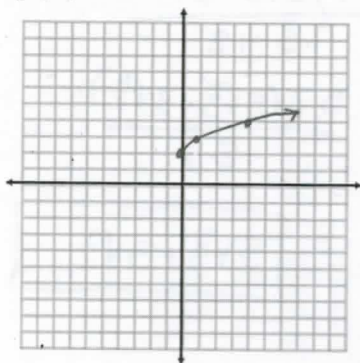
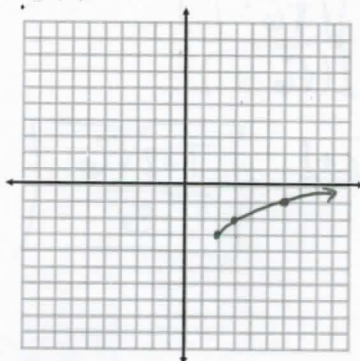


List any shifts or reflections and then graph each function.

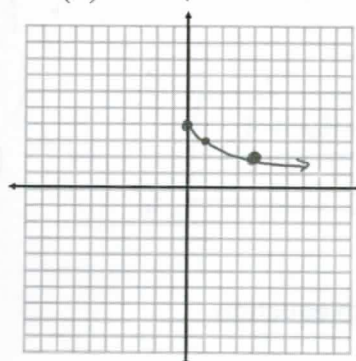
1. $f(x) = \sqrt{x} + 2$ $\uparrow 2$



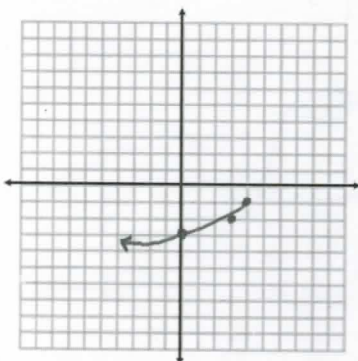
2. $g(x) = \sqrt{x-2} - 3$ $\rightarrow 2, \downarrow 3$



3. $h(x) = 4 - \sqrt{x}$ $\uparrow 4$ reflect over x

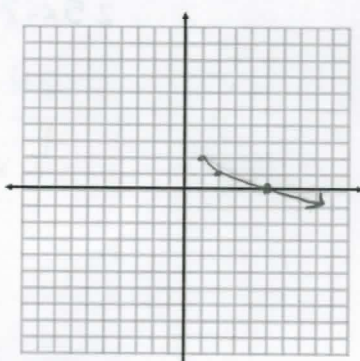


4. $k(x) = -1 - \sqrt{4-x}$ $-1 - \sqrt{-(x-4)}$



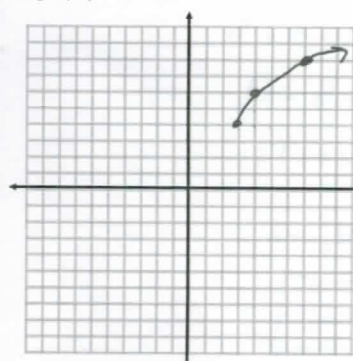
$\downarrow 1 \rightarrow 4$
reflect x and y

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



reflect x
 $\rightarrow 1 \uparrow 2$

6. $f(x) = 2\sqrt{x-3} + 4$



$\rightarrow 3 \uparrow 4$
vertical stretch 2

Write each expression in simple radical form. Show all work.

7. $2\sqrt[3]{500} + \sqrt[3]{108} + 3\sqrt[3]{32}$

$2\sqrt[3]{125 \cdot 4} + \sqrt[3]{27 \cdot 4} + 3\sqrt[3]{8 \cdot 4}$

$10\sqrt[3]{4} + 3\sqrt[3]{4} + 6\sqrt[3]{4}$

$19\sqrt[3]{4}$

8. $4\sqrt{5} + \frac{35\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} - \sqrt{25} \cdot \sqrt{5}$

$4\sqrt{5} + \frac{35\sqrt{5}}{5} - \sqrt{25} \cdot \sqrt{5}$

$4\sqrt{5} + 7\sqrt{5} - 5\sqrt{5}$
 $6\sqrt{5}$

9. $12\sqrt[6]{512}$

$12\sqrt[6]{64} \cdot \sqrt[6]{2^3}$

$12 \cdot 2\sqrt{2}$

$24\sqrt{2}$

10. $\frac{4}{\sqrt[4]{2}} \cdot \frac{\sqrt[4]{8}}{\sqrt[4]{8}}$

$\frac{4\sqrt[4]{8}}{2} = 2\sqrt[4]{8}$

11. $\frac{5}{\sqrt[3]{25}} \cdot \frac{\sqrt[3]{5}}{\sqrt[3]{5}}$

$\frac{5\sqrt[3]{5}}{5} = \sqrt[3]{5}$

12. $\frac{4}{\sqrt[4]{32}} = \frac{4}{\sqrt[4]{16} \cdot \sqrt[4]{2}} = \frac{4}{2\sqrt[4]{2}}$

$\frac{2}{\sqrt[4]{2}} \cdot \frac{\sqrt[4]{8}}{\sqrt[4]{8}} = \frac{2\sqrt[4]{8}}{2} = \sqrt[4]{8}$

$$13. \frac{(\sqrt{2}+1)(\sqrt{3}+1)}{(\sqrt{3}-1)(\sqrt{3}+1)} =$$

$$\frac{\sqrt{6}+\sqrt{2}+\sqrt{3}+1}{3-1}$$

$$\boxed{\frac{\sqrt{6}+\sqrt{3}+\sqrt{2}+1}{2}}$$

$$14. \frac{\left(1-\frac{1}{\sqrt{6}}\right)\sqrt{6}}{\left(1+\frac{1}{\sqrt{6}}\right)\sqrt{6}}$$

$$\frac{(\sqrt{6}-1)(\sqrt{6}-1)}{(\sqrt{6}+1)(\sqrt{6}-1)}$$

$$\frac{6-2\sqrt{6}+1}{6-1} = \boxed{\frac{7-2\sqrt{6}}{5}}$$

$$15. \frac{57}{(\sqrt{3}-3\sqrt{2})(\sqrt{3}+3\sqrt{2})}$$

$$\frac{57(5\sqrt{3}+3\sqrt{2})}{75-18}$$

$$\frac{57(5\sqrt{3}+3\sqrt{2})}{57}$$

$$\boxed{5\sqrt{3}+3\sqrt{2}}$$

Solve each equation.

$$16. x+5 = \sqrt{x+5}+6$$

$$(x-1) = (\sqrt{x+5})^2$$

$$x^2-2x+1 = x+5$$

$$x^2-3x-4 = 0$$

$$(x-4)(x+1) = 0$$

$$x = 4, -1$$

$$\boxed{x = 4}$$

-1 is extraneous

$$17. 5\sqrt{x-1} = \sqrt{x+1}$$

$$25(x-1) = x+1$$

$$25x-25 = x+1$$

$$24x = 26$$

$$\boxed{x = 13/12}$$

$$18. \sqrt{x+4} + \sqrt{x-4} = 4$$

$$(\sqrt{x+4})^2 = (4 - \sqrt{x-4})^2$$

$$x+4 = 16 - 8\sqrt{x-4} + x-4$$

$$x+4 = 12 + x - 8\sqrt{x-4}$$

$$-8 = -8\sqrt{x-4}$$

$$1 = \sqrt{x-4}$$

$$1 = x-4$$

$$\boxed{5 = x}$$

$$19. \left(2\sqrt{x} + \sqrt{4x-3} = \frac{1}{\sqrt{4x-3}}\right) \sqrt{4x-3}$$

$$2\sqrt{4x^2-3x} + 4x-3 = 1$$

$$2\sqrt{4x^2-3x} = -4x+4$$

$$(\sqrt{4x^2-3x})^2 = (-2x+2)^2$$

$$4x^2-3x = 4x^2-8x+4$$

$$5x = 4$$

$$\boxed{x = 4/5}$$