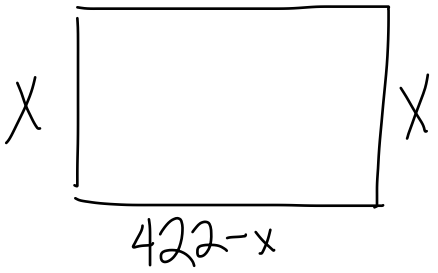
AM Objective #7: WP: Quadratic Functions

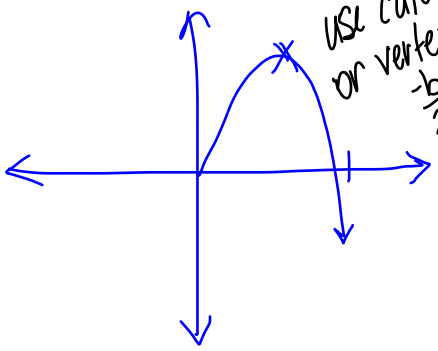
1. A farmer has 844 feet of fencing available and wishes to enclose a rectangular area. If x represents the width of the rectangle, for what value of x is the area largest?

[A] 210.5 feet [B] 213 feet [C] 212 feet [D] none of these

Perimeter = 844
$2x + 2y = 844$
$x + y = 422$
$y = 422 - x$



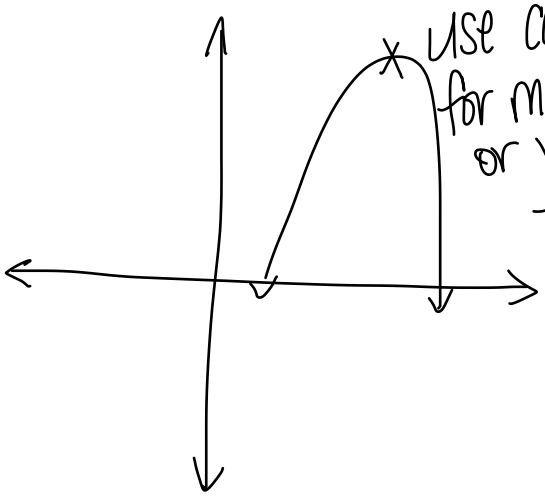
Area $= x \cdot y$
$= x(422 - x)$
$A = 422x - x^2$
max at vertex



use calculator or vertex formula
$\frac{-b}{2a} = \frac{-422}{2(-1)} = 211$ ft

2. The demand for drills depends on their price. A manufacturer determines that the number of drills he can sell at a price of p dollars each is given by the formula $d = -2p^2 + 208p - 320$. At what price will the demand for the drills be a maximum?

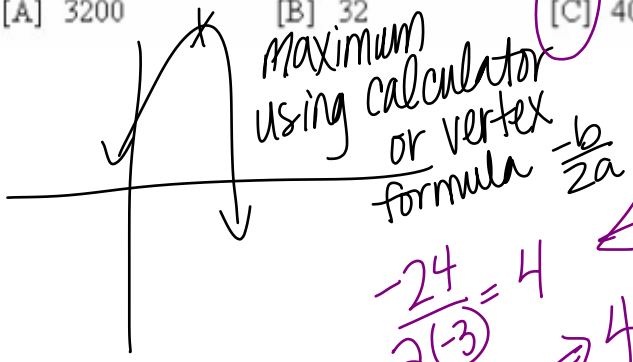
[A] \$80 [B] \$40 [C] \$52 [D] none of these



use calculator for maximum or vertex formula.
$\frac{-b}{2a} = \frac{-208}{2(-2)} = 52$

3. Jafco Manufacturing estimates that its profit, in hundreds of dollars, after producing x thousand units can be expressed as $P = -3x^2 + 24x + 2$. How many units must be produced to obtain the maximum profit?

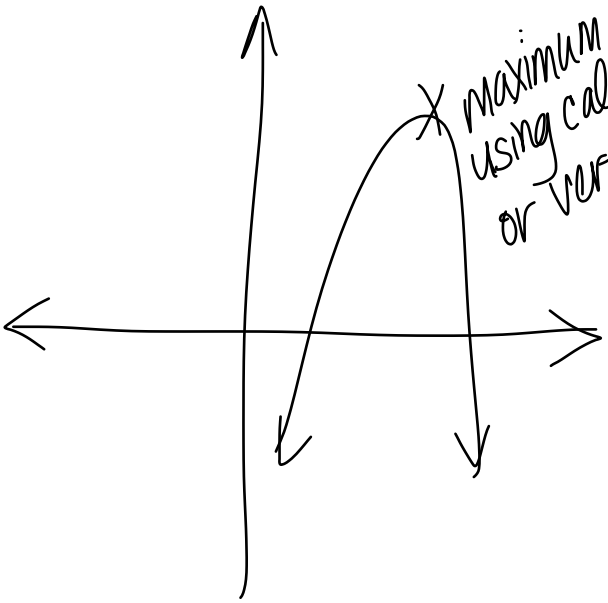
[A] 3200 [B] 32 [C] 4000 [D] none of these



maximum using calculator or vertex formula $\frac{-b}{2a}$

$\frac{-24}{2(-3)} = 4 \Rightarrow 4{,}000$ units.

4. The demand for saws depends on their price. A manufacturer determines that the number of saws it can sell at a price of p dollars each is given by the formula $d = -3p^2 + 72p - 200$. At what price will the demand for the saws be a maximum?



maximum using calculator or vertex formula

$\frac{-b}{2a} = \frac{-72}{2(-3)} = 12$

The demand for saws will be maximum when the price is $12.