Class # 26 – Fri Oct. 29

Over the past week:

parabolas (graphs of quadratic polynomials)

$$y = ax^2 + bx + c$$

last time: rewrite

$$y = x^2 + bx + c$$

(case where $a = 1$)

in the form

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

"vertex form" of a given quadratic polynomial. (b/c the vertex is at (h, k))

via **completing the square!**

see examples from Thurs. (and in §9.7)

Schedule

- Quiz #3 – due today (Sp)
  (Blackboard)

- WebWork

  - ParabolaLab
  - ShiftingParabolas
  - ParabolaVertices-CtS

  due Monday night (Nov 1)

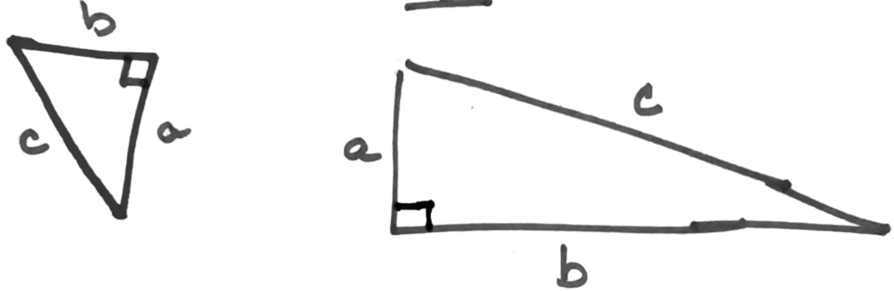
  - ParabolaVertices-VertexFmla.
  - DistanceFormula
  - CircleLab
  - Circles

  due Fri. (Nov 5)

  → today (+Tues?)

Distance formula (from the Pythagorean Thm.)

→ right triangle (where c = "hypotenuse")

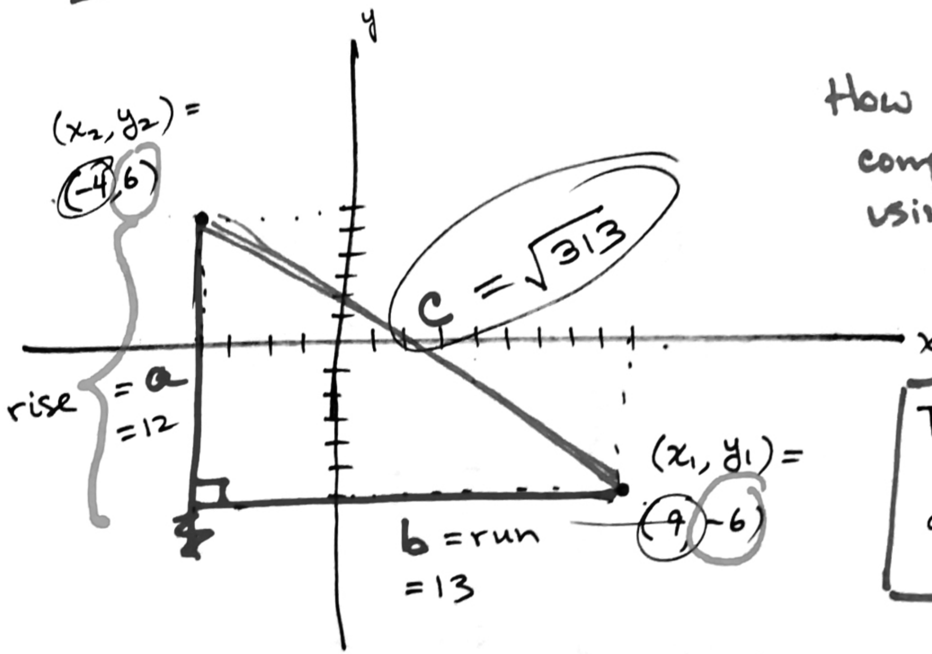


Pythagorean Thm: For any right triangle,

$$a^2 + b^2 = c^2$$

Distance Formula : (See § 11.1)

Ex : Find the distance between $(-4,6)$ and $(9,-6)$:



How can we compute the distance using the Pythagorean Theorem?

$$\boxed{\text{Distance Formula: } \quad d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}}$$

lengths

$$a = |y_2 - y_1| = |6 - (-6)| = |6 + 6| = |12| = 12$$

$$b = |x_2 - x_1| = |(-4) - 9| = |-13| = 13$$

$$\Rightarrow c^2 = a^2 + b^2 = 12^2 + 13^2 = 144 + 169 = 313$$

Equation of a circle

center of the circle: (h,k)

radius of the circle: $r > 0$

algebraically:

$$\boxed{\underbrace{\sqrt{(x-h)^2+(y-k)^2}}_{\text{distance from a point } (x,y) \text{ to the center } (h,k)} = \underbrace{r}_{\text{radius } r}}$$

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

(x,y) is on the circle if and only if (x,y) is distance r from the center (h,k)