

Calculus 1st Semester Final Review

Reference: [6.6]

[1] The limit does not exist.

Reference: [7.8]

[2] 0

Reference: [7.14]

[3] 5

Reference: [7.39]

[4] 3

Reference: [7.46]

[5] -2

Reference: [8.10]

a. 1

b. -3

[6] **c.** The limit does not exist.

Reference: [8.20]

[7] $x = 2$, removable; $x = -2$, nonremovable

Reference: [8.23]

a. $\frac{5}{x^4 - 1}$

[8] **b.** -1, 1

Reference: [8.26]

[9] 27

Reference: [9.8]

[10] ∞

Reference: [9.23]

[11] $x = -7$

Reference: [9.25]

[12] $x = -3$

Reference: [10.5]

a. no derivative

b. negative

c. zero

d. positive

[13] **e.** zero

Reference: [10.11]

[14] $-2x$

Reference: [11.23]

[15] $y = 11x - 6$

Reference: [11.26]

[16] $\frac{1}{3}, 1$

Reference: [11.28]

[17] $(1, -2), (-1, 2)$

Reference: [11.40]

[18] 264 ft/sec

Reference: [12.2]

[19] $\frac{6x^2 + 2}{(1 - 3x^2)^2}$

Reference: [12.25]

[20] $\frac{-2}{(2 - x)^3}$

Reference: [13.2]

[21] $\frac{2x + 1}{3(x^2 + x)^{2/3}}$

Reference: [13.3]

[22] $12(x + 1)(x^2 + 2x + 5)^5$

Reference: [13.11]

[23] $\frac{x^2(7x+3)}{\sqrt{2x+1}}$

Reference: [13.34]

[24] 42 ft/sec²

Reference: [14.3]

[25] $\frac{y}{(x+y)^2+x}$

Reference: [14.10]

[26] $\frac{-2x-y}{x+2y}$

Reference: [14.29]

[27] $\frac{2}{3}$

Reference: [15.5]

[28] 100π in.²/min

Reference: [15.14]

[29] $\frac{7}{9\pi}$ ft/min

Reference: [15.19]

[30] 5 units/sec

Reference: [16.3]

[31] $-\frac{1}{3}, -\frac{1}{2}$

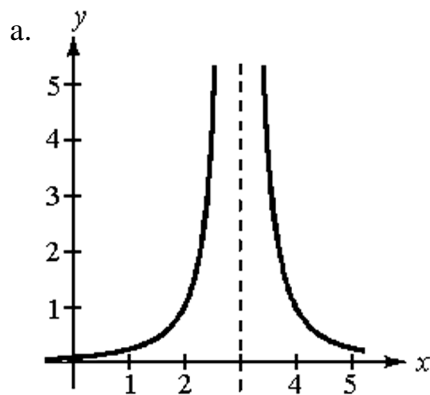
Reference: [16.4]

[32] $x = 0, 1$

Reference: [16.17]

[33] Minimum at (1, 0); Maximum at (3, 4)

Reference: [17.3]



b. $f(2) = f(4) = 1$

[34] c. f is not continuous on $[2, 4]$

Reference: [17.7]

[35] Rolle's Theorem applies; $c = 0, 1,$ and $2.$

Reference: [17.14]

[36] The Mean Value Theorem applies; $c = \frac{5}{2}.$

Reference: [18.3]

[37] Increasing $(-\infty, 0)$; decreasing $(0, \infty)$

Reference: [18.4]

Increasing $(-\infty, 0)$ and $(2, \infty)$; decreasing $(0, 2)$

Reference: [18.10]

[39] Decreasing $(-\infty, 2)$ and $(2, \infty)$

Reference: [18.16]

[40] $\left(2, \frac{1}{54}\right)$, relative maximum

Reference: [18.17]

Relative maximum: $(-2, 20)$; relative minimum: $(1, -7)$

Reference: [18.22]

[42] Relative maximum at $x = \frac{3}{2}.$

Reference: [18.27]

$$f'(x) = \frac{1}{(1-x)^2} \neq 0 \text{ for all } x \neq 1.$$

$f'(x)$ is undefined at $x = 1$, a vertical
[43] asymptote.

Reference: [18.28]

[44] Relative maximum

Reference: [19.4]

Concave upward: $(-\infty, 0), (2, \infty)$

Concave downward: $(0, 2)$

[45] Points of inflection: $(0, 2)$ and $(2, -14)$

Reference: [19.14]

[46] $(4, 0), (2, -32)$

Reference: [19.18]

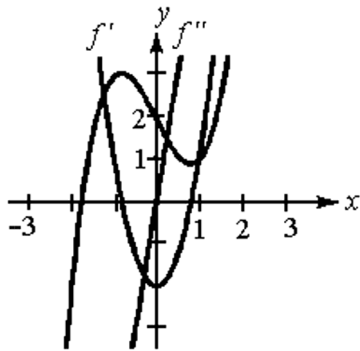
[47] $(1, 4)$

Reference: [19.21]

$x = 0$, relative maximum; $x = \frac{2}{3}$, relative

[48] minimum

Reference: [19.32]



Reference: [20.3]

[50] $y = 2$

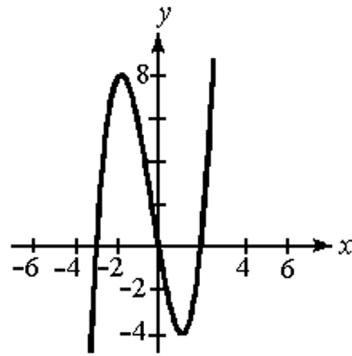
Reference: [20.17]

[51] ∞

Reference: [22.17]

[52] $8^2(2) = 128$ cubic inches

Reference: [21.18]



Reference: [22.8]

[54] 75 feet by 150 feet

Reference: [22.28]

[55] 14

Reference: [24.3]

[56] ± 0.001 in.
