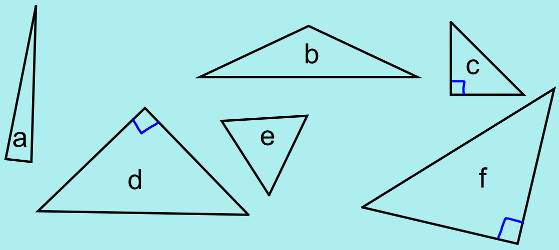
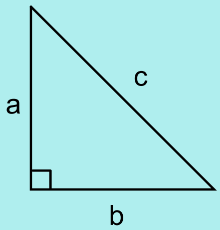
Section 10-1

The Pythagorean Theorem

Goal: to use the Pythagorean Theorem to identify and complete right triangles.



How could we separate these into groups with common characteristics?

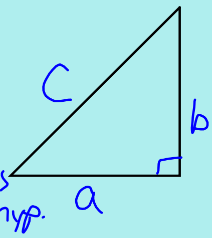


What can we say about this?

Pythagorean Theorem:

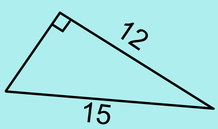
In words:

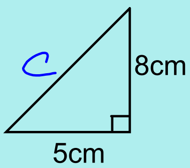
the sum of the square of two sides is the sq. of the hyp.



In symbols: $a^2 + b^2 = c^2$

Find the missing side:





$\cancel{12^2} + b^2 = 15^2 - 12^2$

$\sqrt{b^2} = \sqrt{81}$

$b = 9$

$8^2 + 5^2 = c^2$

$64 + 25 = c^2$

$\sqrt{89} = \sqrt{c^2}$

$9.4\text{ cm} \approx c$

The theorem says that if a triangle is a right triangle, then $a^2 + b^2 = c^2$.

The converse of this is true also. If $a^2 + b^2 = c^2$, then we can say that it is a right triangle.

Could the following represent a right triangle?

a) 6 in, 25 in, 24 in

$6^2 + 24^2 \overset{?}{=} 25^2$

$612 \neq 625$

No

b) 10 cm, 8 cm, 4 cm

No $8^2+4^2=10^2$

$64+16 \neq 100$

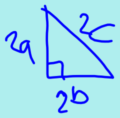
c) 2 ~~ft~~ 24, 26 in, 10 in

$24^2+10^2=26^2$

$676=676$

Yes

If a, b, and c satisfy the Pythagorean Theorem, are 2a, 2b and 2c also possible side lengths of a right triangle?



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

$4(4a^2+4b^2)=4c^2$

$\frac{\cancel{4}(a^2+b^2)}{\cancel{4}}=\frac{\cancel{4}c^2}{\cancel{4}}$

Yes

Hwk:

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