

# Math 8: Pythagorean Relationship - Key

## • Squares and Square Roots

a)

$$\begin{array}{c}
 125 \\
 / \quad \backslash \\
 25 \quad 5 \\
 / \quad \backslash \quad | \\
 5 \quad 5 \quad 5
 \end{array}$$

$25 = 5 \times 5 \times 5$   
Perfect Square

b)  $20^2$   
 $= 400$

c)  $A = s^2$   
 $\sqrt{64} = \sqrt{s^2}$   
 $8 \text{ cm} = s$

## • Exploring the Pythagorean Relationship



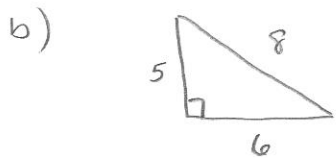
$A_1 = s^2$   
 $= 30^2$   
 $= 900 \text{ mm}^2$

$A_2 = (65)^2$   
 $= 4225 \text{ mm}^2$

$A_3 = (71.59)^2$   
 $= 5125.1281 \text{ mm}^2$

$A_1 + A_2 = A_3$

$900 \text{ mm}^2 + 4225 \text{ mm}^2 = 5125 \text{ mm}^2$



$a^2 + b^2 = c^2$   
 $5^2 + 6^2 = 8^2$   
 $25 + 36 = 64$   
 $61 \neq 64$

The triangle is not a right triangle.

## • Using the Pythagorean Relationship.

a)  $a^2 + b^2 = c^2$   
 $12^2 + 8^2 = c^2$   
 $144 + 64 = c^2$   
 $\sqrt{208} = \sqrt{c^2}$   
 $14.4 \text{ cm} = c$

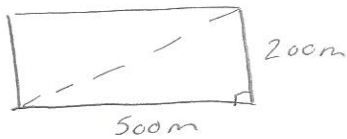
b)  $a^2 + b^2 = c^2$   
 $7^2 + b^2 = 25^2$   
 $49 + b^2 = 625$   
 $\sqrt{b^2} = \sqrt{576}$   
 $b = 24 \text{ cm}$

c)

$a^2 + b^2 = c^2$   
 $10^2 + 10^2 = c^2$   
 $\sqrt{200} = \sqrt{c^2}$   
 $14.14 \text{ units} = c$

# • Applying Pythagorean's Theorem

a)



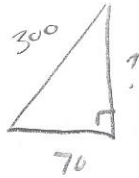
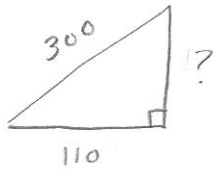
$$\begin{aligned} \text{James} &= 200 + 500 \\ &= \underline{700\text{m}} \end{aligned}$$

Soll

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 200^2 + 500^2 &= c^2 \\ 40000 + 250000 &= c^2 \\ 290000 &= c^2 \\ \underline{538.52\text{cm} = c} \end{aligned}$$

James walked further by 161.48cm.

b)



$$\begin{aligned} a^2 + b^2 &= c^2 \\ a^2 + 110^2 &= 300^2 \\ \sqrt{a^2} &= \sqrt{77900} \end{aligned}$$

$$\begin{aligned} a^2 + 70^2 &= 300^2 \\ \sqrt{a^2} &= \sqrt{85100} \\ a &= 291.72\text{cm} \end{aligned}$$

$$a = 279.11\text{cm}$$

$$\text{min} = 279.11\text{cm}$$

$$\text{max} = 291.72\text{cm}$$