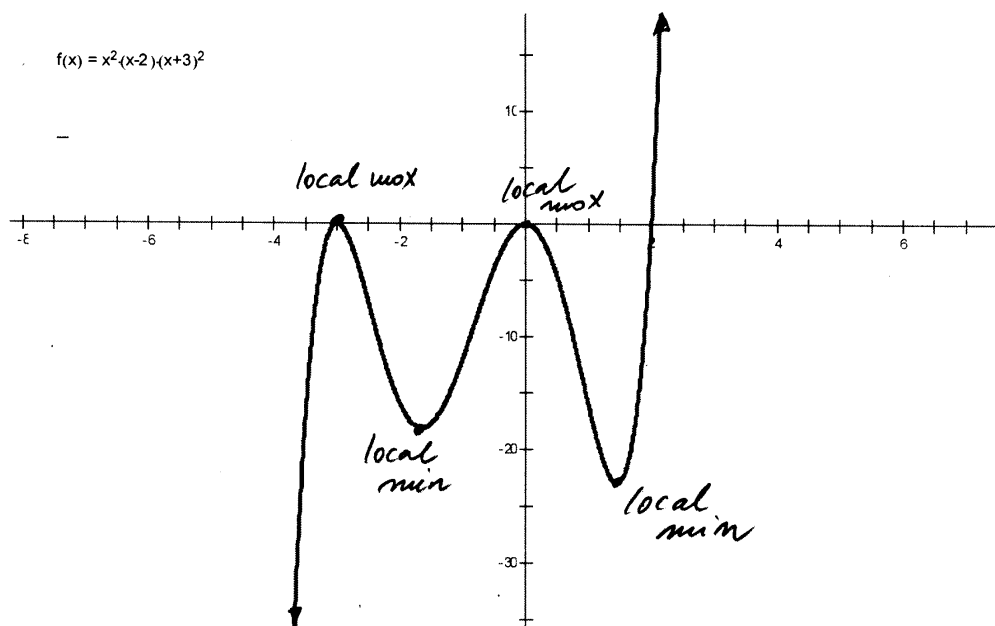


QUIZ #7 @ 25 points

Write neatly. Show all work. Use only information covered up to this point.

Write all responses on separate paper. Clearly label the exercises.

1. Identify on the graph where the function has extreme values (absolute and local).



2. Find the critical points for $f(x) = x - \sqrt{x}$.

3. Find the absolute maximum and minimum values for each function on the given interval:

a) $f(x) = \sin x$, $x \in \left[-\frac{\pi}{2}, \frac{5\pi}{6}\right]$

b) $f(x) = \sqrt{4-x^2}$, $x \in [-2, 1]$

(2) $f(x) = x - \sqrt{x}$
 Domain of f : $x \in [0, \infty)$

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

$$f'(x) = 0 \text{ iff } 2\sqrt{x} - 1 = 0$$

$$\sqrt{x} = \frac{1}{2}$$

$$x = \frac{1}{4}$$

$f'(x)$ not defined when $x = 0$

Set of critical points $\{0, \frac{1}{4}\}$

(3)(a) $f(x) = \sin x$, $x \in [-\frac{\pi}{2}, \frac{5\pi}{6}]$

$$f'(x) = \cos x$$

$$f'(x) = 0 \text{ when } \left. \begin{array}{l} x = \frac{\pi}{2} \\ x = -\frac{\pi}{2} \end{array} \right\}$$

Evaluate f at
 critical point $x = \frac{\pi}{2}$

$$f\left(\frac{\pi}{2}\right) = \sin \frac{\pi}{2} = 1$$

and

end points $x = -\frac{\pi}{2}$, $x = \frac{5\pi}{6}$

$$f\left(-\frac{\pi}{2}\right) = \sin -\frac{\pi}{2} = -1$$

$$f\left(\frac{5\pi}{6}\right) = \sin \frac{5\pi}{6} = \frac{1}{2}$$

Therefore, the absolute minimum is -1 at $x = -\frac{\pi}{2}$

The absolute maximum is 1 at $x = \frac{\pi}{2}$.

(b) $f(x) = \sqrt{4-x^2}$, $x \in [-2, 1]$

$$f'(x) = \frac{1}{2\sqrt{4-x^2}} (-2x)$$

$$f'(x) = \frac{-x}{\sqrt{4-x^2}}$$

$$f'(x) = 0 \text{ iff } x = 0$$

$f'(x)$ not defined when
 $x = 2$ or $x = -2$

(not in the domain)

Evaluate f at
 critical point $x = 0$

$$f(0) = \sqrt{4} = 2$$

and

end points $x = -2$, $x = 1$

$$f(-2) = \sqrt{0} = 0$$

$$f(1) = \sqrt{3}$$

So absolute minimum is 0
 at $x = -2$

Absolute maximum is 2
 at $x = 0$