1/30/20

Do Now

Optimization packet pg 117 #1

Feb 11-8:14 AM

1. The profit for Ace Advertising Co. is $P = 230 + 20s - \frac{1}{2}s^2$ where s is the amount (in hundreds of dollars) spent on advertising. What amount of advertising gives the maximum profit?

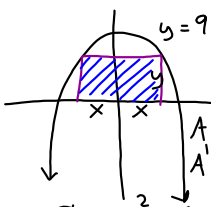
$P' = 20 - S$

$20 = S$

\$ 2,000

Feb 11-10:21 AM

2. Find the area of the largest rectangle with sides parallel to the axes, whose upper vertices are on $y=9-x^2$ and whose lower vertices are on the x-axis.



$A = 2xy$

$y = 9 - x^2$

$A = 2x(9 - x^2)$

$A = 18x - 2x^3$

$A' = 18 - 6x^2$

$18 - 6x^2 = 0$

$\frac{18}{6} = \frac{6x^2}{6}$

$\sqrt{3} = \sqrt{x^2}$

$x = \pm\sqrt{3}$

$x = \sqrt{3}$

A': + | $\sqrt{3}$ | −

max @ $x = \sqrt{3}$

$y = 9 - x^2$

$y = 9 - (\sqrt{3})^2$

$y = 6$

Area $= 2\sqrt{3} \cdot 6$

$= 12\sqrt{3}$ units²

Feb 11-10:23 AM

1) What is the formula for the surface area of a right cylinder?

$SA = 2\pi rh + 2\pi r^2$

2) What is the formula for the volume of a right cylinder?

$V = \pi r^2 h$

$V = BH$

B: area of base; H: height of cylinder

Feb 11-7:45 AM

What is the radius of a cylindrical soda can with a volume of 512 cubic inches that will use the minimum material?

Primary

$SA = 2\pi rh + 2\pi r^2$

$SA = 2\pi r\left(\frac{512}{\pi r^2}\right) + 2\pi r^2$

$SA = \frac{1024}{r} + 2\pi r^2$

$SA = 1024r^{-1} + 2\pi r^2$

$SA' = -1024r^{-2} + 4\pi r$

$0 = -1024r^{-2} + 4\pi r$

$\frac{1024}{r^2} = \frac{4\pi r}{1}$

$\frac{4\pi r^3}{4\pi} = \frac{1024}{4\pi}$

$\sqrt[3]{r^3} = \sqrt[3]{\frac{1024}{4\pi}}$

$r = \sqrt[3]{\frac{1024}{4\pi}}$

Secondary

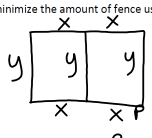
$V = \pi r^2 h$

$\frac{512}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$

SA': − | $\sqrt[3]{\frac{1024}{4\pi}}$ | +

Feb 12-11:34 AM

A 384 square meter plot of land is to be enclosed by a fence and divided into two equal parts by another fence parallel to one pair of sides. What dimensions of the outer rectangle will minimize the amount of fence used?



Primary

$P = 4x + 3y$

$P = 4x + 3\left(\frac{192}{x}\right)$

$P = 4x + 576x^{-1}$

$P' = 4 - 576x^{-2}$

$0 = 4 - 576x^{-2}$

$0 = 4 - \frac{576}{x^2}$

$4 = \frac{576}{x^2}$

$\frac{4x^2}{4} = \frac{576}{4}$

$\sqrt{x^2} = \sqrt{144}$

$x = \pm 12$

$x = 12$

Secondary

$A = 2xy$

$\frac{384}{2x} = \frac{2xy}{2x}$

$\frac{192}{x} = y$

P': − | 12 | +

$y = \frac{192}{12} = 16$

Dimensions

24x16

Feb 23-10:24 AM