M.I. Maximum Revenue

$(3y+3)(3y+3)$

$9y^2 + 9y + 9y + 9$

Do Now:
Given the system of 2 equations, use algebra to create one equation in standard form.

$$3x^2 + 2y^2 - 54y - 143 = 0$$
$$x = 3y + 3$$

FOIL

$3\boxed{(3y+3)^2} + 2y^2 - 54y - 143 = 0$

$3(9y^2 + 18y + 9) + 2y^2 - 54y - 143 = 0$

$\rightarrow 27y^2 + \cancel{54y} + 27 + 2y^2 - \cancel{54y} - 143 = 0$

$\frac{29y^2}{29} - \frac{116}{29} = \frac{0}{29}$

$y^2 - 4 = 0$

$(y+2)(y-2) = 0$

$y = -2$	$y = 2$
Find x	Find x

- What is **revenue**?

Revenue is the amount of $ a company brings in.

The revenue of a product or service can depend on its price in two ways.

1. An increase in price means that more revenue per unit is earned but less units are sold.

2. A decrease in price means that less revenue is earned per unit but more units are sold.

In the next problems, a current price and sales amount will be given and how a price increase or decrease will affect the sales level.

A cinema multiplex averages 2000 tickets sold on a Saturday when ticket prices are \$8. A research firm has determined that for each \$0.25 increase in the ticket price, 50 fewer tickets will be sold.

What is the maximum revenue and what ticket price maximizes the revenue?

x= 1 increase = \$8.25, 1950 tickets

x= 2 increases = \$8.50, 1900 tickets

...

Let x = # of \$0.25 ticket increases

→ 8 + .25x = Ticket price (linear)

→ 2000 - 50x = Avg # of Tickets sold

To Get Revenue:

- Ticket Revenue: multiply $\boxed{\text{\# tickets sold}}$ & $\boxed{\text{cost per ticket}}$

$$R(x) = -12.5x^2 + 100x + 16{,}000$$