

For problems 1 through 4, state the discontinuity type and its x – location.

1)

$$f(x) = \frac{7x^2 + 22x + 3}{7x + 1}$$

2)

$$f(x) = \cos\left(\frac{2\pi}{x^2 - 25}\right)$$

3)

$$f(x) = \frac{3x^2 - 16x + 21}{|x - 3|}$$

4)

$$f(x) = \frac{x + 8}{2x^2 + 11x - 21}$$

5) For

$$f(x) = \frac{3x^2 + 2x - 16}{3x + 8},$$

remove the hole so that $y = f(x)$ becomes defined for all x .

6) For $f(x) = x^2 - 4x + 2$ defined on $x \in [1, 5]$, find $c \in (1, 5)$ such that $f(c) = 4$.

a) Show that the IVTCF applies.

b) Find the corresponding value of c .

7)

$$\lim_{x \rightarrow 3} (x^2 - 4x + 2) = ?$$

8) a) Find the slope of $f(x) = 3x^2 - 4x + 7$ at $x = 3$.

b) Find the equation of the line tangent to $y = f(x)$ at $x = 3$.

9) Find the x – value where the line tangent to $f(x) = 5x^2 - 14x + 13$ is horizontal.

10) Mr. Lody hits a home run. When the ball is hit at home plate, it has an initial upward vertical velocity of 125 ft/sec. Mr. Lody's home run ball lands in the stands, which are 50 ft above home plate. The vertical position y (in ft), as a function of time t (in sec), of the ball is given by

$$y = -16t^2 + 125t.$$

Find the vertical speed of the ball when it lands in the stands.