Warm - Up

① $-\cancel{\sqrt{6^2}} + \cancel{\sqrt{12^2}} = -6 + 12$

$= \boxed{6}$

② $\sqrt{-6^2 + 10^2} = \sqrt{-36 + 100}$

$(-6)^2 = -6 \times -6 = 36$

$-6^2 = -6 \times 6$

$= \sqrt{64}$

$= \boxed{8}$

③ $(\sqrt{9} + \sqrt{4})^2 = (3 + 2)^2$

$\Rightarrow (\sqrt{9})^2 + (\sqrt{4})^2$

$9 + 4$

$= 13$

$= (5)^2$

$= \boxed{25}$

7b)

$C = 600\sqrt{A}$

i) $\frac{12\cancel{00}}{6\cancel{00}} = \frac{\cancel{600}\sqrt{A}}{\cancel{600}}$

$(2)^2 = (\sqrt{A})^2$

$2^2 = \boxed{A = 4}$

ii) $\frac{24\cancel{00}}{6\cancel{00}} = \frac{\cancel{600}\sqrt{A}}{\cancel{600}} \Rightarrow (4)^2 = (\sqrt{A})^2$

$\boxed{16 = A}$

Math 9 Section 1.3 – Pythagorean Theorem

Homework: Section 1.3; 1-3 all, 6-7 even, 8-11 – Answers on Pg. 362

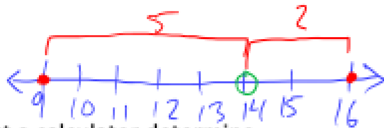
(Don't use a calculator for questions in #2 and #3)

From last classes, we know we can calculate square roots with our calculator, but how do we estimate square roots if the number isn't a perfect square?

Example: Estimate $\sqrt{14}$ **without** a calculator!

$\sqrt{9} < \sqrt{14} < \sqrt{16}$

$3 < \sqrt{14} < 4$



Estimate: closer to 4

Guess: 3.7, 3.8

check: $(3.7)^2 = 13.69$

$(3.8)^2 = 14.44$

Between 3.7 and 3.8

For each example below, without a calculator determine…

1) between which two integers is the value of the square root?
2) which one is it closer to?

100, 121, 144, 169

11^2, 12^2, 13^2

$\sqrt{39}$

$6 < \sqrt{39} < \sqrt{49}$

$6 < \sqrt{39} < 7$

39 is closer to 36 so $\sqrt{39}$ is closer to 6

$\sqrt{162}$

$\sqrt{144} < \sqrt{162} < \sqrt{169}$

$12 < \sqrt{162} < 13$

Closer to 13

since 162 is closer to 169

$-\sqrt{105}$

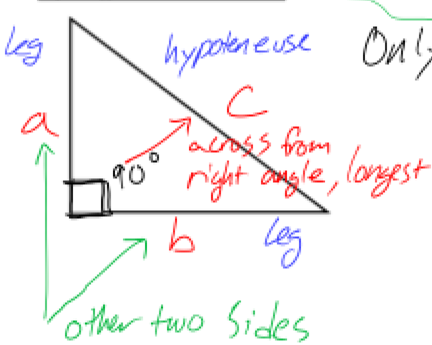
$-\sqrt{100} > -\sqrt{105} > -\sqrt{121}$

$-10 > -\sqrt{105} > -11$

Closer to −10

because 105 is closer to 100

Pythagorean Theorem:



Only works for 90° right triangles

① $a^2 + b^2 = c^2$ (solve for c)

② $a^2 = c^2 - b^2$ (solve for a)

③ $b^2 = c^2 - a^2$ (solve for b)

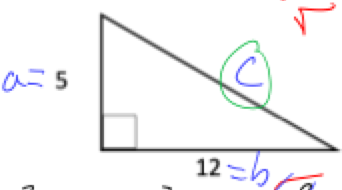
How to solve for missing side of a right triangle

Be Careful

1) Label each side of the triangle with the letters a, b, c
2) Figure out which equation to use
3) Put in numbers and simplify the right-hand side
4) Don't forget to square root at the end!

Solve for the missing side exactly, then to one decimal place (if needed):

$\sqrt{}$



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

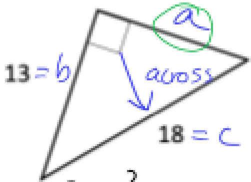
$c^2 = 5^2 + 12^2$

$c^2 = 25 + 144$

$c^2 = 169$

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

$\boxed{c = 13}$



$a^2 = c^2 - b^2$

$\sqrt{a^2} = \sqrt{18^2 - 13^2}$

$a = \sqrt{324 - 169}$

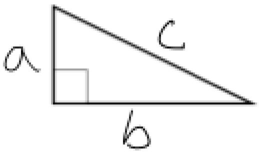
$\boxed{a = \sqrt{155}}$ exact

$\boxed{a = 12.4}$ 1 decimal place

Proof for Pythagorean Theorem: Try to find 2 ways to cover the white square

#1)

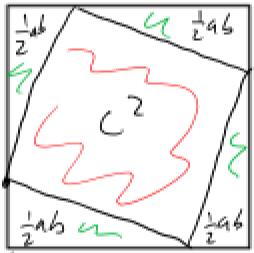
#3) Label the sides of the green triangle



Area $= \frac{1}{2}$ base × height

$= \frac{1}{2}ab$

#2)



$-4(\tfrac{1}{2}ab)$ $\qquad$ $-4(\tfrac{1}{2}ab)$

$$a^2 + b^2 + \cancel{4\left(\tfrac{1}{2}ab\right)} = c^2 + \cancel{4\left(\tfrac{1}{2}ab\right)}$$

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