4.2 WS

KEY

Evaluate the exponential function for the given x values.

1. $f(x)=3^x$ a. $x=0$ b. $x=4$

   a. 1 b. 81

2. $g(x)=10^x$ a. $x=-3$ b. $x=2$

   a. $\frac{1}{1,000}$ b. 100

3. $f(x)=\left(\frac{5}{3}\right)^x$ a. $x=3$ b. $x=-2$

   a. $\frac{125}{27}$ b. $\frac{9}{25}$

4. $g(x)=\left(\frac{1}{2}\right)^x$ a. $x=-2$ b. $x=4$

   a. 4 b. $\frac{1}{16}$

Use a calculator to evaluate the exponential function for the given x value. Round to the nearest hundredth.

5. $f(x)=2^x;\ x=3.2$

   9.19

6. $h(x)=e^x;\ x=-3$

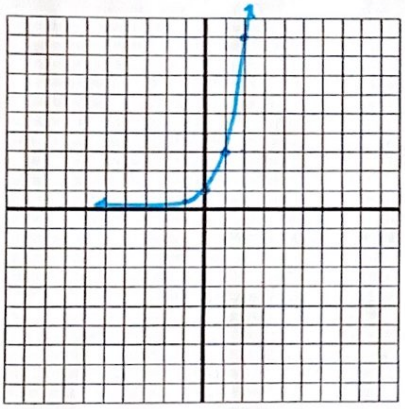
   0.05

7. $g(x)=3.5^x;\ x=\sqrt{3}$

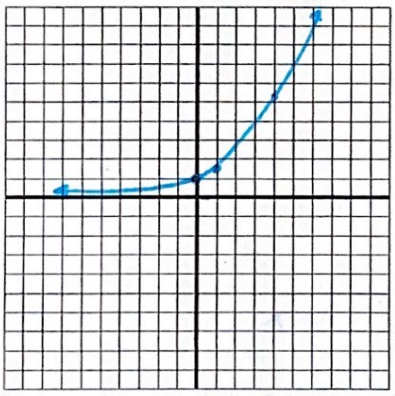
   8.76

Sketch the graph of each function.

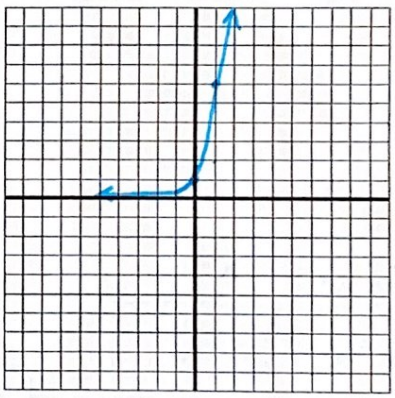
8. $f(x)=3^x$



9. $g(x)=\left(\frac{3}{2}\right)^x$



10. $h(x)=6^x$



Explain how to use the graph of the first function f to produce the graph of the second function F.

11. $f(x)=2^x; F(x)=2^x+3$ Shift 3 units up

12. $f(x)=4^x; F(x)=4^{x+2}$ Shift 2 units left

13. $f(x)=\left(\frac{2}{3}\right)^x; F(x)=\left(\frac{2}{3}\right)^{-x}$ Reflection across the y-axis

14. $f(x)=\left(\frac{1}{3}\right)^x; F(x)=3\left(\frac{1}{3}\right)^x$ Vertical Stretch away from the x-axis by a factor of 3.

Use the composition of functions to determine whether f and g are inverses of one another.

15. $f(x)=4-\frac{3}{2}x;\ g(x)=\frac{1}{2}x+\frac{3}{2}$

No

16. $f(x)=\frac{-16+x}{4};\ g(x)=4x+16$

yes

17. $f(x)=-\frac{2}{x}-1;\ g(x)=-\frac{2}{x+1}$

yes

18. $f(x)=-(x+1)^3;\ g(x)=3+x^3$

No

Find the inverse of each function, then state the domain and range of $f^{-1}(x)$.

19. $f(x)=-3x+11$

$y-11=-3x$

$\frac{-1}{3}y+\frac{11}{3}=x$

$f^{-1}(x)=\frac{-1}{3}x+\frac{11}{3}$

D_x of $f^{-1}(x)=(-\infty,\infty)$

R_y of $f^{-1}(x)=(-\infty,\infty)$

20. $f(x)=\sqrt{4-x}$

$y^2=4-x$

$y^2-4=-x$

$-y^2+4=x$

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

D_x of $f^{-1}(x)=[0,\infty)$

R_y of $f^{-1}(x)=(-\infty,4]$

21. $f(x)=\frac{x}{x+5}$

$yx+5y=x$

$5y=x-yx$

$5y=x(1-y)$

$f^{-1}(x)=\frac{5x}{1-x}$

D_x of $f^{-1}(x)=(-\infty,1)\cup(1,\infty)$

R_y of $f^{-1}(x)=(-\infty,-5)\cup(-5,\infty)$