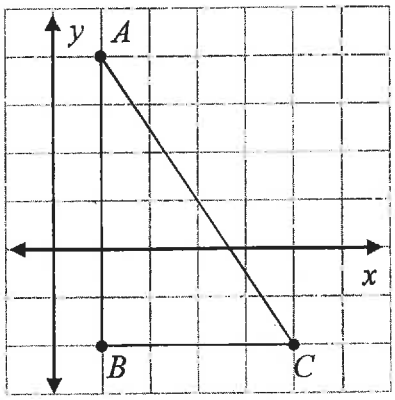
Name: Key Date: _____

Geometry Notes CG - 4: Distance Formula

(4, 1)

Ex: $A(1, 4)$, $B(1, -2)$ and $C(5, -2)$



(1, -2) (5, -2)

a. Horizontal segment: find the distance from B to C

1. $d = 4$
2. $(x - x)$

Change in x $(5 - 1) = 4$

b. Vertical segment: find the distance from A to B

1. $d = 6$
2. $(y - y)$

$(4 - (-2)) = 6$

c. Diagonal segment: find the distance from A to C

1. Do not count diagonally
2. $a^2 + b^2 = c^2$

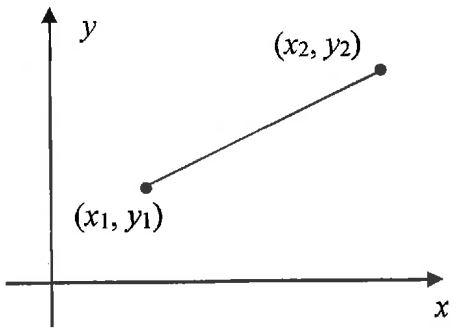
$4^2 + 6^2 = c^2$

$16 + 36 = c^2$

$52 = c^2$

$7.2 = c$

Distance Formula

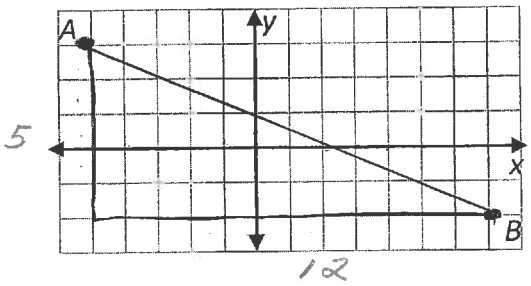


$$d^2 = (x - x)^2 + (y - y)^2$$

$$d = \sqrt{(x - x)^2 + (y - y)^2}$$

(-5, 3)

Ex: Find the length of $\overline{AB}$ in the graph at right.



(7, -2

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

$5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$\sqrt{169} = \sqrt{c^2}$

$13 = c$

Ex: Find the distance between (35, 112) and (–17, 48).

$d = \sqrt{(112-48)^2 + (35-(-17))^2}$

$= \sqrt{64^2 + 52^2}$

$= \sqrt{4096 + 2704}$

$= \sqrt{6800} = \boxed{82.46}$

Ex: Find the distance between the points $(a, a + b)$ and $(5a, b - 2a)$.

$d = \sqrt{(a+b-(b-2a))^2 + (a-5a)^2}$

$= \sqrt{(a+b-b+2a)^2 + (-4a)^2}$

$= \sqrt{(3a)^2 + (-4a)^2}$

$= \sqrt{9a^2 + 16a^2} = \sqrt{25a^2} = \boxed{5a}$

Ex: Find the length of $\overline{JK}$ with endpoints $J(42, 63)$ and $K(42, -37)$.

$d = \sqrt{(63-(-37))^2 + (42-42)^2}$

$= \sqrt{100^2}$

$= \boxed{100}$

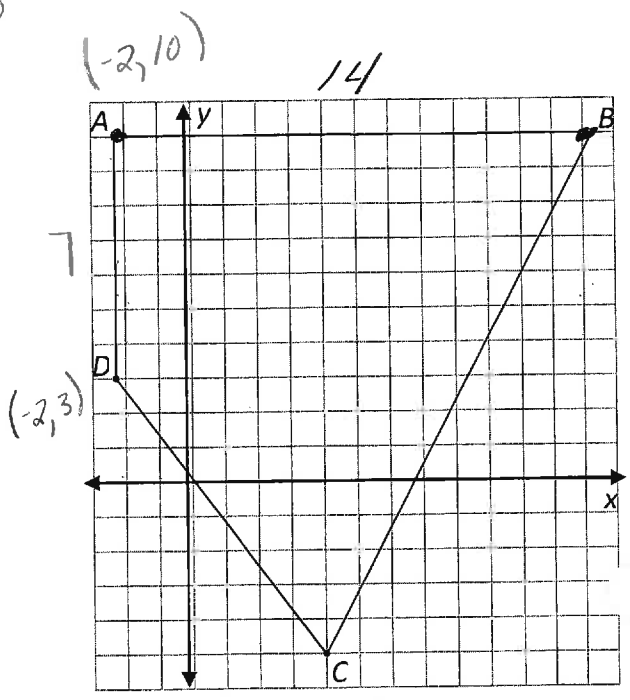
Ex: Find the length of $\overline{PQ}$ with endpoints $P(18, -29)$ and $Q(46, 67)$.

$d = \sqrt{(67-(-29))^2 + (46-18)^2}$

$= \sqrt{96^2 + 28^2}$

$= \sqrt{9216 + 784} = \sqrt{10000} = 100$

Ex: Find the perimeter of quadrilateral $ABCD$ shown in the graph at right.



$\overline{DC} = \sqrt{(3-(-5))^2 + (-2-4)^2}$

$= \sqrt{8^2 + (-6)^2}$

$= \sqrt{64+36}$

$= \sqrt{100}$

$= 10$

$\overline{BC} = \sqrt{(10-(-5))^2 + (12-4)^2}$

$= \sqrt{15^2 + 8^2}$

$= \sqrt{225 + 64}$

$= \sqrt{289} = 17$

$P = 10 + 17 + 7 + 14 = \boxed{48}$