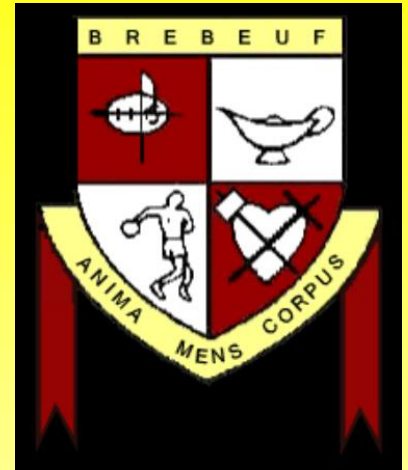


ST. JEAN DE BREBEUF MATHEMATICS



CHAPTER 2.1

THE PYTHAGOREAN

THEOREM



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CHAPTER 2.1 THE PYTHAGOREAN THEOREM

GETTING TO KNOW YOUR CALCULATOR

Square button

→ Raises a number to the exponent 2


EXAMPLE: Evaluate 3^2

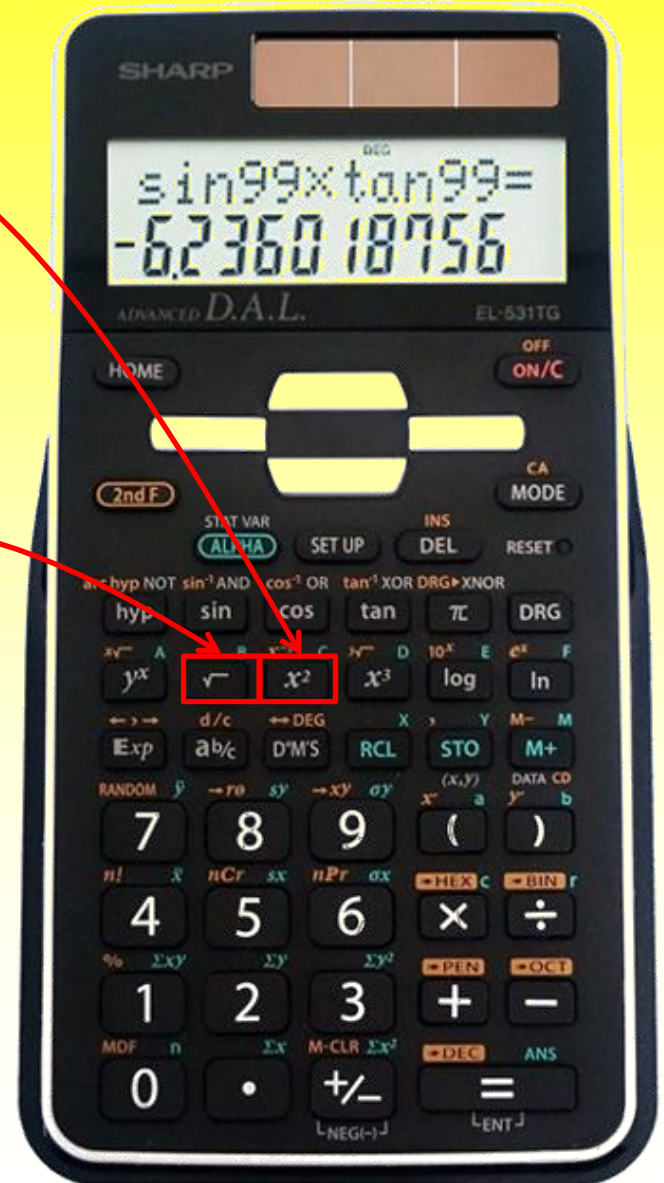
Press “3” → “x²” → “=”

Square root button

→ Takes the square root of a number

EXAMPLE: Evaluate $\sqrt{36}$

Press “” → “36” → “=”



CHAPTER 2.1 THE PYTHAGOREAN THEOREM

KEY CONCEPTS

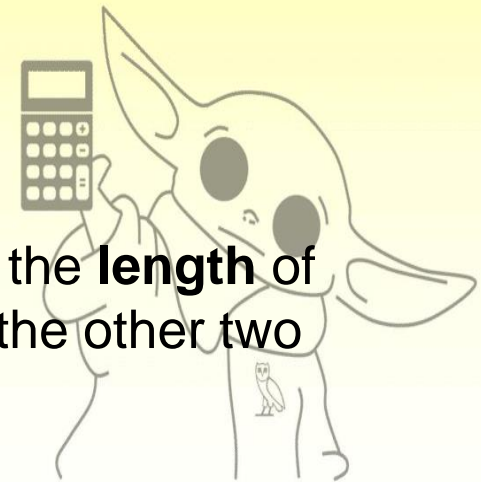
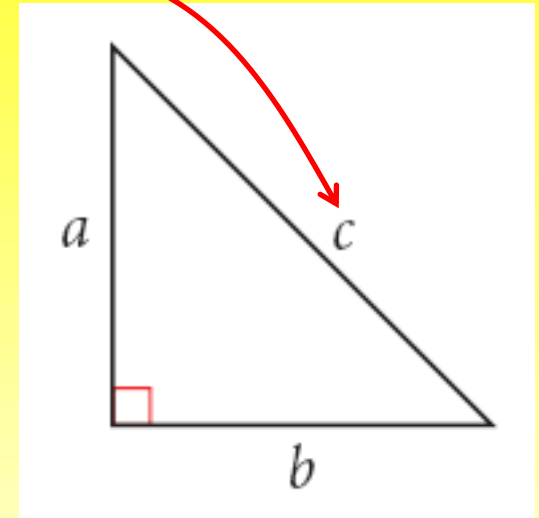
In a right triangle, the **hypotenuse**
→ is the longest side
→ the side opposite the *right* angle

The square of the hypotenuse is equal to the sum of the squares of the legs.

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

where “**c**” always represents the *hypotenuse*

You can use the **Pythagorean Theorem** to find the **length** of one side of a *right* triangle, given the lengths of the other two sides.

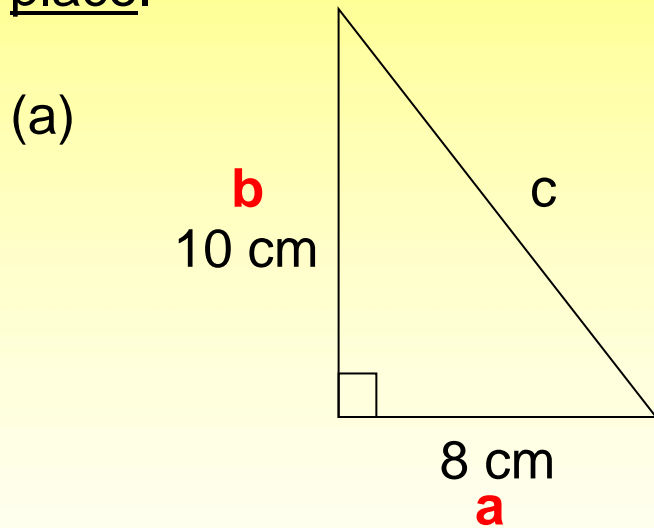


CHAPTER 2.1 THE PYTHAGOREAN THEOREM

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

EXAMPLE 1 Finding the Length of a Side

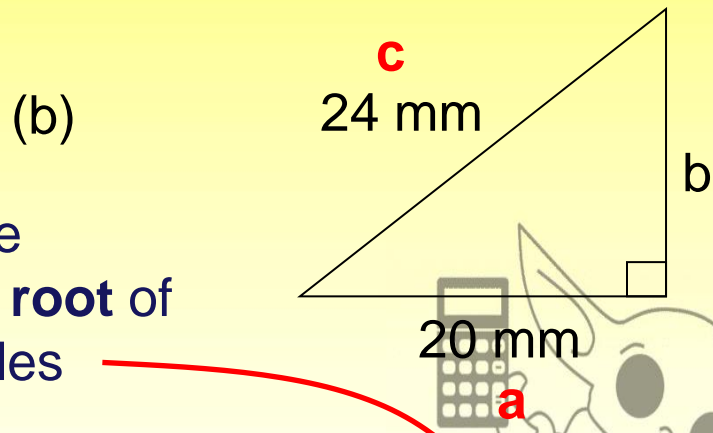
Find the length of each unknown side. Round your answer to one decimal place.



$$\begin{aligned}c^2 &= a^2 + b^2 \\c^2 &= (8)^2 + (10)^2 \\c^2 &= 64 + 100\end{aligned}$$

$$\begin{aligned}c^2 &= 164 \\ \sqrt{c^2} &= \sqrt{164} \\ \mathbf{c = 12.8\text{ cm}}\end{aligned}$$

Take the **square root** of both sides



$$\begin{aligned}c^2 &= a^2 + b^2 \\(24)^2 &= (20)^2 + b^2 \\576 &= 400 + b^2 \\576 - 400 &= b^2\end{aligned}$$

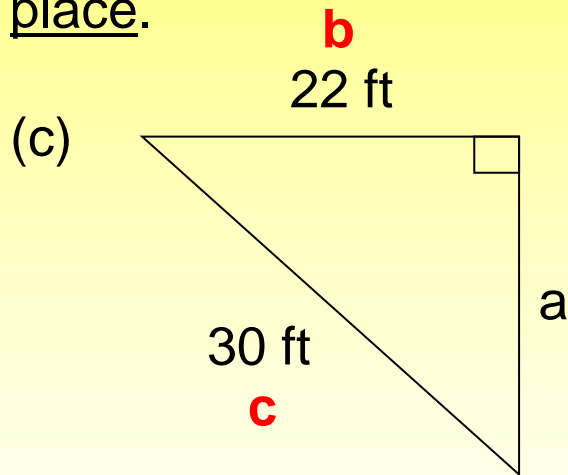
$$\begin{aligned}176 &= b^2 \\ \sqrt{176} &= \sqrt{b^2} \\ \mathbf{13.3\text{ mm} = b}\end{aligned}$$

CHAPTER 2.1 THE PYTHAGOREAN THEOREM

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

EXAMPLE 1 Finding the Length of a Side

Find the length of each unknown side. Round your answer to one decimal place.



Take the **square root** of both sides

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

$$(30)^2 = a^2 + (22)^2$$

$$900 = a^2 + 484$$

$$900 - 484 = a^2$$

$$416 = a^2$$

$$\sqrt{416} = \sqrt{a^2}$$

$$20.4 \text{ ft} = a$$



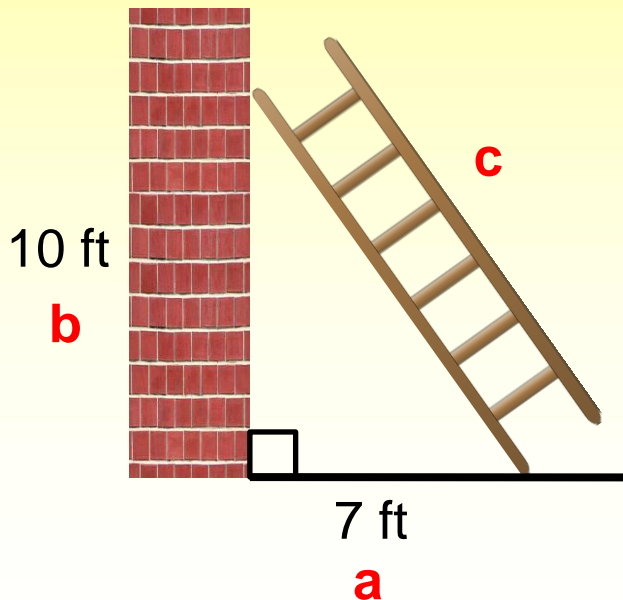
CHAPTER 2.1 THE PYTHAGOREAN THEOREM

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

EXAMPLE 2

A ladder is placed on a wall which is **10 feet** high. The foot of the ladder is placed **7 feet** from the base of the wall.

How long is the ladder? Round your answer to the nearest whole number.



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

$$c^2 = (7)^2 + (10)^2$$

$$c^2 = 49 + 100$$

$$c^2 = 149$$

$$\sqrt{c^2} = \sqrt{149}$$

$$c = 12$$



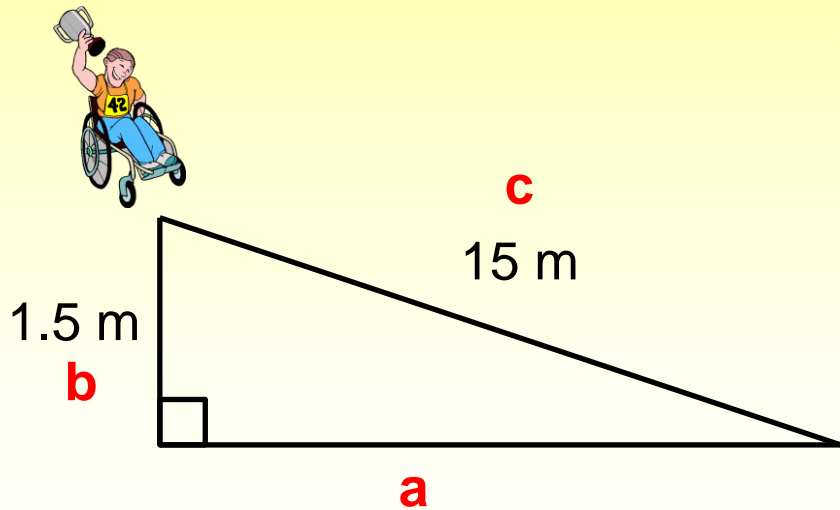
The ladder is **12 feet** long.

CHAPTER 2.1 THE PYTHAGOREAN THEOREM

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

EXAMPLE 3

The new sports complex has to build a wheelchair ramp outside the front doors. The current stairs go through a **vertical rise of 1.5 metres**. If the ramp is to be **15 metres** long, how far from the sports complex will the ramp start? Round your answer to one decimal place.



$$c^2 = a^2 + b^2$$
$$(15)^2 = a^2 + (1.5)^2$$

$$225 = a^2 + 2.25$$

$$225 - 2.25 = a^2$$

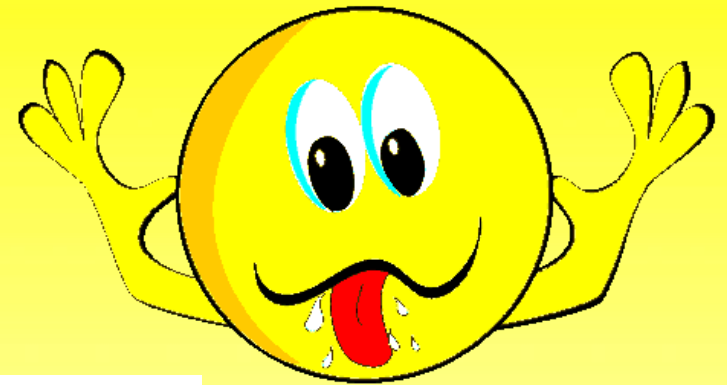
$$222.75 = a^2$$

$$\sqrt{222.75} = \sqrt{a^2}$$

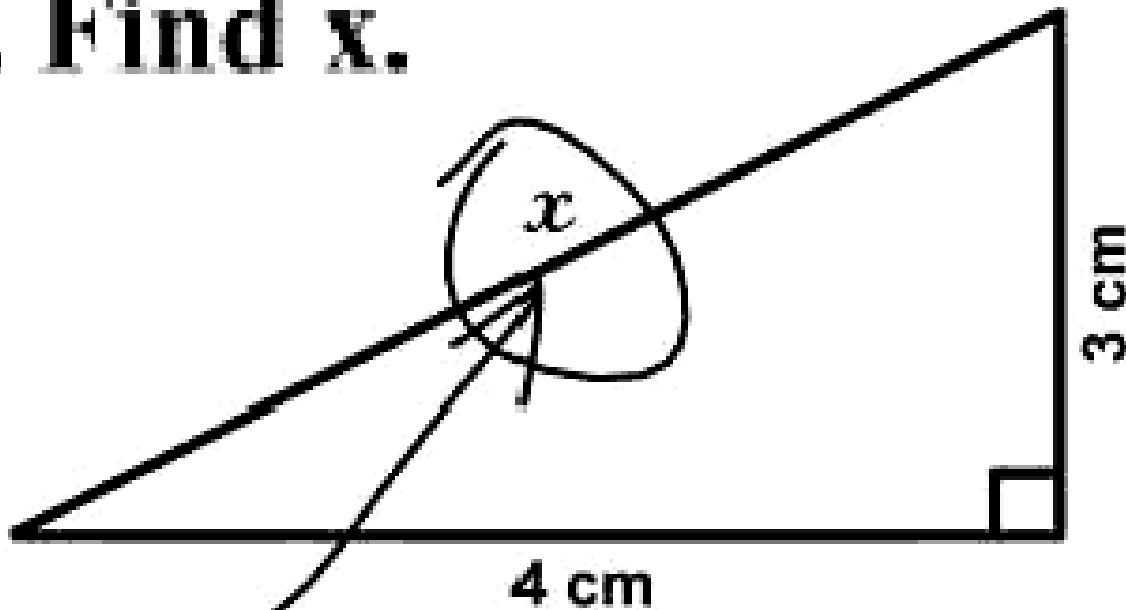
$$14.9 = a$$

The ramp will start **14.9 metres** from the sports complex.

DO NOT DO THIS!!!



3. Find x .



Here it is



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CHAPTER 2.1 THE PYTHAGOREAN THEOREM

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

Homework:

Page 50 – 53

#2ac, 3ac, 4ab, 5, 6a,
7ab, 10

