

201  $\int 3.5 \# 5 \quad y, 11, 26, 34$

(4)

$$y = 4x^4 - 8x^2 + 8 \stackrel{\text{SET}}{=} 0 \Rightarrow$$

$$u^2 - 8u + 8 = 0$$

$$u^2 - 8u + 4^2 = -8 + 16 = 8$$

$$(u-4)^2 = 8$$

$$u-4 = \pm 2\sqrt{2}$$

$$u = 4 \pm 2\sqrt{2} = x^2$$

$$x = \pm \sqrt{4 \pm 2\sqrt{2}} \quad \text{all zeros off,}$$

$$\approx \pm 2.61312593,$$

$$\pm 1.0823912$$

D = IR  
EVEN

$$y' = 4x^3 - 16x$$

$$= 4x(x^2 - 4) = 4x(x-2)(x+2) \stackrel{\text{SET}}{=} 0 \Rightarrow$$

$$x \in \{0, \pm 2\}$$

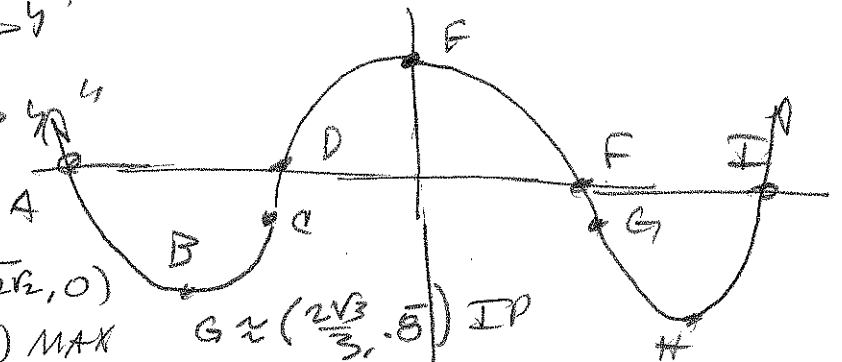
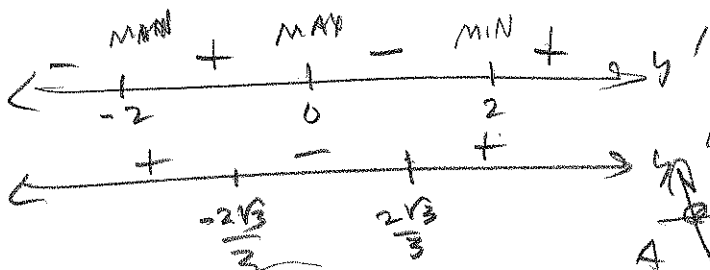
$$y'' = 12x^2 - 16 = 4(3x^2 - 4) \stackrel{\text{SET}}{=} 0 \Rightarrow$$

$$3x^2 = 4$$

$$x^2 = \frac{4}{3}$$

$$x = \pm \frac{2}{\sqrt{3}} = \pm \frac{2\sqrt{3}}{3} \approx \pm 1.1547$$

$$x \in \left\{ \pm \frac{2\sqrt{3}}{3} \right\}$$



$$A \approx (-\sqrt{4+2\sqrt{2}}, 0)$$

$$D = (-\sqrt{4-2\sqrt{2}}, 0)$$

$$G \approx (\frac{2\sqrt{3}}{3}, 8) \text{ IP}$$

$$B \approx (-2, -8) \text{ MIN}$$

$$E = (0, 8) \text{ MAX}$$

$$H = (2, -8) \text{ MIN}$$

$$C \approx (-\frac{2\sqrt{3}}{3}, -8.88)$$

$$F = (\sqrt{4-2\sqrt{2}}, 0)$$

$$I = (\sqrt{4+2\sqrt{2}}, 0)$$

201 § 3.5 #s 11, 26, 34

$$(11) \quad y = \frac{-x^2 + x}{x^2 - 3x + 2} = -\frac{x^2 - x}{x^2 - 3x + 2} = -\frac{x(x-1)}{(x-2)(x-1)}$$

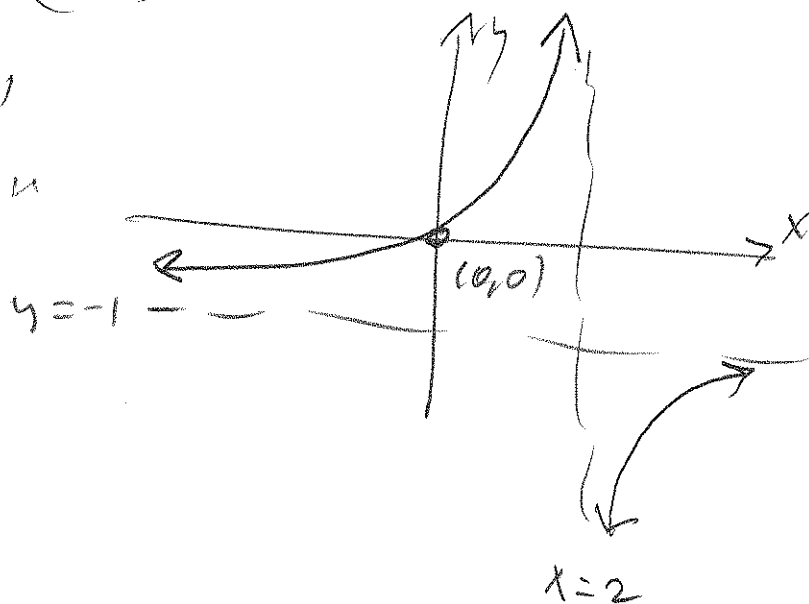
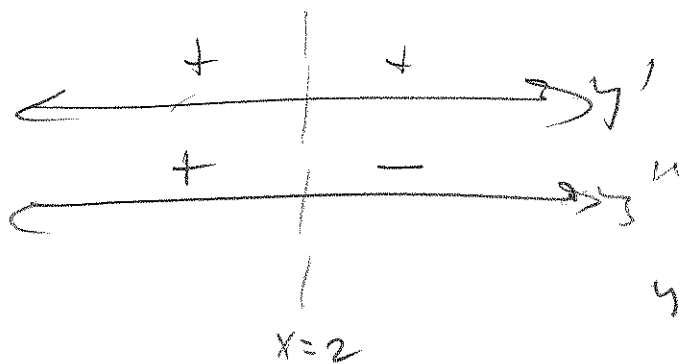
$$D = \mathbb{R} \setminus \{1, 2\}, \quad \begin{array}{l} x=2 \text{ is V.A.} \\ (1, -1) \text{ is HOLE} \\ \text{H.A.} = y = -1 \end{array}$$

Now, except for the hole,  $y = -\frac{x}{x-2}$

$$y' = -\left[ \frac{1(x-2) - x(1)}{(x-2)^2} \right]$$

$$= -\left[ \frac{x-2-x}{(x-2)^2} \right] = \frac{2}{(x-2)^2} = 2(x-2)^{-2}$$

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



201  $\{3, 5, 26, 34\}$

$$D = [-\sqrt{2}, \sqrt{2}]$$

(26)  $y = x \sqrt{2-x^2}$      $\text{SET } 0 \Rightarrow x = 0, \pm \sqrt{2}$

$$y' = \sqrt{2-x^2} + x \left( \frac{1}{2} (2-x^2)^{-\frac{1}{2}} (-2x) \right)$$

$$= \frac{2-x^2}{\sqrt{2-x^2}} - \frac{x^2}{\sqrt{2-x^2}} = \frac{2-2x^2}{\sqrt{2-x^2}} = - \frac{2(x^2-1)}{\sqrt{2-x^2}}$$

$\text{SET } 0 \Rightarrow x = \pm 1, \cancel{\pm \sqrt{2}}$      $\text{SET } \neq \Rightarrow x = \pm \sqrt{2}$

CVS:  $x = \pm 1$

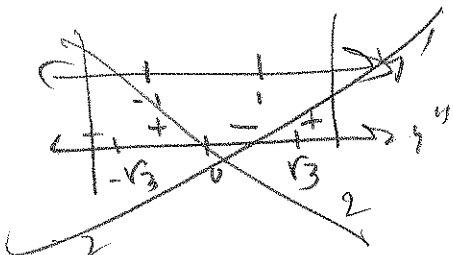
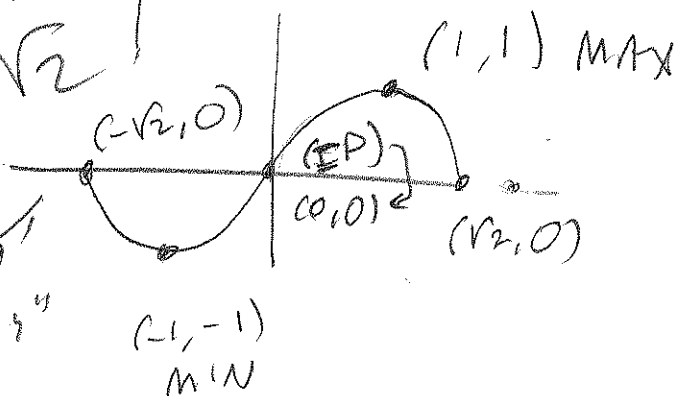
$$y'' = -2 \left[ \frac{2x(2-x^2)^{\frac{1}{2}} - (x^2-1) \left( \frac{1}{2} (2-x^2)^{-\frac{1}{2}} (-2x) \right)}{2-x^2} \right]$$

$$= -2 \left[ \frac{\frac{2x(2-x^2)}{\sqrt{2-x^2}} + \frac{x(x^2-1)}{\sqrt{2-x^2}}}{2-x^2} \right]$$

$$= -2 \left[ \frac{x[4-2x^2+x^2-1]}{(2-x^2)^{3/2}} \right] = -2 \left[ \frac{x[-x^2+3]}{(2-x^2)^{3/2}} \right]$$

$$= \frac{2x[x^2-3]}{(2-x^2)^{3/2}} \quad \text{SET } 0 \Rightarrow x \in \{0, \pm \sqrt{3}\}$$

$\sqrt{3} > \sqrt{2}$



201 §3.5 #34

(34)  $y = x + \cos x$  Hard to find zeros analytically

$$y' = 1 - \sin x \stackrel{\text{SET}}{=} 0 \Rightarrow$$

$$x = \frac{\pi}{2} + 2n\pi, n \in \mathbb{Z}$$

$$y'' = -\cos x \stackrel{\text{SET}}{=} 0$$

$$x = \frac{(2n+1)\pi}{2}, n \in \mathbb{Z}$$

Note:  $y' = 1 - \sin x \geq 0 \forall x$ , so no extremes. Just terraces

