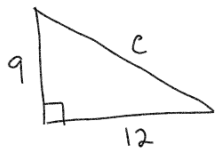
Pre-Algebra
Square Roots and Right Triangles
Example 2

Use the Pythagorean Theorem to find the missing side of the following right triangles:

1.



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

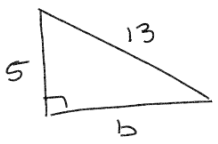
$9^2+12^2=c^2$

$81+144=c^2$

$\sqrt{225}=\sqrt{c^2}$

$15=c$

2.



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

$5^2+b^2=13^2$

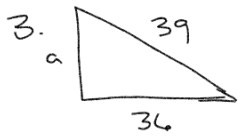
$25+b^2=169$

$-25 \quad -25$

$\sqrt{b^2}=\sqrt{144}$

$b=12$

3.



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

$a^2+36^2=39^2$

$-36^2 \quad -36^2$

$\sqrt{a^2}=\sqrt{39^2-36^2}$

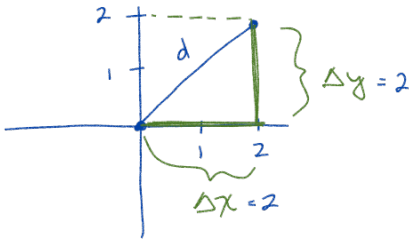
$a=\sqrt{39^2-36^2}$

$=\sqrt{225}$

$a=15$

Use what you know about the Pythagorean Theorem to find the distances between two points given:

1. $(0,0)$ & $(2,2)$



$d^2=\Delta x^2+\Delta y^2$

$d^2=2^2+2^2$

$d=\sqrt{2^2+2^2}$

$=\sqrt{4+4}$

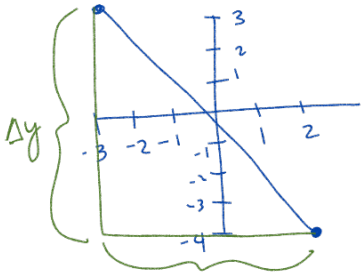
$=\sqrt{8}$

$8 = 2 \cdot 4$

$4 = 2 \cdot 2$

$d=2\sqrt{2}$

2. $(2,-4)$ & $(-3,3)$



$\Delta y = 4+3 = 7$

$\Delta x = 2+3 = 5$

$d^2=\Delta x^2+\Delta y^2$

$d^2=5^2+7^2$

$d^2=25+49$

$d^2=74$

$d=\sqrt{74}$

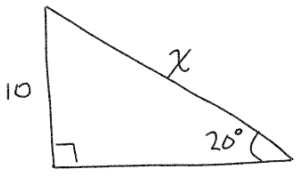
$74 = 2 \cdot 37$

$\therefore$

$d=\sqrt{74}$

Use a trig function to find the missing side of the right triangle:

1.



KNOW: OPP
NEED: HYP

∴ USE SIN

$\sin\theta = \frac{OPP}{HYP}$

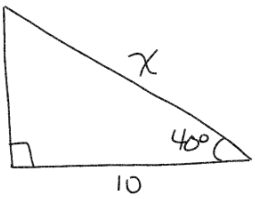
$x \cdot \sin 20° = \frac{10}{x} \cdot x$

$\frac{x\sin 20°}{\sin 20°} = \frac{10}{\sin 20°}$

$x = \frac{10}{\sin 20°}$

$x = 29.2$

2.



KNOW: ADJ.
NEED: HYP.

∴ USE COS

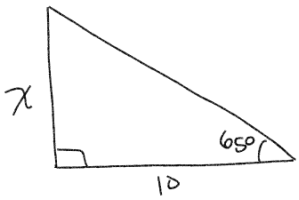
$\cos\theta = \frac{ADJ}{HYP}$

$\cos 40° = \frac{10}{x}$

$\therefore x = \frac{10}{\cos 40°}$

$x = 13.1$

3.



KNOW: OPP
NEED: ADJ.

∴ USE TAN

$\tan\theta = \frac{OPP}{ADJ}$

$10 \cdot \tan 65° = \frac{x}{10} \cdot 10$

$10\tan 65° = x$

$x = 21.4$