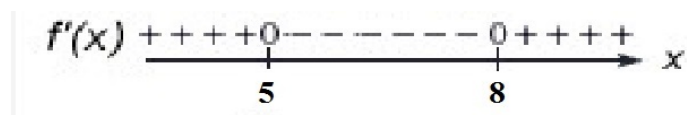


MTH 162
Quiz 3, Form A
Fall 2015

Show all work in a neat and organized fashion. Clearly indicate your answers.
20 points possible.

Calculator OK, but none with CAS.

1. (5 pts.) This figure shows the sign diagram for $f'(x)$.



Use the sign diagram to determine

- (a) the critical values of $f(x)$,

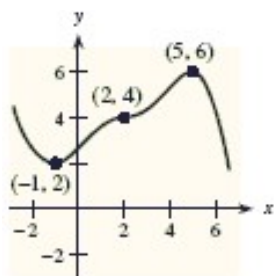
- (b) intervals on which $f(x)$ increases,

- (c) intervals on which $f(x)$ decreases,

- (d) x -values at which relative maxima for $f(x)$ occur,

- (e) x -values at which relative minima for $f(x)$ occur,

2. (3 pts.) This figure shows the graph of $y = f(x)$.



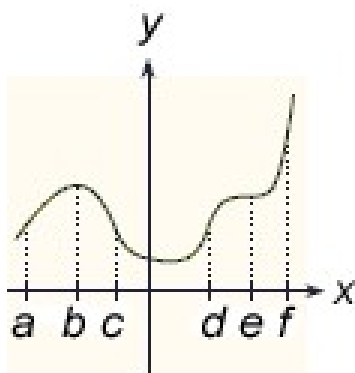
Identify at which of the three indicated points the derivative $f'(x)$

(a) changes from positive to negative,

(b) changes from negative to positive,

(c) does not change sign.

3. (4 pts.) This figure shows the graph of $y = f(x)$.



Use the indicated x -values on the graph to find intervals where $f''(x) > 0$.

4. (8 pts.) A function and its first and second derivatives are given.

$$f(x) = 3x^5 - 80x^3$$

$$f'(x) = 15x^2(x - 4)(x + 4)$$

$$f''(x) = 60x(x^2 - 8)$$

(For the following questions, you may find decimal approximations rounded to two decimal places.)

- (a) Find the critical values of $f(x)$.
- (b) Find the relative maximum points of $f(x)$ (find both x and y values).
- (c) Find the relative minimum points of $f(x)$ (find both x and y values).
- (d) Find the points of inflection of $f(x)$ (find both x and y values).

Formulas

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$f(x) = ax^2 + bx + c \implies f'(x) = 2ax + b$$

function	derivative
$y = fg$	$y' = f'g + fg'$
$y = \frac{f}{g}$	$y' = \frac{f'g - fg'}{g^2}$
$y = (\text{stuff})^n$	$y' = n(\text{stuff})^{n-1}(\text{stuff})'$
$y = \ln x$	$y' = \frac{1}{x}$
$y = \ln(\text{stuff})$	$y' = \frac{1}{(\text{stuff})}(\text{stuff})'$
$y = e^x$	$y' = e^x$
$y = e^{\text{stuff}}$	$y' = e^{(\text{stuff})}(\text{stuff})'$