2.1 Notes/Examples

When graphing you must:

- use graph paper
- label x & y axis
- label pts (x,y)
- label graph w/function
- label x & y intercepts as exacts!

Midpoint Formula:

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

Distance Formula:

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

Example: Find all points having an x-coordinate of 2 whose distance from the point (-2, -1) is 5.

(2,y) since d = 5

$5 = \sqrt{(2+2)^2+(y+1)^2}$

$(5)^2 = \left(\sqrt{16+(y+1)^2}\right)^2$

$25 = 16+(y+1)^2$

$-16 \quad -16$

$\pm\sqrt{9} = \sqrt{(y+1)^2}$

$\pm 3 = y+1$

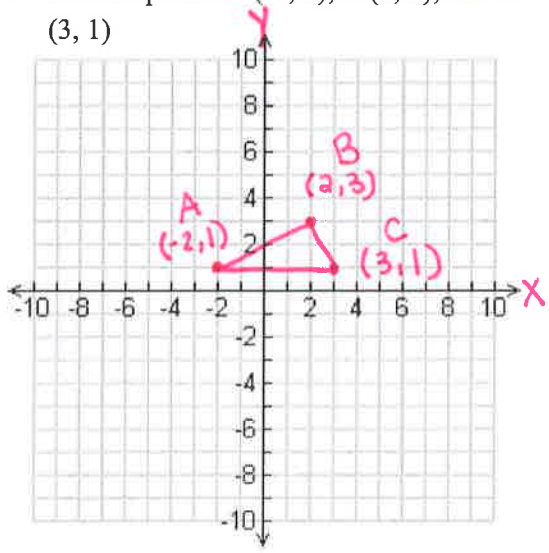
$y = -1 \pm 3$

$y = 2, -4$

so (2,2) & (2,-4)

Triangle Problem

∇ Plot the points A (-2, 1), B (2, 3), and C (3, 1)



∇ Find the length of each side of the triangle

$d(A,B) = \sqrt{(-2-2)^2+(1-3)^2} = \sqrt{(-4)^2+(2)^2}$

$= \sqrt{16+4} = \sqrt{20} = \sqrt{4}\cdot\sqrt{5} = \boxed{2\sqrt{5}}$

$d(B,C) = \sqrt{(2-3)^2+(3-1)^2} = \sqrt{1+4} = \boxed{\sqrt{5}}$

$d(A,C) = \sqrt{(-2-3)^2+(1-1)^2} = \sqrt{25+0} = \sqrt{25} = \boxed{5}$

$\boxed{d(A,B) = 2\sqrt{5} \quad d(B,C) = \sqrt{5} \quad d(A,C) = 5}$

∇ How would you decide if this triangle is a right triangle?

The pythagorean theorem

- Is this triangle a right triangle?

C = 5 since the hypotenuse is always the ~~long~~ longest side

$(2\sqrt{5})^2 + (\sqrt{5})^2 \stackrel{?}{=} 5^2$

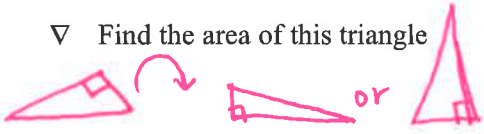
$4\cdot 5 + 5 \stackrel{?}{=} 25$

$20+5 \stackrel{?}{=} 25$

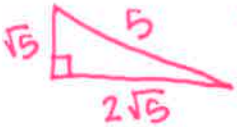
$25 \stackrel{?}{=} 25$

True so yes this is a right triangle

∇ Find the area of this triangle



you need to make sure that the 90° angle is on the bottom for height ~~that~~ (never use the hyp. as a base or height)



$A = \frac{1}{2}b\cdot h$

$A = \frac{1}{2}2\sqrt{5}\cdot\sqrt{5}$

$= (\sqrt{5})^2 = \boxed{5 \text{ units}^2}$