

$$\frac{x^3}{(x-4)} - 3x$$

$$\frac{3}{4}x^2 - 3 = 0$$

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

$$\pm 2 = \pm 2$$

$$\begin{array}{c} + \quad - \quad + \\ \hline f'(-3) \quad \& f'(0) \quad \& f'(3) \end{array}$$

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

3.3B More 1st Derivative

A. $f(x) = \sin x$ on $[0, 2\pi]$

$$0 = \cos x$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\begin{array}{c} + \quad \quad - \quad \quad + \\ \hline f'(\pi/4) \quad \pi/2 \quad f'(\pi) \quad 3\pi/2 \quad f'(7\pi/4) \end{array}$$

$$\begin{array}{l} \text{Inc: } [0, \pi/2) \cup (3\pi/2, 2\pi] \\ \text{Dec: } (\pi/2, 3\pi/2) \end{array}$$

$$\text{Ex. } f(x) = \sin x - \cos x ; [0, 2\pi]$$

$$0 = \cos x + \sin x$$

$$-\cos x = \sin x$$

$$\frac{3\pi}{4}, \frac{7\pi}{4}$$

$$\begin{array}{c} + \quad - \quad + \\ \hline f\left(\frac{3\pi}{4}\right) \quad f'(\pi) \quad f\left(\frac{7\pi}{4}\right) \quad f'\left(\frac{11\pi}{6}\right) \end{array}$$

$$\text{Inc: } \left[0, \frac{3\pi}{4}\right) \cup \left(\frac{7\pi}{4}, 2\pi\right]$$

$$\text{Dec: } \left(\frac{3\pi}{4}, \frac{7\pi}{4}\right)$$

B. #17 $f(x) = x^2 - 6x$

$$0 = 2x - 6$$

$$\frac{6}{2} = \frac{2x}{2}$$

$$3 = x$$

$$\begin{array}{c} - \quad \quad + \\ \hline f'(0) \quad 3 \quad f'(4) \end{array}$$

$$\text{Inc: } (3, +\infty)$$

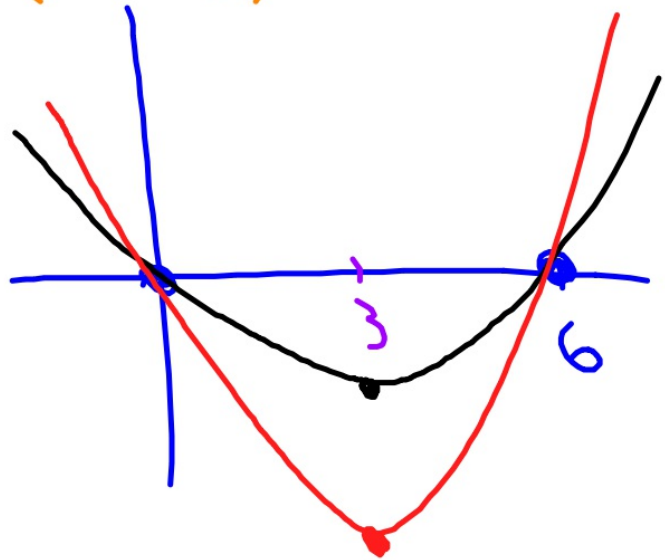
$$\text{Dec: } (-\infty, 3)$$

X-intercepts

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

$$0 = x(x - 6)$$

0 ← 6 ←



$$\# 21 \quad f(x) = 2x^3 + 3x^2 - 12x$$

$$0 = 6x^2 + 6x - 12 \quad \begin{array}{c} + \quad \quad - \quad \quad + \\ \hline | \quad \quad \quad \quad | \quad \quad \quad | \end{array}$$

$$0 = 6(x^2 + x - 2) \quad \begin{array}{c} f'(x) - 2 \quad f'(0) \quad | \quad f'(2) \end{array}$$

$$0 = 6(x+2)(x-1) \quad \begin{array}{l} \text{Inc: } (-\infty, -2) \cup (1, \infty) \\ \text{Dec: } (-2, 1) \end{array}$$

$$x = -2, +1$$

3.3 19-24, 26 {Draw
39-42 }Inc/Dec
61-64