4.4 Day 6

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Saturday, November 24, 2012
2:45 PM

51. True. This is guaranteed by the Extreme Value Theorem

52. False. consider $f(x)=x^3$ @ $c=0$

53. D

$x+y=60$
$y=60-x$
$y=20$

$x^2y=f$
$40^2(20)$
$=32000$

$f(x)=x^2(60-x)$
$f(x)=60x^2-x^3$
$f'(x)=120x-3x^2$
$0=3x(40-x)$
$x=40$

54. B

look @ the range $[3,30]$ the answer must fall within here.
since $f'(x)<0$ between 1 & 25
this means the function is decreasing.
$\therefore$ $f(25)$ will be the lowest value in the range.

55. B

$A=\frac{1}{2}bh$

$A=\frac{h}{2}\left(\sqrt{100-h^2}\right)$

$b^2+h^2=10^2$

$b=\sqrt{100-h^2}$

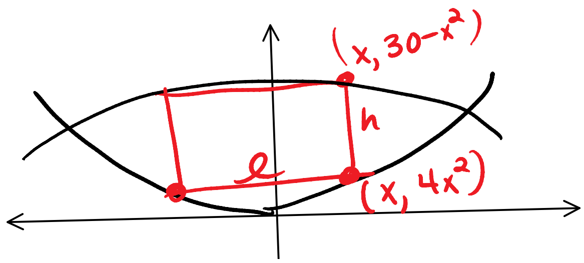
$A'=\frac{\sqrt{100-h^2}}{2}-\frac{h^2}{2\sqrt{100-h^2}}$

$A'=0$ when $h=\sqrt{50}$

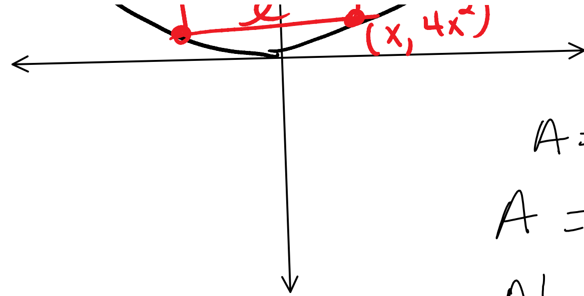
$b=\sqrt{100-\sqrt{50}^2}=\sqrt{50}$

$A=\frac{1}{2}(\sqrt{50})(\sqrt{50})=25$

56. E



$l=2x$
$h=30-x^2-4x^2$
$=30-5x^2$



$$A = 2x(30 - 5x^2)$$

$$A = 60x - 10x^3$$

$$A' = 60 - 30x^2$$

$$0 = 60 - 30x^2$$

$$x = \sqrt{2}$$

$$A = 60\sqrt{2} - 10\sqrt{2}^3$$

$$= 60\sqrt{2} - 20\sqrt{2} = 40\sqrt{2}$$

61. Skip