

What's Going On?

- Checking In** Your Thoughts...
- Minds on** 3 Forms
- Action!** Profit Functions and Systems
- Consolidation** Questions from the homework?

Learning Goal - I will be ready for tomorrow's test!

Checking In

Determining features from a graph

Determining features from an equation

Completing the Square

Solving by Factoring

Solving by the Quadratic Formula

Determining the Inverse of a Quadratic

Profit Functions

Radicals

Determining an Equation from Given Information

Linear-Quadratic Systems



 Minds on

3 Forms

Action!

Profit Functions

Given the demand and cost functions (in thousands) below determine

- The Profit function
- The break even points
- The number of units that need to be sold to achieve the max profit
- The max profit
- The inverse of the profit function
- The number of units sold to reach a profit of \$31,000

$$p(x) = -2x + 25$$

$$C(x) = 3x + 17$$

Selling price

$$p(x)[x] \quad \text{✗}$$

$$R(x) = (-2x + 25)(x)$$

$$R(x) = -2x^2 + 25x$$

$$P(x) = R(x) - C(x)$$

$$P(x) = -2x^2 + 25x - (3x + 17)$$

$$P(x) = -2x^2 + 22x - 17$$

b) Use quadratic formula to find "zeros"

c) Go halfway between the zeros
(addem up divide by 2)

d) Plug in the answer from c into $P(x)$.

$$P(x) = -2(x - 5.5)^2 + 43.5$$

$$P = -2(x - 5.5)^2 + 43.5$$

$$X = -2(P - 5.5)^2 + 43.5$$

$$\sqrt{\frac{X - 43.5}{-2}} = \sqrt{(P - 5.5)^2}$$

$$P - 5.5 = + \sqrt{-\frac{1}{2}(X - 43.5)}$$

$$- \sqrt{-\frac{1}{2}(X - 43.5)}$$

$$P = + \sqrt{-\frac{1}{2}(X - 43.5)} + 5.5$$

$$- \sqrt{-\frac{1}{2}(X - 43.5)} + 5.5$$

#sold \nearrow Profit \nearrow

$$X = + \sqrt{-\frac{1}{2}(P - 43.5)} + 5.5$$

$$- \sqrt{-\frac{1}{2}(P - 43.5)} + 5.5$$

f) Plug 31 in for P above

Action!

Systems

The height $h(t)$ of a baseball, in meters, at time t seconds after it is tossed out of a window is modelled by the function $h(t) = -5t^2 + 20t + 15$. A boy shoots at the baseball with a paintball gun. The trajectory of the paintball is given by the function $g(t) = 3t + 3$.

a. Will the paintball hit the baseball? If so, when? At what height will the baseball be?

b. Determine the domain and range. ball
paintball

$$h(t) = g(t)$$

$$-5t^2 + 20t + 15 = 3t + 3$$

$$\begin{array}{r} -3t -3 \\ -3t -3 \\ \hline -5t^2 + 17t + 12 = 0 \end{array}$$

$$t = \frac{-17 \pm \sqrt{17^2 - 4(-5)(12)}}{2(-5)}$$

$$= \frac{-17 \pm \sqrt{289 + 240}}{-10}$$

$$= \frac{-17 \pm 23}{-10}$$

$$= \frac{-17 + 23}{-10} \text{ and } \frac{-17 - 23}{-10}$$

$$= -0.6s \text{ and } \textcircled{4s}$$

$$h(4) = 3(4) + 3$$

$$= 15m$$

Action!

Get Radical

Given

$$f(x) = -2\sqrt{6}(x + 3\sqrt{3})(x - 5\sqrt{3})$$

What are the zeros? $-3\sqrt{3}$ and $5\sqrt{3}$

What are the coordinates of the vertex? $h = \frac{-3\sqrt{3} + 5\sqrt{3}}{2}$

What's the vertex form equation?

What is the y-intercept? $h = \frac{2\sqrt{3}}{2}$

What's the standard form equation?

$$k = -2\sqrt{6}(\sqrt{3} + 3\sqrt{3})(\sqrt{3} - 5\sqrt{3})$$

$h = \sqrt{3}$

$$k = -2\sqrt{6}(4\sqrt{3})(-4\sqrt{3})$$

$$k = -2\sqrt{6}(-16(3))$$

$$k = -2\sqrt{6}(-48)$$

$$k = 96\sqrt{6} \quad (x, y) = (\sqrt{3}, 96\sqrt{6})$$

$$y = -2\sqrt{6}(x - \sqrt{3})^2 + 96\sqrt{6}$$

$a \quad h \quad k$

Consolidation

Burning Questions

$$\frac{400-2x}{2} \quad 200-x$$

$$8000 = (x) \left(200 - \frac{400-2x}{2} \right) \quad 400$$

$$8000 = 200x - x^2$$

$$x^2 - 200x + 8000 = 0$$