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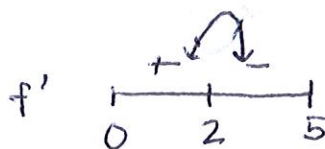
(47-55) all

(47)  $f' = 4 - 2x = 0$

$4 = 2x$

$x = 2$

incr:  $[0, 2)$     decr:  $(2, 5]$



$f(0) = 12$

$f(5) = 7$

abs max  $x = 2$

abs min  $x = 0$

rel min  $x = 5$

(48)  $f' = 54 - 6x^2 = 0$

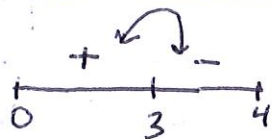
$54 = 6x^2$

$9 = x^2$

$x = \pm 3$

not in domain

incr:  $[0, 3)$     decr:  $(3, 4]$



$f(0) = 5$

$f(4) = 93$

abs max  $x = 3$

abs min  $x = 0$

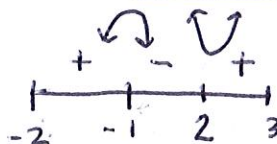
rel min  $x = 4$

(49)  $f' = 6x^2 - 6x - 12 = 0$

$6(x^2 - x - 2) = 0$

$6(x - 2)(x + 1) = 0$

incr:  $(-2, -1) \cup (2, 3)$     decr:  $(-1, 2)$      $x = -1, 2$



local min  $x = -2$

local max  $x = 3$

abs max  $x = -1$

abs min  $x = 2$

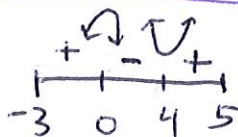
mins  $\left[ \begin{matrix} f(-2) = -3 \\ f(2) = -19 \end{matrix} \right]$     max  $\left[ \begin{matrix} f(-1) = 8 \\ f(3) = -8 \end{matrix} \right]$

(50)  $f' = 3x^2 - 12x = 0$

$3x(x - 4) = 0$

$x = 0, 4$

incr:  $(-3, 0)$     decr:  $(0, 4)$



abs max  $x = 0$

abs min  $x = -3$

rel max  $x = 5$

rel min  $x = 4$

mins  $\left[ \begin{matrix} f(-3) = -76 \\ f(4) = -27 \end{matrix} \right]$

max  $\left[ \begin{matrix} f(0) = 5 \\ f(5) = -20 \end{matrix} \right]$

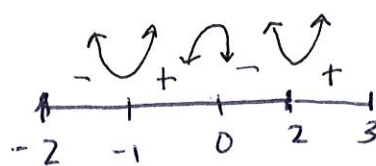
(51)  $f' = 12x^3 - 12x^2 - 24x = 0$

$12x(x^2 - x - 2) = 0$

$12x(x - 2)(x + 1) = 0$

$x = 0, 2, -1$

incr:  $(-1, 0)$     decr:  $(-2, -1)$      $(0, 2)$



abs max  $x = -2$

abs min  $x = 2$

all else relative

max  $\left[ \begin{matrix} f(-2) = 33 \\ f(0) = 1 \\ f(3) = 28 \end{matrix} \right]$

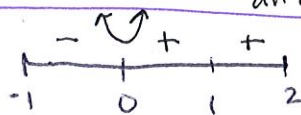
mins  $\left[ \begin{matrix} f(-1) = -4 \\ f(2) = -31 \end{matrix} \right]$

(52)  $f' = 3(x^2 - 1)^2 \cdot 2x = 0$

$x = 1, 0, -1$

incr:  $(0, 1)$     decr:  $(1, 2)$

decr:  $(-1, 0)$



abs min  $x = 0$

abs max  $x = 2$

$f(1) = 0$

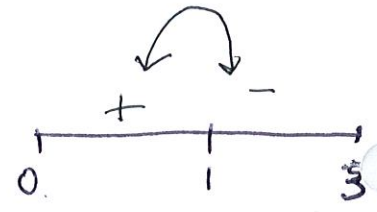
$f(2) = 27$

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

$\frac{x^2 - x + 1 - 2x^2 + x}{(x^2 - x + 1)^2} = 0$

$\frac{-x^2 + 1}{(x^2 - x + 1)^2} = 0$

$x = 1$ ,  ~~$x = -1$~~  not in domain



incr: (0,1)  
dec: (1,3)

abs max  $x = 1$   
abs min  $x = 0$   
rel min  $x = 3$

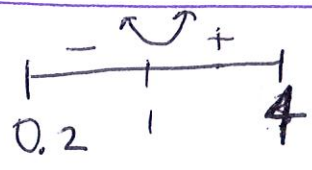
$f(0) = 0$   
 $f(3) = .43$

54  $f' = 1 - \frac{1}{x^2} = 0$

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

$x^2 = 1$

$x = \pm 1$ ,  ~~$x = -1$~~  not in domain



$f(0.2) = 5.2$   
 $f(4) = 4.25$

inc: (1,4)  
dec: (0,1)

abs min  $x = 1$   
abs max  $x = 0.2$   
rel max  $x = 4$

55  $f' = t \cdot \frac{1}{2}(4-t^2)^{-1/2} \cdot -2t + (4-t^2)^{1/2} = 0$

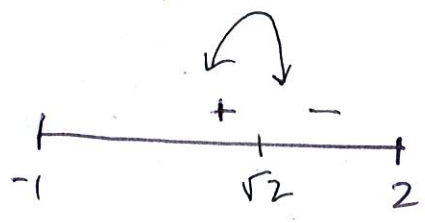
$t^2 \cdot (4-t^2)^{-1/2} + (4-t^2)^{1/2} = 0$

$(4-t^2)^{1/2} (t^2 \cdot (4-t^2)^{-1} + 1) = 0$

$t = \sqrt{2}$ ,  ~~$t = -\sqrt{2}$~~  not in domain

$\frac{t^2}{4-t^2} = -1$

$t^2 = -4 + t^2$   
 $0 = -4$   
none



abs min  $x = -1$   
abs max  $x = \sqrt{2}$   
rel min  $x = 2$

incr:  $(-1, \sqrt{2})$   
dec:  $(\sqrt{2}, 2)$

$f(-1) = -1.7$   
 $f(2) = 0$