

CALCULUS REVIEW ANSWERS

- #1 a) $1.23^\circ\text{C}/\text{SEC}$ b) $0.31^\circ\text{C}/\text{SEC}$ c) $0.47^\circ\text{C}/\text{SEC}$ d) TEMP IS INCREASING, HOWEVER IT IS INCREASING AT A RATE WHICH IS DECREASING.
- #2 a) $0 < x < 1, x > 2.5$ b) $-2.8 < x < 0, 0.7 < x < 2$ c) $x < -3$ d) $x > 1.2$ e) $x < -2.8, 0 < x < 0.7, 2 < x < 2$
- f) $-3 < x < 0, 0 < x < 1.2$ g) NONE h) $x = 0$ i) $x = -2.8, 0.7, 2$ j) $(-2.8, -3.8), (0.7, 1.8), (2, -12)$
- k) $x = -2.8, 0.7, 2$ l) $x < -2.8 (x \neq -3), 0 < x < 2.7, 2 < x < 2$ m) $-3.2 < x < -3, 1.2 < x < \infty$
- n) $-2.8 < x < 0, 0.7 < x < 1.2$ o) $x = 1.2$ p) $-3 < x < 0, 0 < x < 1.2$ q) $x = -3, x = 0$
- #6 a) 1 b) 2 c) ONE d) 6 e) 4 f) 4 g) 4 h) ∞
- #7 a) 9 b) 0 c) ONE d) -11 e) 2 f) 0 g) 0 h) -4
- #8 a) $x = 5$ b) $x = 2, 6$ c) $x = 0$ d) $x = 0, 3$ e) $x = 3$ #9 a) $\ln 40$ b) $\ln 32$ c) $\ln(2x^4)$ e) $\ln(12.5x^{2/3})$

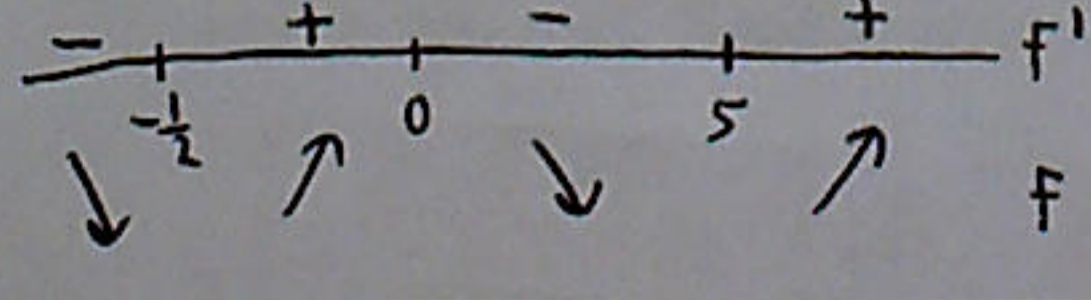
- #10 a) 1 b) -5 c) -3 d) -8 11 a) $\frac{dy}{dx} = 8x - 7$ b) $\frac{df(x)}{dx} = \frac{1}{2\sqrt{x}} + \frac{1}{3x^{2/3}}$
- c) $\frac{dp(x)}{dx} = (-6x - 7)(4x - 1) + 4(-3x^2 - 7x + 8)$ d) $\frac{df(x)}{dx} = -\frac{10}{x^3} + \frac{12}{x^4}$ e) $f'(x) = -32x^{-3} + 40x^{-6}$
- f) $\frac{df(x)}{dx} = \frac{1}{3}(x-1)$ g) $q'(x) = \frac{-x^2 - 2x + 3}{(x^2 + 3)^2}$ h) $\frac{dc(x)}{dx} = \frac{0.3x^2}{(10 - 0.1x^3)^2}$ i) $\frac{df(x)}{dx} = \frac{2x^4 + 2x^3 - x^2 + 1}{(2x^2 + x - 1)^2}$
- j) $\frac{df(x)}{dx} = 5(4x^2 + 3x)^4 \cdot (8x + 3)$ k) $\frac{dl(x)}{dx} = \frac{2}{5(x-1)} - \frac{1}{x+1}$ l) $\frac{df(x)}{dx} = \frac{-x(2x+5)(5x^2 + 132x + 180)}{(4x^3 - 6x^2)^4}$
- m) $x^2 + 4y^2 = 6xy$ $\frac{dy}{dx} = \frac{x - 3y}{3x - 4y}$ n) $f'(x) = 5e^{5x}$ o) $\frac{dg(x)}{dx} = -6e^{-6x}$ p) $\frac{dh(x)}{dx} = \frac{1}{x}$
- q) $\frac{dj(x)}{dx} = \frac{1}{x \ln x}$ with $x > 1$ r) $\frac{dk(x)}{dx} = \frac{1}{2x \sqrt{\ln x}}$ s) $\frac{df(x)}{dx} = 2(6x^2 - 5x)(2x - 1)^3(48x^2 - 48x + 5)$
- t) $\frac{dm(x)}{dx} = 5 \cdot 3^x \cdot \ln 3$ u) $\frac{dn(x)}{dx} = 14^{2x+1} \cdot \ln 14 \cdot 2$ v) $\frac{dp(x)}{dx} = 7^x \ln 7 + 5x^4$
- w) $\frac{dq(x)}{dx} = 3^4 \cdot \ln 3 \cdot 4^x \cdot \ln 4$ x) $\frac{dr(x)}{dx} = \cos x$ y) $\frac{dt(x)}{dx} = -\sin(x^2 - 3) \cdot 2x$ z) $u'(x) = \tan x \sec x$

- #12 a) $\frac{dg(x)}{dx} = 2$ b) $\frac{dT(x)}{dx} = -2x + 3$ c) $\frac{dw(x)}{dx} = 12x^2 - 3$ d) $\frac{dR(x)}{dx} = \frac{3}{(x+2)^2}$ e) $\frac{dS(x)}{dx} = \frac{1}{2\sqrt{x-4}}$

- #13 a) $\frac{d^2y}{dx^2} = -180x^2$ b) $\frac{d^2y}{dx^2} = 60x^{-5} + 60x$ c) $\frac{d^2y}{dx^2} = 0$ d) $\frac{d^2y}{dx^2} = e^x$ e) $\frac{d^2y}{dx^2} = a^x (\ln a)^2$
- f) $\frac{d^2y}{dx^2} = \frac{-2000}{x^2}$ g) $\frac{d^2y}{dx^2} = 2\sin^2 x - 2\cos^2 x$ OR $-2\cos 2x$ (100 PERCENT INVOLVED)

- #14) $-\sqrt{3}$ #15) $243x - 3721y - 5022 = 0$ #16) $y = -7x + 12$ #17) $8x - 8y - 3 = 0$

- #18) $y = -108x - 4$ #19) $y = -16$ AND $204x + 9y + 484 = 0$

#20 a)  $\frac{f'}{f}$ $\min(-\frac{1}{2}, \frac{7}{18})$ + $(5, -25)$
 $\max(0, 0)$