Calculus 6.1
1, 7, 10, 14, 20, 24, 54, 56-58

① absolute max @ x_3
absolute min —

⑦ absolute max @ x_1
absolute min @ x_2

⑩ $F'(x) = 3x^2 - 6x - 24$

$3(x^2 - 2x - 8) = 0$

$3(x-4)(x+2) = 0$

$x = 4 \quad x = -2$

$F(-3) = 23$

$F(-2) = 33$ ← absolute max

$F(4) = -75$ ← absolute min

$F(6) = -31$

⑭ $F'(x) = 4x^3 - 64x$

$4x(x^2 - 16) = 0$

$x = 0 \quad x = -4 \quad x = 4$

$F(-5) = -182$

$F(-4) = -263$

$F(0) = -7$

$F(4) = -263$

$F(6) = 137$ ← absolute max

absolute min @ ± 4 $y = -263$

⑳ $F'(x) = \frac{2}{3}(x^2 - 16)^{-1/3}(2x)$

$\frac{4x}{3\sqrt[3]{x^2-16}} = 0$

$x = 0 \quad x = \pm 4$

$F(-5) = 4.32$

$F(-4) = 0$

$F(0) = 6.35$

$F(4) = 0$

absolute min

$F(8) = 13.2$ ← absolute max

㉔ $F'(x) = \frac{\frac{1}{x} \cdot x^2 + 2x \ln x}{x^4} = \frac{x + 2x \ln x}{x^4} = \frac{x(1 + 2\ln x)}{x^4} = 0$

$x(1 + 2\ln x) = 0$

$x = 0 \quad 1 + 2\ln x = 0$

$\ln x = -\frac{1}{2}$

$x = e^{-1/2} \approx .607$

$F(1) = 0$

$F(.607) = -1.35$ ← abs. min

$F(4) = .08$ ← abs. max

(54) $M'(x) = -\frac{2}{45}x + 2 = 0$

$-\frac{2}{45}x = -2$

$x = -2 \cdot \frac{45}{2}$

$x = 45$

$M(30) = 20$

$M(45) = 25$

$M(65) = 16.11$

abs. max is 25 @ 45 MPH

abs. min is 16.11 @ 65 MPH

(56) $\pi \frac{x^2}{4\pi^2} + \left(\frac{12-x}{4}\right)^2 = A_{sum}$

$\frac{2\pi x}{4\pi^2}$

$A'_{sum} = \frac{1}{8\pi}x + 2\left(\frac{12-x}{4}\right)\left(\frac{-1}{4}\right) = \frac{x}{8\pi} - \frac{12}{8} + \frac{x}{8}$

$0 = x\left(\frac{1}{2\pi} + \frac{1}{8}\right) - \frac{3}{2}$

$\frac{3}{2} = x\left(\frac{1}{2\pi} + \frac{1}{8}\right)$

$\frac{3}{2\left(\frac{1}{2\pi} + \frac{1}{8}\right)} = x \approx 5.278$

(57) $A_{sum}(5.278) = 5.04$

$A_{sum}(12) = 11.46$ ← absolute max all circle

$A_{sum}(0) = 9$

(58) $x = 5.278$

side of square $= \frac{12 - 5.278}{4} = 1.68$ ← → yeah!!!

radius of circle $= \frac{5.278}{2\pi} = .84 =$ radius

diameter $= 2r = 1.68$