

Solve.

1.  $6x^2 = -x + 12$

2.  $x^2 - x = 5$

3.  $2(x-5)^{-1} + \frac{1}{x} = 0$

4.  $|2-x| = 5$

5.  $\ln x - \ln(x+1) = 1$

6.  $\frac{e^{x+5}}{e^5} = 3$

7.  $3^{2x} - 2 \cdot 3^{x+5} + 3^{10} = 0$

8.  $e^{\ln(2x+1)} = 5x$

9. Solve for t:  $\frac{d}{t+r} = \frac{5}{t}$

10. Solve for p:  $hp - 1 = q + kp + 6p$

11. Solve for y:  $2x + 2xy' + 2y + 3y^2y' = 0$

12. Write an equation of the line passing through the point  $(3, -1)$  with slope  $\frac{5}{2}$ .

13. Write an equation of the line passing through the points  $\left(-4, \frac{2}{3}\right)$  and  $\left(-\frac{3}{4}, -\frac{5}{6}\right)$

14. Write an equation of the line passing through the point  $(4, -2)$  and perpendicular to the line  $2x - 3y = 3$ .

15. Find all points of intersection of the graphs of  $x^2 - 2x - y = 6$  and  $x - y = -4$ .

Find the domain of  $f$ :

16.  $f(x) = \sqrt{4x-3}$

17.  $f(x) = \ln(5-3x)$

Multiply.

18.  $(3x^2 - 8)^2$

19.  $\left(x^{\frac{5}{4}} - \frac{2}{\sqrt{5}}\right)^2$

Factor and simplify. Express the answer as a fraction without negative exponents.

20.  $3x(2x+5)^{-\frac{1}{2}} + 3(2x+5)^{\frac{1}{2}}$

21.  $-4x(3x-2)^{-\frac{4}{3}} + 4(3x-2)^{-\frac{1}{3}}$

Use the properties of logarithms to expand the expressions.

22.  $\ln \sqrt{x^2 y^3 z}$

23.  $\ln \frac{(4x^5 - x - 1)\sqrt{x-7}}{(x^2 + 1)^3}$

24. Find the x-intercept for the graph of the function  $f(x) = \ln x - 3$ .

Identify any horizontal and /or vertical asymptotes.

25.  $f(x) = \frac{x^2}{x^2 + x - 2}$

26.  $f(x) = \frac{4}{x^2 - 16}$

27. Express as a simple fraction:  $\frac{\frac{2}{x+h} - \frac{2}{x}}{h}$

28. If  $\csc q = \frac{13}{5}$  and  $q$  is in the second quadrant, find  $\sec q$ .

29. If  $\cot q = -\frac{4}{3}$  and  $q$  is in the fourth quadrant, find  $\cos q$ .

Find all  $q$  in the interval  $[0, 2\pi)$  that satisfies the following equations.

30.  $\sin 2q = -\frac{\sqrt{3}}{2}$

31.  $\sin q - \sin q \cot q = 0$

32. Write the expression  $\sqrt{9-x^2}$  in terms of  $q$  when  $x = 3\sin q$ .

Simplify

33.  $\frac{\sec q}{\tan q}$

34.  $\sin^2 q \csc q \sec q$

35. Find  $\cos 2A$  if  $\sin A = \frac{1}{4}$  and  $0 \leq A \leq \frac{\pi}{2}$ .

Write the given expression in algebraic form.

36.  $\sin\left(\arctan \frac{x}{4}\right)$

37.  $\cot\left(\arcsin \frac{x}{2}\right)$

Evaluate each of the following.

38.  $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

39.  $\arctan(-1)$

40.  $\operatorname{arc cot}\left(-\frac{1}{\sqrt{3}}\right)$