

① Let f be the function given by $f(x) = x^3 - 7x + 6$. (No calc)

(a) Find the zeros of f .

(b) Write an equation of the line tangent to the graph of f at $x = -1$.

(c) Find the number c that satisfies the conclusion of the Mean Value Theorem for f on the closed interval $[1, 3]$.

② Consider the function f defined by $f(x) = e^x \cos x$ with domain $[0, 2\pi]$. (No calc)

- (a) Find the absolute maximum and minimum values of $f(x)$.
- (b) Find the intervals on which f is increasing.
- (c) Find the x -coordinate of each point of inflection of the graph of f .

a) Notes: Abs. max or min may occur only at an endpoint or critical point. Find critical points and set up a table where you include x -coordinates of endpoints and critical points. Find y -values. Then compare.

3. Let f be the function defined by $f(x) = 3x^5 - 5x^3 + 2$.

- (a) On what intervals is f increasing?
- (b) On what intervals is the graph of f concave upward?
- (c) Write the equation of each horizontal tangent line to the graph of f .

4. 10.

Let f be the function defined by $f(x) = \sin^2 x - \sin x$ for $0 \leq x \leq \frac{3\pi}{2}$.

- (a) Find the x -intercepts of the graph of f .
- (b) Find the intervals on which f is increasing.
- (c) Find the absolute maximum value and the absolute minimum value of f .
Justify your answer.

5.

Let f be the function given by $f(x) = x^3 - 5x^2 + 3x + k$, where k is a constant.

- (a) On what intervals is f increasing?
- (b) On what intervals is the graph of f concave downward?
- (c) Find the value of k for which f has 11 as its relative minimum.