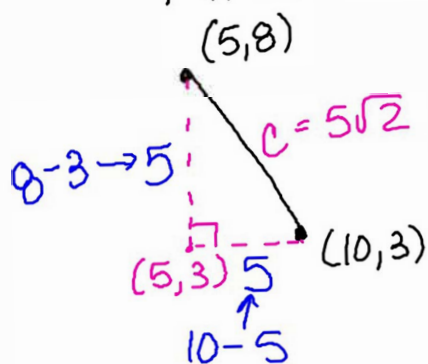


Notes for Chapter 9

9.1 Distance and Midpoint Formulas

Find the distance between the points given.



Pythagorean Theorem

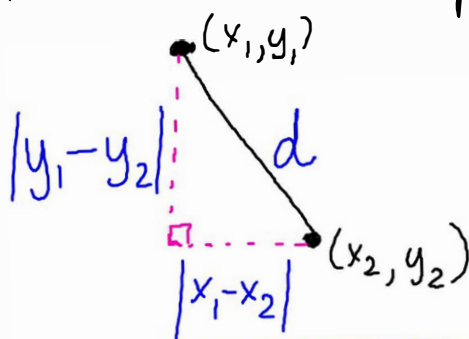
$$a^2 + b^2 = c^2$$

$$(5)^2 + (5)^2 = c^2$$

$$\sqrt{50} = \sqrt{c^2}$$

$$\sqrt{50} = 5\sqrt{2}$$

$$c = 5\sqrt{2}$$



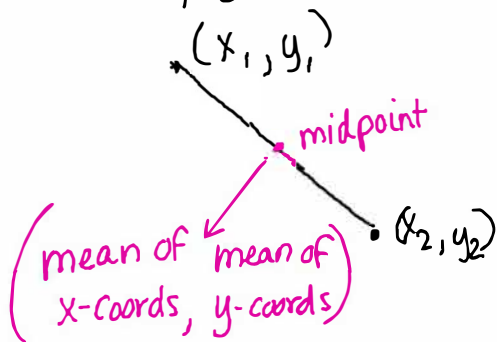
$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{d^2}$$

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

Distance Formula

Midpoint
Formula :

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$



Find the midpoint of
(3, -8) and (-4, 7).

$$\text{Midpoint : } \left(\frac{3 + (-4)}{2}, \frac{-8 + 7}{2} \right)$$

$$\left(-\frac{1}{2}, -\frac{1}{2} \right)$$

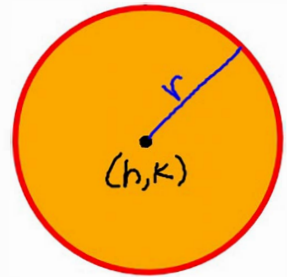
9.2 Circles

* See coolmath.com
"Circles, Conics"

$$(x-h)^2 + (y-k)^2 = r^2$$

Center: (h, k)

radius: r



Write an equation of a circle with $r = 7\sqrt{2}$
and center at $(5, -3)$.

$$(x-5)^2 + (y-(-3))^2 = (7\sqrt{2})^2$$

$$(x-5)^2 + (y+3)^2 = 49(2)$$

$$(x-5)^2 + (y+3)^2 = 98$$

Write the equation in (h,k) form. $(x-h)^2 + (y-k)^2 = r^2$

Find the center and radius.

$$x^2 + y^2 + 10x - 4y + 21 = 0$$

$$x^2 + 10x + y^2 - 4y = -21$$

$$x^2 + 10x + \underline{\quad} + y^2 - 4y + \underline{\quad} = -21 + \underline{\quad} + \underline{\quad}$$

$$\left(\frac{10}{2}\right)^2$$

$$x^2 + 10x + 25 + y^2 - 4y + 4 = -21 + 25 + 4$$

$$(x+5)^2 + (y-2)^2 = 8$$

Center: $(-5, 2)$

radius: $\sqrt{8} = 2\sqrt{2}$

① get x's together
get y's together
move constant to
other side

② Complete the square

Graphing Circles

① Plot the center point.

② If the radius is r ,
plot a point r units
to the left, up, right
and down from the center.

③ Connect the outer points
with a curve that forms
a circle.