

1. Write the equation of each function  $g(x)$  after the translation.

a.  $f(x) = 5x^2$  after a reflection over the x-axis

$g(x) = -5x^2$

b.  $f(x) = 2^x$  after a reflection over the y-axis

$g(x) = 2^{-x}$

2. Describe (in words) each graph in relation to its basic function.

a. Compare  $g(x) = -4^x$  to the basic function  $f(x) = 4^x$

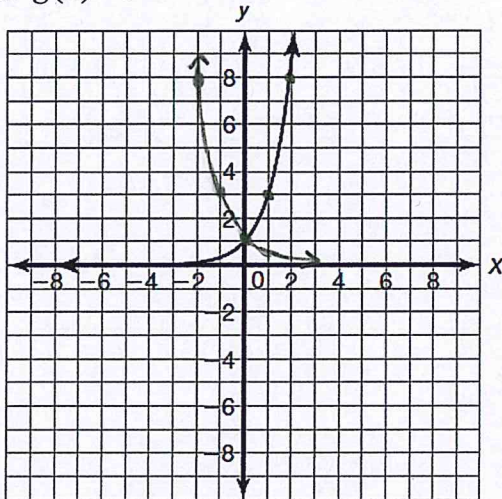
Reflection over the x-axis  
or vertical reflection

b. Compare  $g(x) = 5^{-x}$  to the basic function  $f(x) = 5^x$

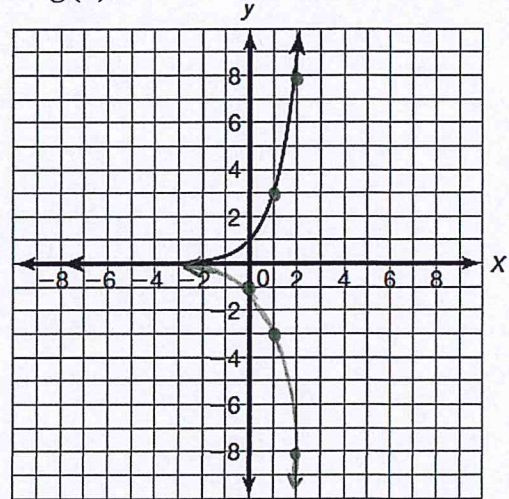
Reflection over the y-axis  
or horizontal reflection

3. Each coordinate plane shows the graph of the basic function. Sketch the graph of  $g(x)$ .

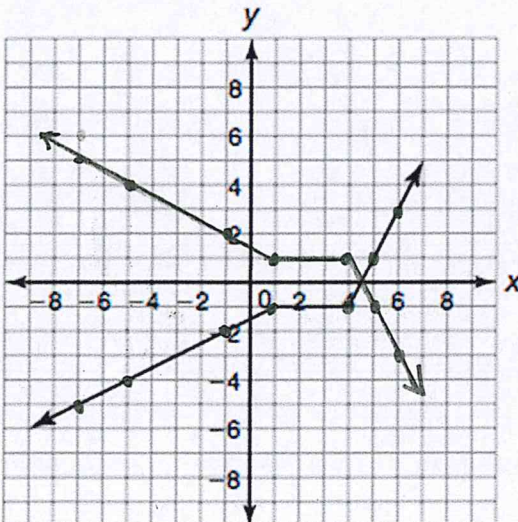
a.  $g(x) = b^{-x}$



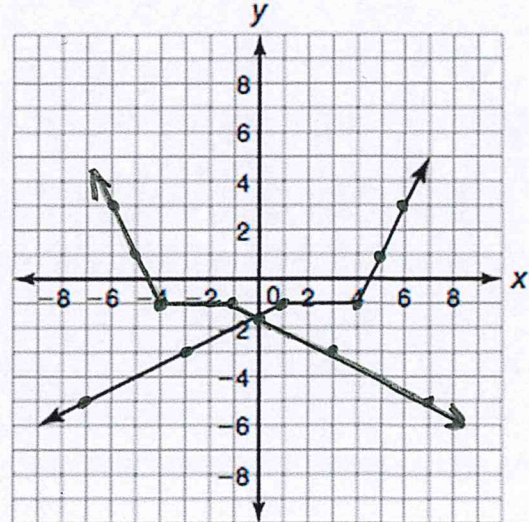
b.  $g(x) = -b^x$



c.  $g(x) = -f(x)$



d.  $g(x) = f(-x)$



Simplify each expression.

$$4. -3j^6 \cdot 12j$$

$$-36j^7$$

$$5. -8h^3 \cdot 5h^{-4}$$

$$-40h^{-1} = -\frac{40}{h}$$

No negative exponents

$$6. 4x^{-3}y^0$$

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

$$7. \frac{9m^{-2}}{4n^{-1}}$$

$$\frac{9n}{4m^2}$$

$$8. \frac{-6a^{-2}bc^2}{-d^{-4}}$$

$$\frac{6bc^2d^4}{a^2}$$

$$9. \frac{10fg^{-5}h^0}{h^{-2}} \quad h^{0-(-2)} = 0+2$$

$$\frac{10fh^2}{g^5}$$

$$10. (-4x^3y)^2$$

$$(-4)^2 (x^3)^2 y^2$$

$$16x^6y^2$$

$$11. (x^{-2}y^4 \cdot x^5y^{-7})^3$$

$$(x^3y^{-3})^3 = (x^3)^3 (y^{-3})^3$$

$$x^9y^{-9} = \frac{x^9}{y^9}$$

$$12. -11^0$$

$$-1 \cdot 11^0 = -1 \cdot 1$$

$$= -1$$

$$13. \left(\frac{-4x^3}{-8x^6}\right)^3$$

$$\left(\frac{1}{2x^3}\right)^3 = \frac{1^3}{2^3(x^3)^3}$$

$$\frac{1}{8x^9}$$

$$14. \frac{x^6y^9}{x^2y^5}$$

$$x^4y^4$$

$$15. \left(\frac{3x^4}{2y^3}\right)^3$$

$$\frac{3^3(x^4)^3}{2^3(y^3)^3} = \frac{27x^{12}}{8y^9}$$

Evaluate each expression.

$$16. \sqrt[3]{343} = 7$$

$$17. \sqrt[3]{-8} = -2$$

$$18. \sqrt[4]{256} = 4$$

$$19. \sqrt[5]{-243} = -3$$

Because  $7^3 = 343$

Because  $(-2)^3 = -8$

Because  $4^4 = 256$

Because  $(-3)^5 = -243$

Write each radical as a power.

$$20. \sqrt[3]{13} = 13^{\frac{1}{3}}$$

$$21. \sqrt[6]{y^2} = y^{\frac{2}{6}} = y^{\frac{1}{3}}$$

$$22. \sqrt[7]{m^2} = m^{\frac{2}{7}}$$

$$23. \sqrt{x^5} = x^{\frac{5}{2}}$$

Write each power as a radical. Simplify your answer, if possible.

$$24. x^{\frac{1}{2}} = \sqrt{x}$$

$$25. y^{\frac{2}{3}} = \sqrt[3]{y^2}$$

$$26. 9^{\frac{2}{5}} = \sqrt[5]{9^2} = \sqrt[5]{81}$$

$$27. n^{\frac{5}{2}} = \sqrt{n^5} = \sqrt{n \cdot n \cdot n \cdot n \cdot n} = n^2 \sqrt{n}$$