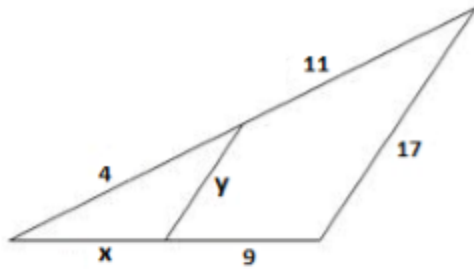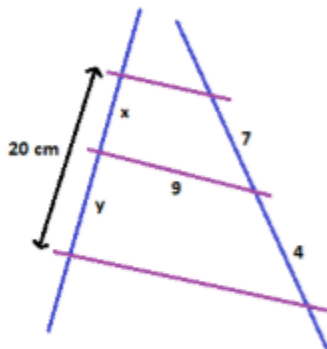# UNIT 7: GEOMETRY. TRIANGLE THEOREMS

**Exercise 1:** Work out the values of x and y:

Exercise 2: Find the values of the indeterminates:

Exercise 3: The Greek mathematician Thales applied the intercept theorem to determine the height of the Cheops' pyramid using a pole. At the same time of the day he measured the length of the pyramid's shadow from its center and the length of the pole's shadow. Knowing that the height of the pole was 1.63m, its shadow measures 2 m and the shadow of the pyramid from its vertex has a length of 180 m, could you tell me the height of the pyramid?
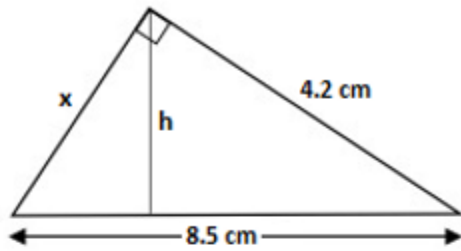
1.63 m
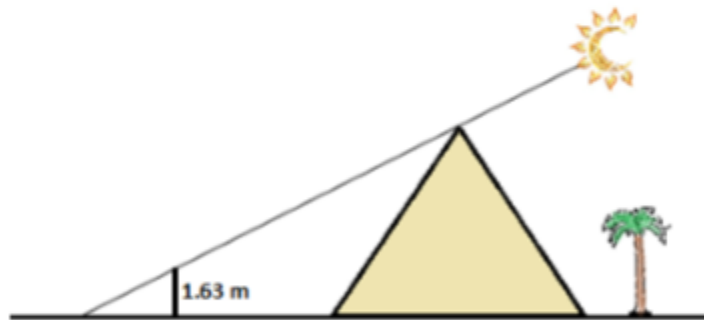
Exercise 4: We already know that the Empire State Building is 381 m high. Find the length of its shadow if, at a certain moment of the day, I am standing 175 m away from it and the tips of our shadows coincide. BTW, my height is 1.55 m.
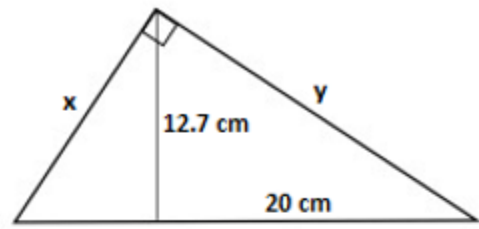
381 m

1.55 m

175 m
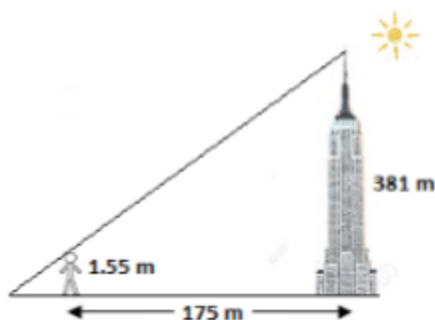
Exercise 5: Find the values of the indeterminates using the right angle altitude theorems:
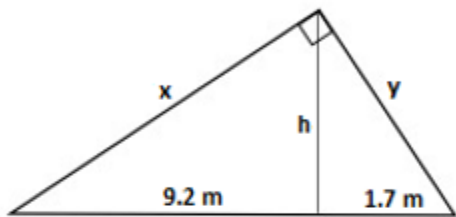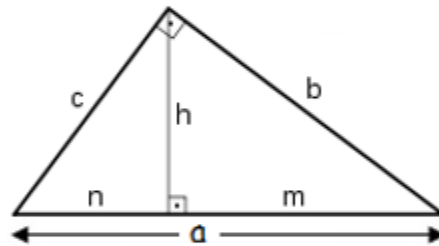
a)

b)

Exercise 6: Find the values of the indeterminates using the right angle altitude theorems:


Exercise 7: Knowing that you are not allowed to use Pythagoras' theorem, find the value of all the indeterminates in the following triangle knowing that $a = 20$ cm and $c = 12$ cm. Indicate what theorem you are using in each step.


Exercise 8: Work out the axial diagonal D of a cuboid with sides of length 15 cm, 19 cm and 23 cm

Exercise 9: Find the area and the volume of a regular hexagonal pyramid if the radius of the base has a length of 10 cm and the edge of the faces measures 12 cm and $V_{PYR} = \frac{1}{3} A_{BASE} \cdot h$

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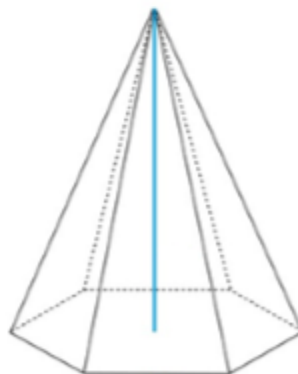
Exercise 10: Find the area and the volume of a regular pentagonal pyramid with altitude $10 \, \text{cm}$ if the length of the side of the base is $7 \, \text{cm}$ and the length of its edge is $12 \, \text{cm}$
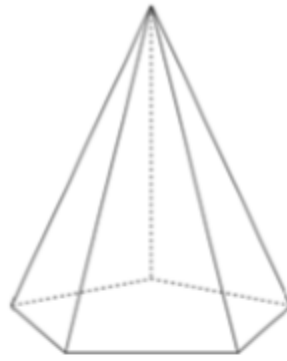
Exercise 11: Find the area of a regular heptagonal pyramid with altitude $15 \, \text{cm}$ if the length of the side of the base is $18 \, \text{cm}$ and the length of the radius of the base is $10 \, \text{cm}$
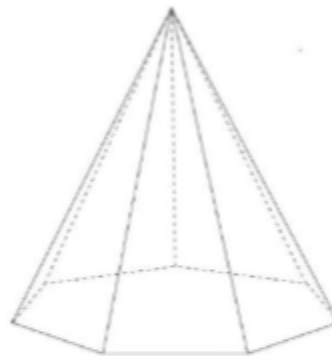
Exercise 12: Find the capacity of a bucket of popcorn if its dimensions are given by:

Height   6 3/8 inches
Bottom diameter   5 1/2 inches
Top diameter 7   inches

Exercise 13: Repeat the problem if we have a square popcorn bucket knowing that the formula for the volume of a pyramid is given by $V_{PYR} = \dfrac{1}{3} A_{BASE} \cdot h$

Height   7 inches
Bottom edge   3.5 inches
Top edge 4   inches