

MAC2233 Business Calculus

Broward College. Final Review. *imathesis.com*

Find the limit, if it exists.

1) Find: $\lim_{x \rightarrow -1} \frac{6x + 5}{5x - 6}$ 1) _____

- A) $\frac{1}{11}$ B) -11 C) $-\frac{1}{11}$ D) 1

2) Find: $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$ 2) _____

- A) -8 B) 8 C) 16 D) -24

3) Find: $\lim_{x \rightarrow 5} \frac{x - 5}{|x - 5|}$ 3) _____

- A) 0 B) -1 C) 1 D) Does not exist

4) Find: $\lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 3x}$ 4) _____

- A) $-\frac{1}{3}$ B) $\frac{1}{3}$ C) 0 D) Does not exist

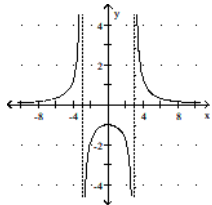
5) Let $f(x) = \begin{cases} \frac{x^2 - 16}{x + 4} & \text{if } x > 0 \\ \frac{x^2 - 16}{x - 4} & \text{if } x < 0 \end{cases}$ 5) _____

Find $\lim_{x \rightarrow 0^+} f(x)$

- A) 0 B) -4 C) 4 D) Does not exist

Use the given graph to find the indicated limit.

6) 6) _____



$\lim_{x \rightarrow 3^-} f(x)$

- A) ∞ B) 0 C) $-\infty$ D) 3

Find the limit.

7) Determine the limit.

7) _____

$$\lim_{x \rightarrow 5^+} f(x), \text{ where } f(x) = \frac{x^2}{(x-5)^3}$$

- A) 5 B) -2 C) ∞ D) $-\infty$

Provide an appropriate response.

8) If the limit at infinity exists, find the limit.

8) _____

$$\lim_{x \rightarrow \infty} \frac{5x^2 + 7x - 9}{-6x^2 + 2}$$

- A) ∞ B) 0 C) $-\frac{5}{6}$ D) $-\frac{2}{9}$

9) If the limit at infinity exists, find the limit.

9) _____

$$\lim_{x \rightarrow \infty} \frac{3x^3 + 5x}{4x^4 + 10x^3 + 2}$$

- A) 1 B) $\frac{3}{4}$ C) 0 D) ∞

10) Find the vertical asymptote(s) of the graph of the given function.

10) _____

$$f(x) = \frac{x^2 - 100}{(x-9)(x+3)}$$

- A) $x = -9$ B) $x = 9, x = -3$ C) $y = 9, y = -3$ D) $x = 10, x = -10$

11) Find the horizontal asymptote, if any, of the given function.

11) _____

$$f(x) = \frac{2x^3 - 3x - 9}{9x^3 - 5x + 3}$$

- A) $y = 0$ B) $y = \frac{3}{5}$ C) $y = \frac{2}{9}$ D) None

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

12) $y = x^2 + 6x$ between $x = 4$ and $x = 8$

12) _____

- A) 28 B) 18 C) 14 D) 9

Find the instantaneous rate of change for the function at the value given.

13) Find the instantaneous rate of change for the function $f(x) = 5x^2 + x$ at $x = -4$.

13) _____

- A) -14 B) -41 C) -39 D) 6

Solve the problem.

14) Suppose an object moves along the y -axis so that its location is $y = f(x) = x^2 + x$ at time x (y is in meters and x is in seconds). Find the average velocity for x changing from 3 to $3 + h$ seconds.

14) _____

- A) $12 - h$ m/s B) $7 + h$ m/s C) $7 - h$ m/s D) $12 + h$ m/s

Provide an appropriate response.

15) Find $f'(x)$ if $f(x) = \pi$.

15) _____

- A) $f'(x) = \pi$ B) $f'(x) = 1$ C) $f'(x) = \pi^2$ D) $f'(x) = 0$

- 16) Find $f'(x)$ for $f(x) = 2x^5 + 6x^8$. 16) _____
 A) $10x^4 + 48x^7$ B) $10x^6 + 48x^9$ C) $10x^3 + 48x^2$ D) $2x^4 + 6x^7$
- 17) Find: $\frac{d}{dx} \left(\frac{4}{x^4} - 5\sqrt[3]{x} \right)$ 17) _____
 A) $\frac{1}{x^3} + \frac{5}{3}x^{-4/3}$ B) $\frac{1}{4}x^{-5} - 15x^{2/3}$
 C) $-16x^{-5} - \frac{5}{3}x^{-2/3}$ D) $\frac{1}{4x^3} - \frac{5}{3}x^{-2/3}$
- 18) Find the equation of the tangent line at $x = -6$ for $f(x) = \frac{x^3}{2}$. Write the answer in the form $y = mx + b$. 18) _____
 A) $y = 216x + 54$ B) $y = 216x + 18$ C) $y = 18x + 216$ D) $y = 54x + 216$
- 19) Suppose that the total profit in hundreds of dollars from selling x items is given by $P(x) = 4x^2 - 5x + 10$. Find the marginal profit at $x = 5$. 19) _____
 A) \$15 B) \$45 C) \$32 D) \$35
- 20) The revenue (in thousands of dollars) from producing x units of an item is modeled by $R(x) = 5x - 0.0005x^2$. Find the marginal revenue at $x = 1000$. 20) _____
 A) \$4.00 B) \$10,300.00 C) \$104.00 D) \$4.50
- 21) The total profit from selling x units of doorknobs is $P(x) = (6x - 7)(9x - 8)$. Find the marginal average profit function. 21) _____
 A) $\bar{P}'(x) = 54 - \frac{56}{x^2}$ B) $\bar{P}'(x) = 54x - 111$ C) $\bar{P}'(x) = 54x - 56$ D) $\bar{P}'(x) = 54 - \frac{111}{x^2}$
- Find the derivative.
- 22) Find $f'(x)$ for $f(x) = (8x - 9)^{-4}$. 22) _____
 A) $-\frac{4}{(8x - 9)^3}$ B) $-\frac{32}{(8x - 9)^3}$ C) $-\frac{4}{(8x - 9)^5}$ D) $-\frac{32}{(8x - 9)^5}$
- 23) $y = (x^{-2} + x)^{-3}$ 23) _____
 A) $\frac{dy}{dx} = \frac{3x^5(2 - x^3)}{(1 + x^3)^3}$ B) $\frac{dy}{dx} = \frac{3x^4(2 - x^3)}{(1 + x^3)^4}$
 C) $\frac{dy}{dx} = \frac{3x^5(2 - x^3)}{(1 + x^3)^4}$ D) $\frac{dy}{dx} = \frac{3x^4(2 - x^3)}{(1 + x^3)^3}$
- 24) Find $f'(x)$ for $f(x) = (4x^2 + 3x)^2$. 24) _____
 A) $f'(x) = 64x^3 + 36x^2 + 18x$ B) $f'(x) = 32x^3 + 36x^2 + 9x$
 C) $f'(x) = 64x^3 + 72x^2 + 18x$ D) $f'(x) = 32x^3 + 36x^2 + 18x$

Provide an appropriate response.

25) Find $\frac{dy}{dx}$ for $y = \ln(3x^3 - x^2)$ 25) _____

A) $\frac{3x - 2}{3x^2 - x}$

B) $\frac{9x - 2}{3x^2 - x}$

C) $\frac{9x - 2}{3x^3 - x}$

D) $\frac{9x - 2}{3x^2}$

26) Find $f'(x)$ for $f(x) = (\ln x)^8$ 26) _____

A) $\frac{1}{x^8}$

B) $\frac{8 \ln^7 x}{x}$

C) $8 \ln x$

D) $8 \ln^7 x$

E) $\frac{1}{(\ln x)^8}$

27) Find $\frac{dy}{dx}$ for $y = 17^{x-1}$ 27) _____

A) $17^{x-1} \ln(17^{x-1})$

B) $17^{x-1} \ln(17)$

C) $17^{x-1} \ln(x)$

D) $17 \ln(17)$

Find the integral.

28) $\int 5(t^2 - 5t - 2) dt$ 28) _____

A) $\frac{5}{3}t^3 - \frac{5}{2}t^2 - 2t + C$

B) $5t^3 - 5t^2 - 2t + C$

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

D) $10t - 5 + C$

29) $\int (3x^5 - 8x^3 + 2) dx$ 29) _____

A) $\frac{3}{4}x^4 - 4x^2 + C$

B) $\frac{1}{6}x^6 - \frac{1}{4}x^4 + 2x + C$

C) $\frac{1}{2}x^6 - 2x^4 + 2x + C$

D) $\frac{3}{5}x^5 - \frac{8}{3}x^3 + 2x + C$

30) $\int \frac{6 + x^2}{x} dx$ 30) _____

A) $\frac{3}{x^2} + x^2 + C$

B) $\frac{6}{x^2} + x^2 + C$

C) $6 \ln|x| + \frac{1}{3}x^3 + C$

D) $6 \ln|x| + \frac{1}{2}x^2 + C$

31) $\int 9x^{-5} dx$ 31) _____

A) $-45x^{-6} + C$

B) $\frac{36}{x^4} + C$

C) $-\frac{9}{4}x^{-4} + C$

D) $\frac{9}{4x^6} + C$

Evaluate the integral.

32) $\int_{-1}^1 (3x^2 - 8x) dx$ 32) _____

A) 7

B) 2

C) -7

D) 12

33) $\int_3^{16} 3\sqrt{x} \, dx$. 33) _____
A) 128 B) 288 C) 24 D) 192

34) $\int_0^b 9x^8 \, dx$ 34) _____
A) $\frac{1}{9}b^9$ B) $9b^9$ C) b^7 D) b^9

35) $\int_1^e \left(16x - \frac{5}{x} \right) dx$ 35) _____
(Express your answer in terms for e.)
A) $8e^2 - 5$ B) $8e^2 - 13$ C) $16e^2 - 5$ D) $8e^2 - 8$

36) $\int_{0.1}^{0.4} 5e^{2x} \, dx$ 36) _____
(Round to three decimal places.)
A) 5.021 B) 2.510 C) 0.967 D) 0.425

37) $\int_1^2 \left[4\sqrt{x} - \frac{5}{x} \right] dx$ 37) _____
(Round to three decimal places.)
A) 3.001 B) 12.846 C) 1.410 D) 7.505