

Class # 27 - Tues, Nov 2

- WebWork -

- finish "Parabola Lab" + "Shifting Parabolas"
(due tonight)

due Friday } - finish "Parabola Vertices - Cts" + "Parabola Vertices - Vertex Formula"
examples now

- "Distance Formula" + "Circles" } examples tonight

- start : "nonlinear systems"

"Parabola Vertices - Cts" : #2 "completing the square"

Given the parabola (quadratic function):

y = x^2 + 7x + (17/4)

Step 1 y - (17/4) = x^2 + 7x

(7/2)^2 = 7/2 * 7/2 = 49/4

Step 2 (Cts) : x^2 + 7x + 49/4

Step 3 : (Add the "Cts" # to both sides) x^2 + bx + (b/2)^2 = (x + b/2)^2

(b/2)^2 "in order to Cts, divide b by 2, and square"

y - 17/4 + 49/4 = x^2 + 7x + 49/4

Step 4 : y + 32/4 = (x + 7/2)^2 => y = (x + 7/2)^2 - 8

'Parabole Vert - Cts' : #3 (Extra credit)

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Given : $y = 3x^2 + 30x + 80$

Step 1 : $\frac{y-80}{3} = \frac{3x^2 + 30x}{3}$

Step 2 : (divide both sides by "a")

$$\frac{y-80}{3} = \frac{3x^2 + 30x}{3}$$

$$\frac{y-80}{3} = x^2 + 10x$$

Step 3 : Identify the "Cts" for LHS

$$x^2 + 10x + \frac{25}{3}$$

Step 4 : $\frac{y}{3} - \frac{80}{3} + 25 = x^2 + 10x + \frac{25}{3}$

$$\left. \begin{aligned} -\frac{80}{3} + \frac{75}{3} &= -\frac{5}{3} \\ &= \frac{5}{3} \end{aligned} \right\}$$

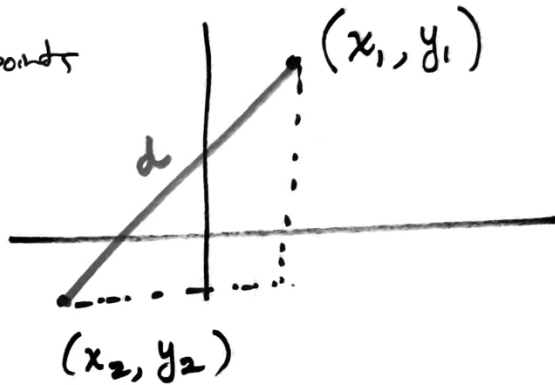
$$\frac{y}{3} - \frac{5}{3} = (x+5)^2 \Rightarrow \frac{y}{3} = (x+5)^2 + \frac{5}{3}$$

Distance formula

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distance d between 2 points
 (x_1, y_1) and (x_2, y_2) is :

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$



Ex : last time (WW "Distance Formula #1")

OpenStax ~~Ex~~ Examples 11.2 + 11.3

Equation of a circle (with center at $(\underline{h}, \underline{k})$ and radius \underline{r}) :

$$\boxed{(x - h)^2 + (y - k)^2 = r^2}$$

#5

#5