

Ch. 3.1 Critical points, EVT, Absolute extrema

p. 167-168

#11, 13, 37, 39, 21

41, 43, 52, 53

63, 64, 65

*Find critical numbers: set $f'(x) = 0$ (consider numerator and denominator)

13) $g(t) = t\sqrt{4-t}, t < 3$

$$g(t) = t(4-t)^{1/2}$$

$$g'(t) = 1(4-t)^{1/2} + t \cdot \frac{1}{2}(4-t)^{-1/2}(-1)$$

$$g'(t) = \sqrt{4-t} - \frac{t}{2\sqrt{4-t}}$$

$$g'(t) = \frac{2(4-t)}{2\sqrt{4-t}} - \frac{t}{2\sqrt{4-t}}$$
$$= \frac{8-2t-t}{2\sqrt{4-t}} = \frac{8-3t}{2\sqrt{4-t}}$$

critical pts:

$$8-3t = 0$$

$$3t = 8$$

$$t = 8/3$$

$$2\sqrt{4-t} = 0$$

$$\sqrt{4-t} = 0$$

$$4-t = 0$$

$$t = 4 \quad t < 3$$

(EVT)

21) Find Absolute extrema: test critical pts, test endpoints

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

$$f'(x) = 3x^2 - \frac{3}{2} \cdot 2x = 3x^2 - 3x$$

$$f'(x) = 3x(x-1)$$

$$0 = 3x(x-1)$$

$$x = 0, 1$$

$$f(-1) = -5/2 \text{ (Min)}$$

$$f(0) = 0$$

$$f(1) = -1/2$$

$$f(2) = 2 \text{ (Max)}$$

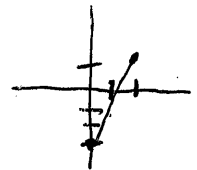
Abs min is $-5/2$

at $x = -1$

Abs max is 2

at $x = 2$

37) $f(x) = 2x - 3$ $f(0) = -3$
 $f(2) = 1$



a) $[0, 2]$

Abs max: (2, 1)

Abs min: (0, -3)

b) $[0, 2)$

Min: (0, -3)

c) $(0, 2]$

Max: (2, 1)

d) $(0, 2)$

no extrema

52) a) abs min
b) rel. max
c) neither

d) rel. min
e) rel. max
f) rel. min

g) neither

63) True

64) True

65) False