

Evaluate the limit, if it exists.

$$1) \lim_{x \rightarrow \infty} \frac{-3x^2 + 10x - 7}{2x^2 + 8}$$

Divide using synthetic division.

$$2) \frac{x^5 + x^3 + 3}{x - 2}$$

Solve the system of equations.

$$\begin{aligned} 3) \quad &4x + 5y + z = 25 \\ &2x - 3y - z = -21 \\ &4x + y + 4z = 17 \end{aligned}$$

For the following function, determine $\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$.

$$4) f(x) = 7x - 7$$

$$5) f(x) = 9x^2 - 7x - 5$$

Solve the logarithmic equation symbolically.

$$6) \log 6x = 8.7$$

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

$$7) 6 \ln(3x) = 30$$

Solve the rational equation.

$$8) 1 + \frac{1}{x} = \frac{90}{x^2}$$

For the given functions f and g , find the indicated composition.

$$9) f(x) = \frac{6}{x-1}, \quad g(x) = \frac{5}{2x}$$
$$(f \circ g)(x)$$

Solve the quadratic equation.

$$10) 6x^2 + 10x + 2 = 0$$

Solve the problem.

$$11) \text{Determine: } \lim_{x \rightarrow 9} \frac{x-9}{x^2-81}$$

12) Determine: $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$

Expand the expression.

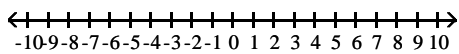
13) $\log_a 4x^2yz^4$

Solve the inequality.

14) $x^2 - 2x - 35 \leq 0$

Solve the polynomial inequality and graph the solution set on a number line. Express the solution set in interval notation.

15) $x^2 + 6x \geq 0$



For the following limit, determine $\lim_{x \rightarrow a} f(x)$, if it exists.

16) $\lim_{x \rightarrow 3} \frac{x^2 + 9}{x + 3}$

Write the complete factored form of the polynomial $f(x)$, given the indicated zero.

17) $f(x) = x^3 - 3x^2 - 10x + 24$
2 is a zero.

Find the horizontal asymptote, if any, of the graph of the rational function.

18) $f(x) = \frac{8x}{8x + 7}$

Find an n th degree polynomial function with real coefficients satisfying the given conditions.

19) $n = 4$; 2i, 7, and -7 are zeros; leading coefficient is 1

Find the distance between the pair of points.

20) (2, -5) and (-2, -7)

Answer Key

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1) $-\frac{3}{2}$

2) $x^4 + 2x^3 + 5x^2 + 10x + 20 + \frac{43}{x-2}$

3) $\{(-1, 5, 4)\}$

4) 7

5) $18a - 7$

6) $x = \frac{108.7}{6}$

7) $\left\{\frac{e^5}{3}\right\}$

8) $-10, 9$

9) $\frac{12x}{5-2x}$

10) $\frac{-5 \pm \sqrt{13}}{6}$

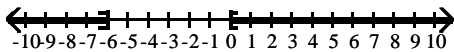
11) $\frac{1}{18}$

12) $\frac{1}{4}$

13) $\log_a 4 + 2\log_a x + \log_a y + 4\log_a z$

14) $-5 \leq x \leq 7$

15) $(-\infty, -6] \cup [0, \infty]$



16) 3

17) $f(x) = (x+3)(x-4)(x-2)$

18) $y = 1$

19) $f(x) = x^4 - 45x^2 - 196$

20) $2\sqrt{5}$