

Math 1121
 Homework # 24
 # 12, # 17

12

$$f(x) = x^3 - 3x^2 - 24x + 5, \quad [-3, 6]$$

$$\begin{aligned} f'(x) &= 3x^2 - 6x - 24 \\ &= 3(x^2 - 2x - 8) \\ &= 3(x-4)(x+2) \\ x &= 4, \quad x = -2 \end{aligned}$$

x	f(x)
4	-75
-2	33
-3	23
6	-31

(calculator)

$x=4, y=-75$ is the abs min
 $x=-2, y=33$ is the abs max

17

$$f(x) = \frac{1-x}{3+x}, \quad [0, 3]$$

$$\begin{aligned} f'(x) &= \frac{(3+x)(-1) - (1-x)(1)}{(3+x)^2} \\ &= \frac{-3-x-1+x}{(3+x)^2} \\ &= \frac{-4}{(3+x)^2} \end{aligned}$$

$$\begin{aligned} f' = 0: \quad -4 &= 0 \quad \text{n/a} \\ f' \text{ DNE: } (3+x)^2 &= 0 \\ x &= -3 \end{aligned}$$

x	f(x)
0	1/3
3	-1/3
3	

outside the interval

$x=0, y=1/3$ is the abs max
 $x=3, y=-1/3$ is the abs min.