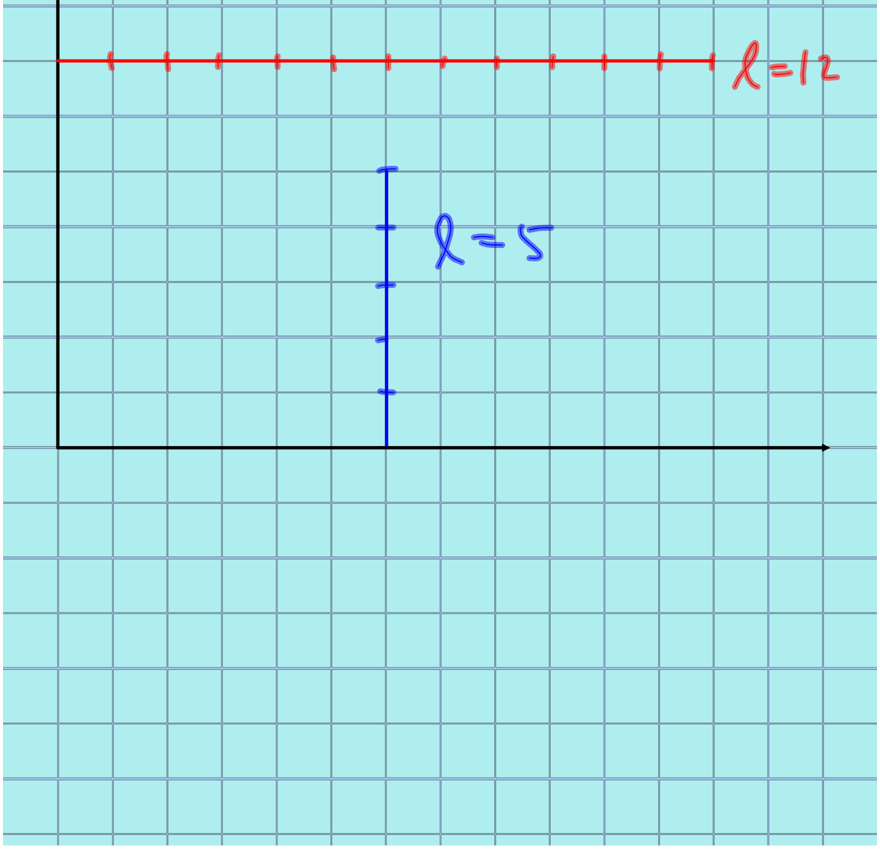
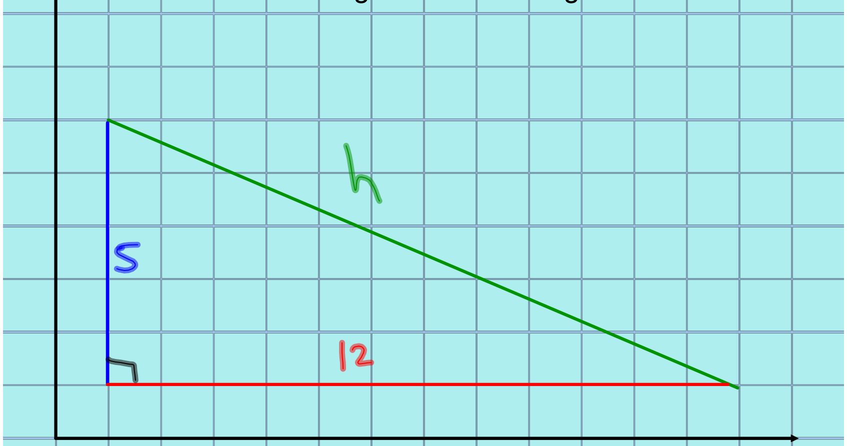
determine the length of
each line segment



determine the length of the line segment



$h^2 = 5^2 + 12^2$

$h^2 = 25 + 144$

$h^2 = 169$

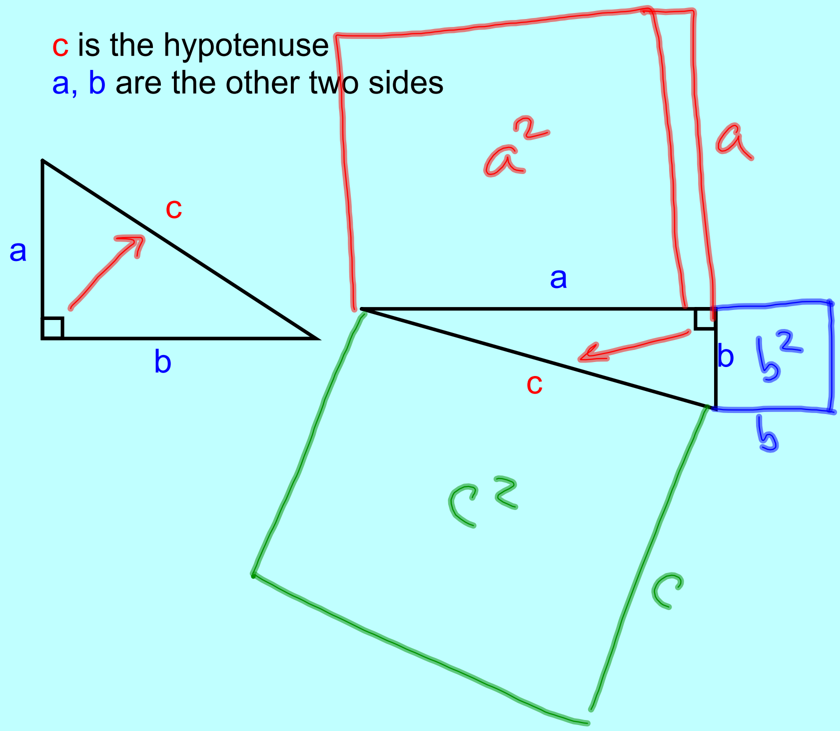
$h = \sqrt{169}$

$h = 13$

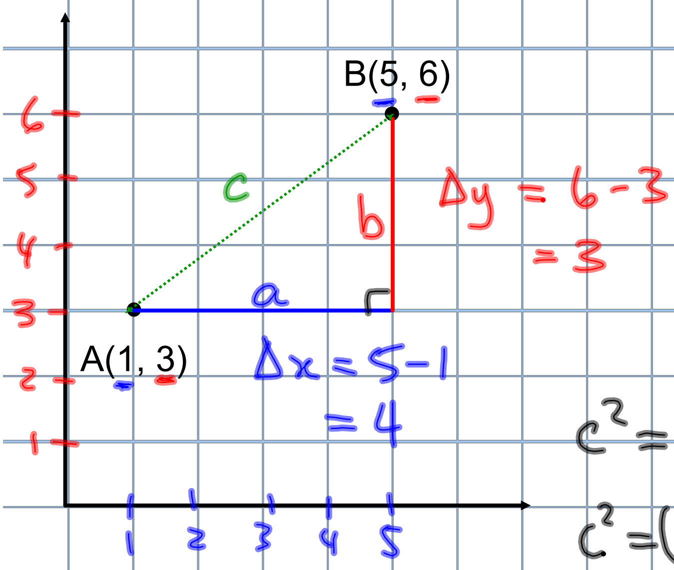
Recall: The Pythagorean theorem (see p.68 to review)

In a <u>right-triangle</u>, $a^2 + b^2 = c^2$, where

c is the hypotenuse
a, b are the other two sides



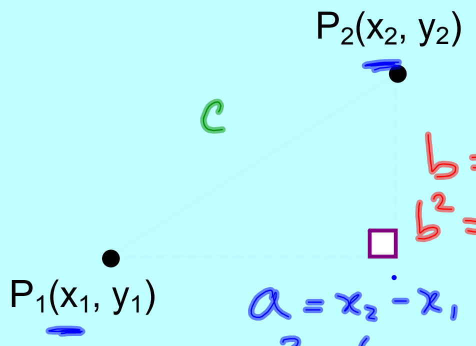
Ex.1 Determine the length of AB (d_{AB} or $\overline{AB}$)



$$c^2 = a^2 + b^2$$
$$c^2 = (4)^2 + (3)^2$$
$$c^2 = 16 + 9$$
$$c^2 = 25$$
$$\boxed{c = 5}$$

To derive a formula, consider two general points,

Point #1 is $P_1(x_1, y_1)$ Point #2 is $P_2(x_2, y_2)$



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

$b = y_2 - y_1$

$b^2 = (y_2 - y_1)^2$

$a = x_2 - x_1$

$a^2 = (x_2 - x_1)^2$

$c^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

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

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

Ex.2 What is the distance between the points G(-3,1) and H(4,5)? *Give an exact and approximate answer rounded to the nearest tenth.*

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

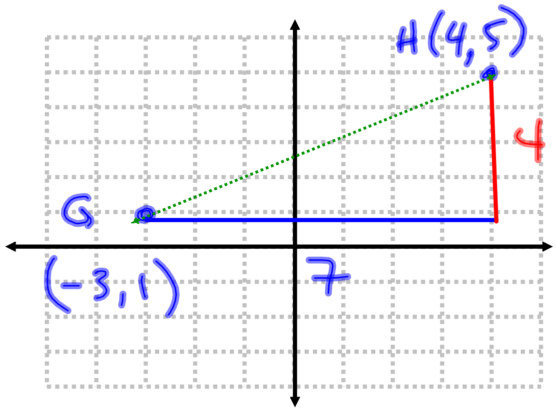
$= \sqrt{(4-(-3))^2 + (5-1)^2}$

$= \sqrt{(7)^2 + (4)^2}$

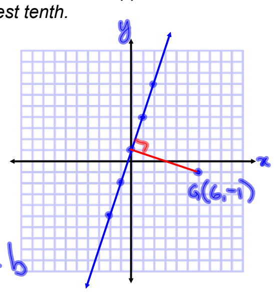
$= \sqrt{49 + 16}$

$= \sqrt{65}$ exact answer

$\doteq 8.1$ approximate answer



Ex.3 Calculate the distance between the point G(5, ~~2~~) (6,-1) and the line y = 3x + 1. *Give an exact and approximate answer rounded to the nearest tenth.*



① find $m_\perp$

$m_\perp = -\frac{1}{3}$

② $y = m_\perp x + b$

$y = -\frac{1}{3}x + b$

③ sub (6,-1) to find b

$-1 = -\frac{1}{3}(6) + b$

$-1 = -2 + b$

$+2 \quad +2$

$1 = b \quad \rightarrow y = -\frac{1}{3}x + 1$ ②

④ find point of intersection

$y = 3x+1$ ① $\quad y = -\frac{1}{3}x + 1$ ②

sub ① into ②

$3x + 1 = -\frac{1}{3}x + 1$

$3x + \frac{1}{3}x = 0$

$\frac{9}{3}x + \frac{1}{3}x = 0$

$\frac{10}{3}x = 0$

$\boxed{x = 0}$ → sub into ①

$y = 3(0) + 1$

$\boxed{y = 1}$

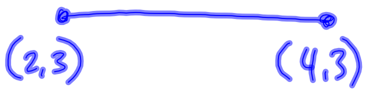
$\therefore (0,1)$

⑤ calculate distance between (0,1) and (6,-1)

Assigned Work:

p.86-87 # 1ac, 4cd, 6, 7(draw), 12ab, 15

6.

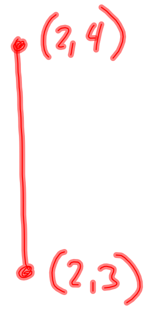


height does not change

y-value constant

$\Delta y = 0$

(f) $(-10,-2)$ to $(6,-2)$



only height changes

x-value constant

$\Delta x = 0$

(c) $(-6,8)$ to $(-6,-9)$

(b) to find distance of horizontal or vertical line, use Δx or Δy, but make answer positive

12 (a) $y = 4x - 2$ $\quad(-3,3)$