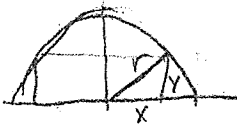


CH4 Test 2 RW

①



$$x^2 + y^2 = r^2$$

$$y = \sqrt{16 - x^2}$$

$$A = 2xy$$

$$A = 2x(\sqrt{16 - x^2})$$

$$A' = 2x \left(\frac{1}{2}\right)(16 - x^2)^{-\frac{1}{2}} \cdot -2x + 2\sqrt{16 - x^2} = 0$$

$$\frac{2x^2}{\sqrt{16 - x^2}} = 2\sqrt{16 - x^2}$$

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

$$x^2 = 16 - x^2$$

$$2x^2 = 16$$

$$x^2 = 8$$

$$x = \sqrt{8}$$

$$A = 2\sqrt{8}(\sqrt{16 - 8}) = \boxed{16 \text{ sq units}}$$

② $f(x) = x^4 + 4x^3 - 2$

$$f'(x) = 4x^3 + 12x^2 = 0$$

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

$$\boxed{x = 0 \text{ \& } -3} \leftarrow \begin{array}{l} \text{CRIT VALUES} \\ \text{\& REL EXTREMA} \end{array}$$

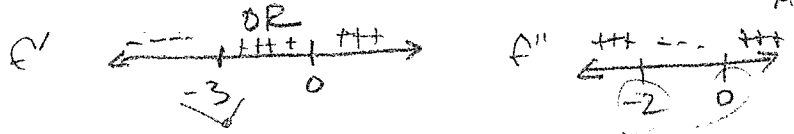
$$f''(x) = 12x^2 + 24x = 0$$

$$12x(x + 2) = 0$$

$x = 0 \text{ \& } -2$ & possible inflection pts

$$f''(0) = 0 \text{ No conclusion } f''(-3) > 0 \text{ \& } \uparrow \text{ MIN}$$

Rel MIN @ $x = -3$
Inflection @ $x = -2 \text{ \& } 0$



③ $f(1) - f(-2) = f'(c)$

$$\frac{1^4 - (-2)^4}{1 - (-2)} = 4c^3 + 12c^2$$

$$\frac{3 - 16}{3} = 4c^3 + 12c^2$$

$$0 = 4c^3 + 12c^2 - 7$$

CROCES

$$\boxed{c = -0.916, 0.689}$$

$$c = -3.7, -0.916, 0.689$$

③ $y = \frac{x^2}{x^2 - 4x + 3} \rightarrow y' = \frac{(x^2 - 4x + 3)(2x) - x^2(2x - 4)}{(x^2 - 4x + 3)^2} = \frac{-4x^2 + 6x}{(x^2 - 4x + 3)^2}$

VERT ASYM $x^2 - 4x + 3 = 0$
 $(x - 3)(x - 1) = 0$
 $x = 3 \text{ and } 1$

$$0 = 2x^3 - 8x^2 + 6x = 2x^2(x - 4) + 6x$$

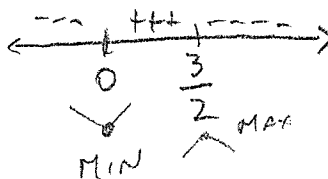
$$0 = -4x^2 + 6x$$

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

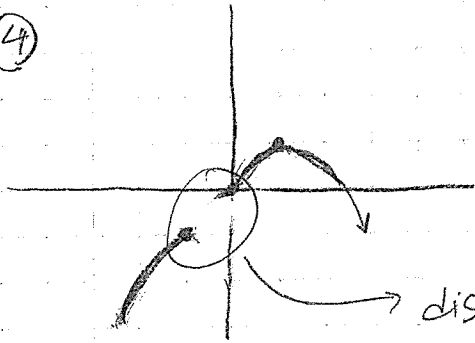
$$x = 0 \text{ \& } \frac{3}{2} \text{ (CRIT PTS)}$$

Rel MIN @ $x = 0$ Rel MAX @ $x = \frac{3}{2}$

Horiz $\lim_{x \rightarrow \infty} = \boxed{1}$



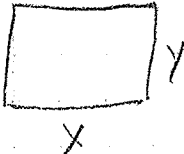
④



discrepancy here, cannot be done

⑤

②



D: $0 < x < 40$

$$A = xy$$

$$P = 2x + 2y = 40$$

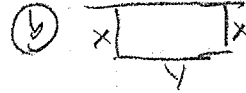
$$y = \frac{40 - 2x}{2} = 20 - x$$

$$A = x(20 - x) = 20x - x^2$$

$$A' = 20 - 2x = 0$$

$$x = 10 \leftarrow \text{MAX so } 10' \times 10'$$

$$A = 100 \text{ sq ft}$$



$$P = 2x + y = 40$$

$$y = 40 - 2x$$

$$A = x(40 - 2x)$$

$$A = 40x - 2x^2$$

$$A' = 40 - 4x = 0$$

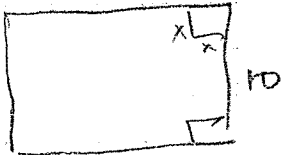
$$x = 10 \text{ so } y = 20$$

↑ MAX

$$10' \times 20'$$

$$A = 200 \text{ sq ft}$$

⑥



D: $0 < x < 5$

$$V = (10 - 2x)(16 - 2x)x$$

$$V = 160x - 52x^2 + 4x^3$$

$$V' = 160 - 104x + 12x^2$$

$$0 = 160 - 104x + 12x^2$$

$$x = 2 \leftarrow \text{NOT IN DOMAIN}$$

NOT IN DOMAIN

⑦

a = slope of velocity Thus

$$\frac{18 - 30}{12 - 6} = \frac{-12}{6} =$$

$$\boxed{-2 \text{ m/s}^2}$$