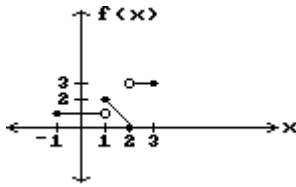


Decide whether the limit exists. If it exists, find its value.

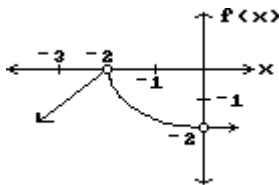
1) $\lim_{x \rightarrow 1} f(x)$

$x \rightarrow 1$



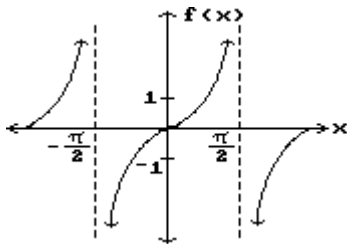
2) $\lim_{x \rightarrow 0} f(x)$

$x \rightarrow 0$



3) $\lim_{x \rightarrow \pi/2} f(x)$

$x \rightarrow \pi/2$



Use the properties of limits to evaluate the limit if it exists.

4) $\lim_{x \rightarrow 1} \frac{3x^2 + 7x - 2}{3x^2 - 4x - 2}$

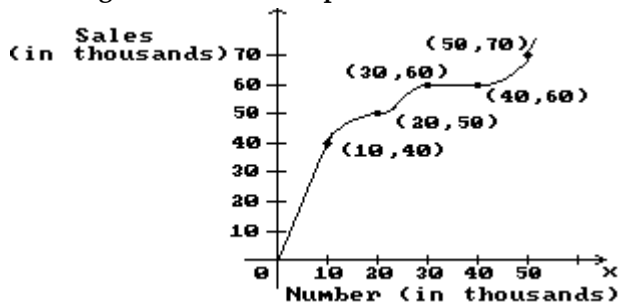
5) $\lim_{x \rightarrow 49} \frac{\sqrt{x} - 7}{x - 49}$

6) $\lim_{x \rightarrow 0} \frac{x^3 + 12x^2 - 5x}{5x}$

Find the average rate of change for the function over the given interval.

7) $y = x^2 + 5x$ between $x = 3$ and $x = 8$

The graph shows the total sales in thousand of dollars from the distribution of x thousand catalogs. Find the average rate of change of sales with respect to the number of catalogs distributed for the change in x .



8) 10 to 50

Compute the derivative of the function using the limit definition.

9) $f(x) = x^2 + 3x$

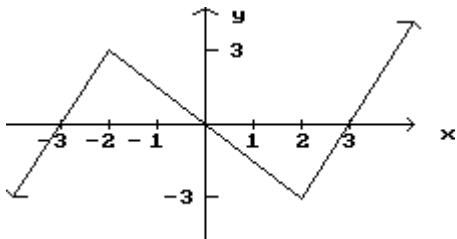
Find the equation of the tangent line to the curve when x has the given value.

10) $f(x) = \frac{\sqrt{x}}{5}$; $x = 4$

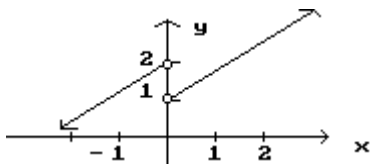
11) $f(x) = \frac{5}{2}x^2 + x$; $x = -4$

Find the x -values where no derivative exists.

12)



13)



Solve the problem.

14) The total cost to produce x handcrafted wagons is $C(x) = 70 + 8x - x^2 + 2x^3$. Find the marginal cost when $x = 6$. Explain your answer.

Find the derivative.

15) $f(x) = \sqrt{x}(2x - 5) + 10x - 25$

$$16) y = \frac{x^3 + 1}{x^2}$$

Find the following.

$$17) f'(2) \text{ if } f(x) = -\frac{8}{x} + \frac{5}{x^2}$$

Solve the problem.

18) Let $C(x)$ be the cost function and $R(x)$ the revenue function. Compute the marginal cost, marginal revenue, and the marginal profit functions.

$$C(x) = 0.0004x^3 - 0.024x^2 + 300x + 20,000$$

$$R(x) = 350x$$

Find the derivative of the function.

$$19) f(x) = (x^2 - 4x)(4x^3 - x^2 + 5)$$

Solve the problem.

20) The total profit from selling x units of cookbooks is $P(x) = (7x - 7)(4x - 4)$. Find the marginal average profit function.

Use the quotient rule to find the derivative.

$$21) y = \frac{x^2 - 3x + 2}{x^7 - 2}$$

$$22) y = \frac{x^2 + 2x - 2}{x^2 - 2x + 2}$$

Let $f(x) = 8x^2 - 5x$ and $g(x) = 7x + 9$. Find the composite.

$$23) g[f(3)]$$

Find $f[g(x)]$ and $g[f(x)]$.

$$24) f(x) = 5x^3 + 8; g(x) = 2x$$

Find the derivative of the function.

$$25) f(x) = (x^3 - 8)^{2/3}$$

$$26) f(x) = \frac{5}{(2x - 3)^4}$$

Find the derivative.

$$27) y = -11e^{-9x}$$

$$28) y = e^{2x^2} + x$$

29) $y = 5x^2e^{3x}$

Find the derivative of the function.

30) $y = \ln(3x - 1)^2$

31) $y = \ln(7 + x^2)$

32) $y = x^2 \ln x^2$

Find the derivative.

33) $f(x) = \ln(5 + e^{4x})$

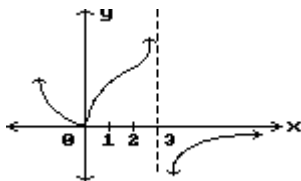
34) $f(x) = \frac{\ln x}{e^x}$

Solve the problem.

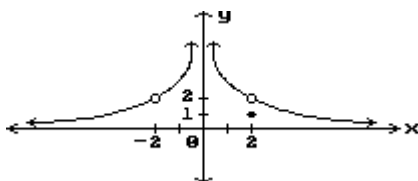
35) The sales in thousands of a new type of product are given by $S(t) = 200 - 20e^{-.2t}$, where t represents time in years. Find the rate of change of sales at the time when $t = 5$. Explain the meaning of your answer.

State where the function is continuous and where it is differentiable.

36)



37)



38) $f(x) = \frac{-5}{x(x - 7)}$

39) $f(x) = 7x^4 - 3x^3 + x - 6$

Provide the proper response.

40) A particle has a position function $s(t)$. Is the derivative of $s(t)$ with respect to time at a given time t_1 , the average or instantaneous velocity? If $s(t) = -2t^2 + 16t$ where t represents the time in years and $s(t)$ gives the distance in feet, what is the instantaneous velocity after 2 seconds?

Answer Key

Testname: NANCYREVIEW2

1) Does not exist

2) -2

3) Does not exist

$$4) -\frac{8}{3}$$

$$5) \frac{1}{14}$$

6) -1

7) 16

$$8) \frac{3}{4}$$

9) $2x + 3$

$$10) y = \frac{x}{20} + \frac{1}{5}$$

$$11) y = -19x - 40$$

$$12) x = -2, x = 2$$

$$13) x = 0$$

14) 212 (The approximate cost of producing the next wagon after 6 wagons have been made is \$212.)

$$15) f'(x) = 3\sqrt{x} - \frac{5}{2\sqrt{x}} + 10$$

$$16) y' = 1 - \frac{2}{x^3}$$

$$17) \frac{3}{4}$$

$$18) C'(x) = 0.0012x^2 - 0.048x + 300$$

$$R'(x) = 350$$

$$P'(x) = -0.0012x^2 + 0.048x + 50$$

$$19) f'(x) = 20x^4 - 68x^3 + 12x^2 + 10x - 20$$

$$20) 28 - \frac{28}{x^2}$$

$$21) y' = \frac{-5x^8 + 18x^7 - 14x^6 - 4x + 6}{(x^7 - 2)^2}$$

$$22) y' = \frac{-4x^2 + 8x}{(x^2 - 2x + 2)^2}$$

23) 408

$$24) f[g(x)] = 40x^3 + 8$$

$$g[f(x)] = 10x^3 + 16$$

$$25) f'(x) = \frac{2x^2}{3\sqrt{x^3} - 8}$$

$$26) f'(x) = \frac{-40}{(2x - 3)^5}$$

$$27) 99e^{-9x}$$

$$28) 4xe^{2x^2} + 1$$

Answer Key

Testname: NANCYREVIEW2

29) $5xe^{3x(3x+2)}$

30) $\frac{6}{3x-1}$

31) $\frac{2x}{x^2+7}$

32) $2x(1 + \ln x^2)$

33) $\frac{4e^{4x}}{5 + e^{4x}}$

34) $\frac{1 - x \ln x}{xe^x}$

35) 1.5 thousand per year

Sales is increasing by 1500 items per year after the product has been on the market for 5 years.

36) Continuous everywhere except $x = 3$;

differentiable everywhere except $x = 0, x = 3$.

37) Continuous everywhere except $x = -2, x = 0, x = 2$;

differentiable everywhere except $x = -2, x = 0, x = 2$.

38) Everywhere except $x = 0$ & $x = 7$

39) Everywhere

40) Instantaneous velocity; 8 ft./sec.