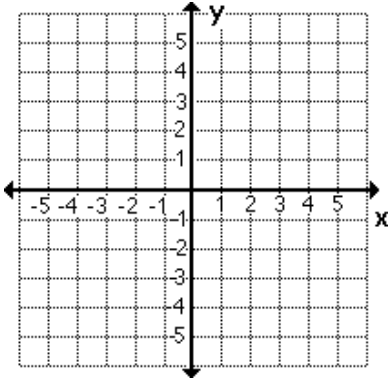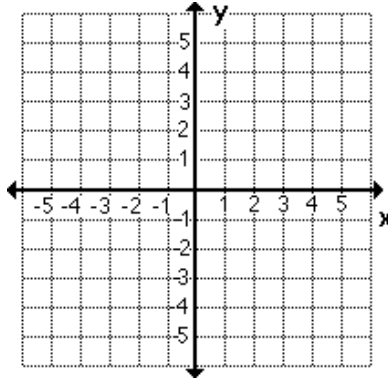## Extra Practice
Exponential Growth and Decay

Sketch the graph of each of the following functions. Label the key point for each.
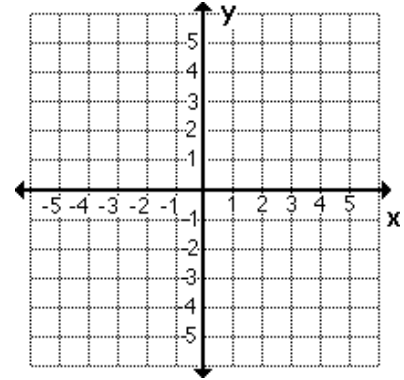
1. $f(x) = 2^{x+1} - 4$
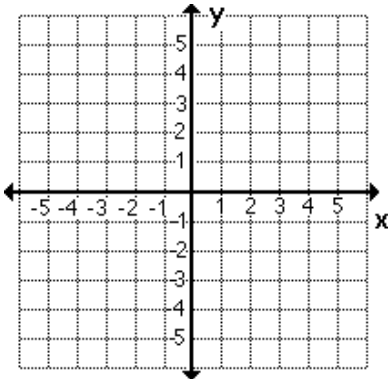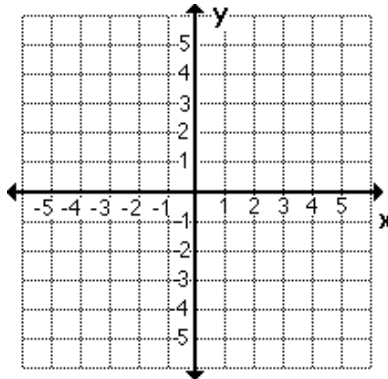
2. $f(x) = \left(\dfrac{1}{3}\right)^{x-4} + 2$
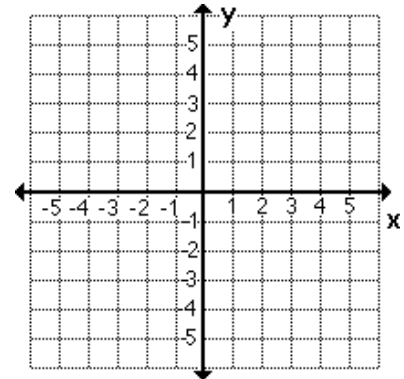
3. $f(x) = -3^x - 2$

4. $f(x) = \left(\dfrac{1}{2}\right)^{x+2}$

5. $f(x) = 2^{x-3} + 1$

6. $f(x) = \left(\dfrac{3}{2}\right)^{x-1}$

Solve each of the following equations for x. (Remember, get the bases to match and use the one to one property to solve.)

7. $16^{2x-3} = 8^{x+2}$

8. $9^{x+2} = 27^{x-5}$

9. $\left(\dfrac{1}{2}\right)^{x-4} = 4^{2x-3}$

Find the range and domain of each of the following exponential functions.

10) $f(x) = 2^{x+6} - 4$

11) $f(x) = -\left(\dfrac{1}{2}\right)^{x-1} + 3$

12) $f(x) = 2(3)^{x+1} - 5$

13) $f(x) = 5^{-x} - 3$

14) $f(x) = -2(5)^{x+2} - 3$

15) $f(x) = e^{x+2} - 3$

Find the key point to each of the following functions.

16) $f(x) = 3^{x+4} - 2$

17) $f(x) = -4^{x-2} + 1$

18) $f(x) = 2^{4-x} + 5$

19) $f(x) = 3(2)^{x+1} - 5$

20) $f(x) = 2\left(\dfrac{1}{2}\right)^{x+4} - 3$

21) $f(x) = -3^{x+2} - 4$

Simplify each of the following expressions.

22) $x^{\sqrt{2}} \cdot x^{3\sqrt{2}}$

23) $\left(2^{\sqrt{3}}\right)^{\sqrt{3}}$

24) $16^{\pi/2}$

25) $\dfrac{25^{\sqrt{3}+4}}{125}$

26) $\left(\sqrt{2}\right)^{\sqrt{3}}\left(\sqrt{2}\right)^{-\sqrt{3}}$

27) $\dfrac{3^{\sqrt{3}} \cdot 81^{\sqrt{27}}}{9^{2\sqrt{3}}}$

28) $\dfrac{36^{\sqrt{7}}}{4^{\sqrt{7}}}$

29) $-81^{3/4}$