

- Given the functions $f(x) = 1 - 3x^2$ and $g(x) = \sqrt{4-x}$, find:
 - $(f \circ g)(2)$
 - $(g \circ f)(-2)$
 - $(f \circ f)(4)$
 - $(g \circ g)(-5)$
- Given $f(x) = \sqrt{x-3}$ and $g(x) = 3x$, find $(f \circ g)(x)$ and $(g \circ f)(x)$ and state the domain of each.
- Determine whether each function is one-to-one.
 - $\{(2, 2), (3, 4), (5, 9), (-3, 12)\}$
 - $f(x) = (x - 5)^2$
 - $g(x) = \sqrt{x+3}$
 - $h(x) = |x| - 7$
- Consider the function $f(x) = \frac{2-x}{3+x}$.
 - Graph f and verify that it is one-to-one.
 - Find $f^{-1}(x)$.
 - Determine the domain and range of f and f^{-1} .
- Sketch the graph of $f(x) = 1 + 2^x$ and state the domain and the range.
- Find the function in the form $f(x) = Ca^x$ that passes through the points $(0, 3)$ and $(3, 192)$.
- Sketch the graph of $y = \log_2(x+2)$ and state its domain and range.
- Solve.
 - $4^{2x-3} = \frac{1}{16}$
 - $9^{x+2} = 27$
- Evaluate each logarithmic expression without a calculator.
 - $\log_3 81$
 - $\ln \frac{1}{e^2}$
 - $\log_{49} 7$
 - $\log_9 27$
- Rewrite $\log_2 6$ in terms of the natural log and determine the value on your calculator. Round your answer to 3 decimal places.
- Combine into a single logarithmic expression: $2 \ln x - \ln(x+1) + \frac{1}{2} \ln y$
- Find the exact solution.
 - $10^{2x-1} = 49$
 - $\log_3(x+4) + \log_3(x-2) = 3$
- How much should be invested at 4% interest compounded semiannually to earn \$50,000 in 18 years?
- How long will it take for an investment to double in value if it earns 7% annual interest, compounded continuously? Round your answer to the nearest year.
- The bones of a prehistoric woman found in the desert of New Mexico contained approximately 5% of the original amount of carbon 14. The half-life of carbon 14 is 5600 years.
 - How long ago did the woman die?
 - What percent of carbon 14 was remaining after 2800 years?
- Find the equation of the parabola whose focus is $(-3, 0)$ and directrix is $x = 3$.
- Find the focus and the directrix of the parabola given by the equation.

$$y = -\frac{1}{4}x^2 + 2x - 5$$
- Sketch the graph of each equation.
 - $\frac{x^2}{25} + \frac{y^2}{9} = 1$
 - $y^2 - \frac{x^2}{4} = 1$
- Find an equation of the ellipse centered at the origin and passing through the points $(1, 2)$ and $(2, 0)$.
- Find the foci and asymptotes of the hyperbola.

$$4x^2 - 4y^2 - 16x + 8y - 88 = 0$$

Answers

1. (a) -5 ; (b) $\sqrt{15}$; (c) -6626 ; (d) 1

2. $(f \circ g)(x) = \sqrt{3x-3}$, D: $[1, \infty)$;
 $(g \circ f)(x) = 3\sqrt{x-3}$, D: $[3, \infty)$

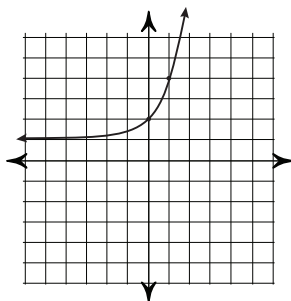
3. (a) yes; (b) no; (c) yes; (d) no

4. (a) graph passes horizontal line test

(b) $f^{-1}(x) = \frac{2-3x}{x+1}$

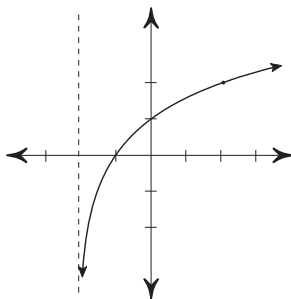
(c) f : Domain: $(-\infty, -3) \cup (-3, \infty)$, Range:
 $(-\infty, -1) \cup (-1, \infty)$
 f^{-1} : Domain: $(-\infty, -1) \cup (-1, \infty)$,
Range: $(-\infty, -3) \cup (-3, \infty)$

5. domain: $(-\infty, \infty)$, range: $(1, \infty)$



6. $y = 3 \cdot 4^x$

7. domain: $(-2, \infty)$, range: $(-\infty, \infty)$



8. (a) $\frac{1}{2}$; (b) $-\frac{1}{2}$

9. (a) 4 ; (b) -2 ; (c) $\frac{1}{2}$; (d) $\frac{3}{2}$

10. 2.585

11. $\ln\left(\frac{x^2\sqrt{y}}{x+1}\right)$

12. (a) $\frac{1}{2} + \log 7$; (b) 5

13. \$24,511.16

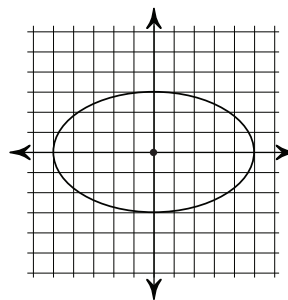
14. about 10 years

15. (a) about 24,203 years ago; (b) about 71%

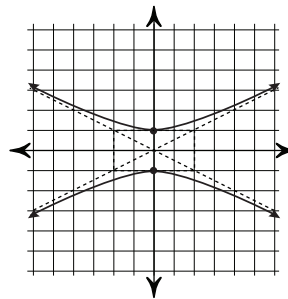
16. $y^2 = -12x$

17. focus: $(4, -2)$, directrix: $y = 0$

18. (a)



(b)



19. $\frac{x^2}{4} + \frac{3y^2}{16} = 1$

20. foci: $(2 \pm 5\sqrt{2}, 1)$, asymptotes: $y = \pm(x-2)+1$