

1) max (5, 31)  
 min (1, -1)  
 $f' = 4x - 4 = 0$   
 $x = 1$   
 $f(1) = 2(1) - 4(1) + 1 = -1$  min  
 $f(-2) = 2(4) - 4(-2) + 1 = 17$   
 $f(5) = 2(25) - 4(5) + 1 = 31$  max.

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2)  $x = 4$

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

$f'(c) = \frac{f(b) - f(a)}{b - a}$

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

$\frac{-2}{x^2} = \frac{f(8) - f(2)}{8 - 2}$

$\frac{-2}{x^2} = \frac{2/8 - 2/2}{6}$

$\frac{-2}{x^2} = \frac{1/4 - 1}{6} \rightarrow \frac{-2}{x^2} = \frac{-3/4}{6}$

$\frac{-2}{x^2} = -\frac{1}{8}$

$x^2 = 16$

$x = \pm 4$

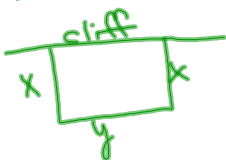
on  $[2, 8]$   
 $x = 4$

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3)  $(-\infty, -1)$  Inc  
 $(-1, 1)$  Dec  $\cap$  max(-1, -2)  
 $(1, \infty)$  Inc  $\cup$  min(1, -6)

4) No Rolle's  
 b/c  $f(-8) \neq f(0)$

5) 350 x 700 ft



$F = 1400$  ft  
 $2x + y = 1400$   
 $y = 1400 - 2x$

max:  $A = xy$

$A = x(1400 - 2x)$

$A = 1400x - 2x^2$

$A' = 1400 - 4x = 0$

$4x = 1400$

$x = 1400/4 = 350$  ft

$y = 1400 - 2(350)$   
 $y = 700$  ft

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6)  $(-\infty, 5/3)$  cc dn

$(5/3, \infty)$  cc up

PI  $(5/3, -376/27)$

$f = x^3 - 5x^2 + 2x - 8$

$f' = 3x^2 - 10x + 2$

$f'' = 6x - 10 = 0$

$x = 5/3$

$(-\infty, 5/3)$  cc dn  
 $(5/3, \infty)$  cc up

PI  $(5/3, -376/27)$

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7a)  $y=0$  (bottom power bigger)

b)  $y = \pm \frac{\sqrt{3}}{-7} = \frac{\sqrt{3}}{7}, -\frac{\sqrt{3}}{7}$

c)  $y = -\frac{8}{3}$

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8)  $A = \frac{32}{3\sqrt{3}} = \frac{32\sqrt{3}}{9}$

$A = 2x \cdot y$

$A = 2x(4-x^2)$

$A = 8x - 2x^3$

$A' = 8 - 6x^2 = 0$

$8 = 6x^2$

$x^2 = \frac{4}{3}$

$x = \pm \frac{2}{\sqrt{3}}$

$A = 2\left(\frac{2}{\sqrt{3}}\right)\left(4 - \frac{4}{3}\right)$   
 $= \frac{4}{\sqrt{3}}\left(\frac{8}{3}\right)$   
 $= \frac{32}{3\sqrt{3}}$

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# 4, 6-8, 10, 13-15,  
17, 20-22, 24, 27

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