ketch a graph of the function from the given information.

$7) = 6, f(-3) = 3, f(8) = 3, f(10) = 4,$

$) = 5.5, f(-5) = 4, f(5) = f(0) = undefined$

$7) = f'(-3) = f'(2) = f'(8) = 0$

$) > 0 \; for \; (-\infty,-7) \cup (-3,0) \cup (8,\infty)$

$) < 0 \; for \; (-7,-3) \cup (0,5) \cup (5,8)$

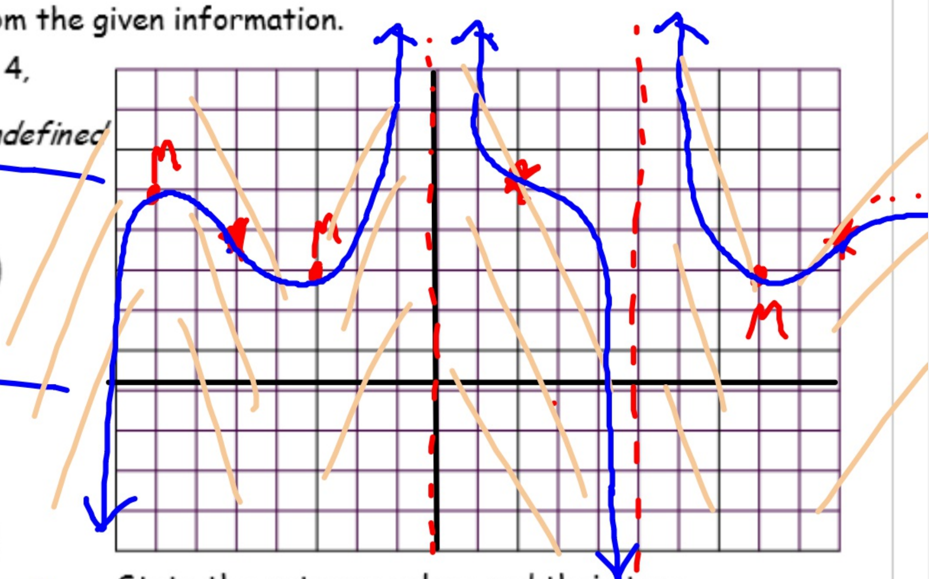
$5) = f''(2) = f''(10) = 0$

$) > 0 \; for \; (-5,0) \cup (0,2) \cup (5,10)$

$) < 0 \; for \; (-\infty,-5) \cup (2,5) \cup (10,\infty)$

$f(x) = \infty, \; \lim_{x\to 0^+} f(x) = \infty, \; \lim_{x\to 5^-} f(x) = -\infty,$

$f(x) = \infty, \; \lim_{x\to\infty} f(x) = 5$



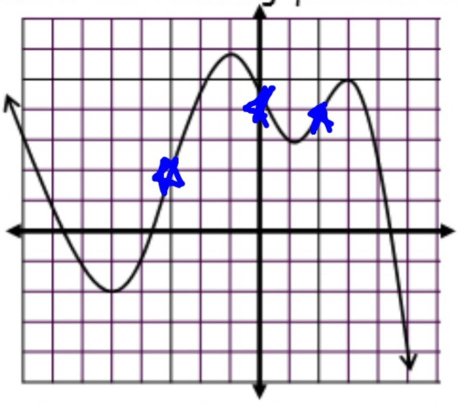
State the extreme values and their type.

POI: (-5, 4), (2, 5.5), (10, 4)

Rel. Min: (-3, 3), (8, 3)

Rel. Max: (-7, 6)

2. Answer the following questions using the given graph. (values will all be approximate)



$f'(x) > 0$: $(-5, -1) \cup (1, 3)$

$f'(x) < 0$: $(-\infty, -5) \cup (-1, 1) \cup (3, \infty)$

$f''(x) > 0$: $(-\infty, -3) \cup (0, 2)$

$f''(x) < 0$: $(-3, 0) \cup (2, \infty)$

Extreme Values: R. Min: $(-5, -2)$ $(1, 3)$ / R. Max:

Points of Inflection: $(-3, 2)$, $(0, 4.5)$, $(2, 4)$

Discontinuities: —

Does the Mean Value Theorem apply for the given interval? If so, calculate the value(s) of c. If not, state the reason why.

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

$(-3, -1)(1, 3)$

$m = \frac{3 - {}^-1}{1 - {}^-3} = \frac{4}{4} = 1$

$) = 2x + 3 = 1$

$2x = {}^-2$

$x = {}^-1$

4) $f(x) = x^2 - 5x + 7$ $[-1,3]$

$(-1, 13)(3, 1)$

$m = \frac{1 - 13}{3 - {}^-1} = \frac{-12}{4} = -$

$f'(x) = 2x - 5 = -3$

$2x = 2$

$x = 1$

5) $f(x) = x^3 - 6x^2 + 9x + 2 \quad 0 \le x \le 4$

$0, 2)(4, 6)$

$m = \frac{6-2}{4-0} = \frac{4}{4} = 1$

$) = 3x^2 - 12x + 9 = 1$

$3x^2 - 12x + 8 = 0$

$\frac{\sqrt{144 - 4 \cdot 3 \cdot 8}}{6} = \frac{12 \pm \sqrt{48}}{6}$

$4\sqrt{3} = \frac{6 \pm 2\sqrt{3}}{3} = .845, 3.155$

6) $f(x) = \frac{x+2}{x} \quad [-1,2]$

Not continuous

b/c VA at $x=0$

Does the Mean Value Theorem apply for the given interval? If so, calculate the value(s) of c
If not, state the reason why.

7) $f(x) = x^4 - 16x^2 + 2 \qquad -1 \le x \le 3$

$(-1, -13)\ (3, -61)$

$m = \dfrac{-61 - -13}{3 - -1} = \dfrac{-48}{4} = -12$

$f'(x) = 4x^3 - 32x = -12$

$4x^3 - 32x + 12 = 0$

$x = .382,\ 2.618$

on calc.

8) $f(x) = \frac{1}{3}(x^3 + x - 4) \qquad [-1, 2]$

$(-1, -2)\ (2, 2)$

$m = \dfrac{2 - -2}{2 - -1} = \dfrac{4}{3}$

$f(x) = \frac{1}{3}x^3 + \frac{1}{3}x - \frac{4}{3}$

$f'(x) = x^2 + \frac{1}{3} = \frac{4}{3}$

$x^2 - 1 = 0$

$x = \pm 1$

9) $f(x)=\dfrac{x+2}{x}$ $\quad [2,5]$

$2,2)\ (5,1.4)$

$\dfrac{1.4-2}{5-2}=\dfrac{-.6}{3}=-.2$

$\dfrac{)-\ (x+2)\cdot 1}{x^2}=\dfrac{-2}{x^2}=-.2$

$-2=-.2x^2$

$10=x^2$

$x=\pm\sqrt{10}$

$=\sqrt{10}$

10) $f(x)=\sin(x)-\dfrac{1}{2}x \quad -\pi\le x\le\pi$

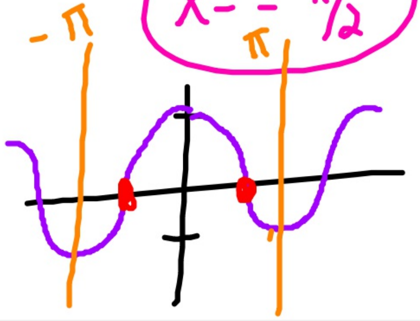
$(-\pi,1.571)\ (\pi,-1.571)$

$m=\dfrac{-1.571-1.571}{\pi - -\pi}=$

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

$\cos(x)=0$

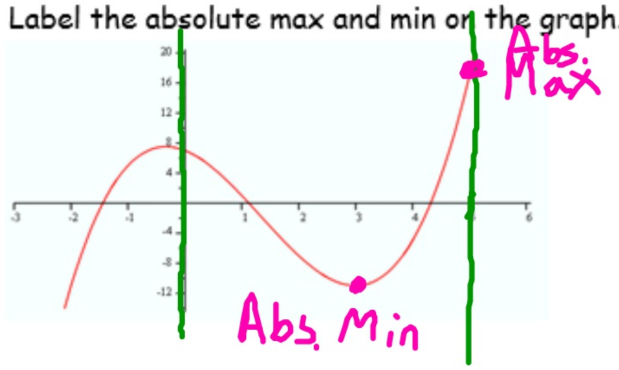
$x=\pm\pi/2$



Using the Min/Max Existence Theorem determine the minimum and maximum values.

11) $f(x) = x^3 - 4x^2 - 3x + 7 \quad 0 \le x \le 5$

Label the absolute max and min on the graph.



12) $f(x) = \frac{1}{3}(x^3 + x - 4) \quad [-1, 2]$

$f(x) = \frac{1}{3}x^3 + \frac{1}{3}x - \frac{4}{3}$

$f'(x) = x^2 + \frac{1}{3} = 0$

$x^2 = -1/3$

$\emptyset$

$f(-1) = -2$ Min

$f(2) = 2$ Max

13) $f(x)=\frac{x}{x-3}$ $[-1,4]$

lot continuous b/c
VA at $x=3$

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

$f'(x)=2x+3=0$

$x=-3/2$

$f(-3)=-1$

$f(-3/2)=-3.25$ Min

$f(1)=3$ Max