

## Extrema on an Interval

## HW 3-2

Find the critical values of the function.

1)  $f(x) = 3x^4 + 4x^3 - 6x^2$

2)  $f(x) = \frac{x+1}{x^2+x+1}$

3)  $f(x) = 5x^{2/3} + x^{5/3}$

4)  $f(x) = 4x - \tan x$

Find the critical values and absolute extrema of the function on the interval.

5)  $f(x) = (x^2 - 1)^3, [-1, 2]$

6)  $f(x) = \frac{x^2 - 4}{x^2 + 4}, [-4, 4]$

7)  $f(x) = x - 2 \cos x, [-\pi, \pi]$

8)  $f(x) = \sin x - \cos^2 x, [0, 2\pi]$

9) An advertisement is run to stimulate the sale of cars. After  $t$  days, the number of cars sold is given by  $N(t) = 4000 + 45t^2 - t^3$ . On what day does the maximum number of cars get sold?

10) If a function  $f$  is continuous for all  $x$  and if  $f$  has a relative minimum at  $(3, -2)$  and a relative maximum at  $(-1, 4)$ , which of the following statements must be true?

a) The graph of  $f$  has a point of inflection somewhere between  $x = -1$  and  $x = 3$

c) The graph of  $f$  has a horizontal asymptote.

b)  $f'(-1) = 0$

d) The graph of  $f$  has a horizontal tangent line at  $x = 3$ .

e) The graph of  $f$  intersects both axes.

Why? \_\_\_\_\_

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11) A particle's velocity is given by  $v(t) = t^3 - 3t^2 + 12t + 4$ . What is its maximum acceleration on the interval  $0 \leq t \leq 3$ ?