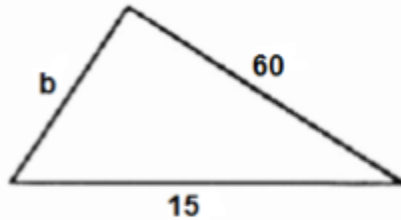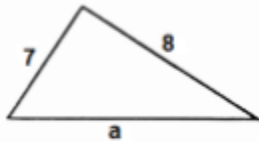# UNIT 9: GEOMETRY

Exercise 1: The sides of a triangle have lengths 6, 8 and 10 cm. The sides of another triangle have lengths 9, 12 and 15 cm. Are they similar?
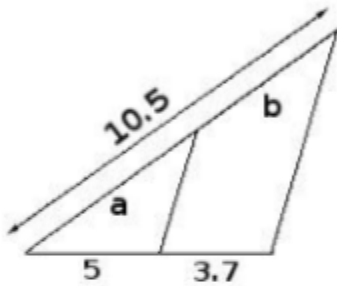
Exercise 2: Find the values of the unknowns a and b so that the following triangles are similar:
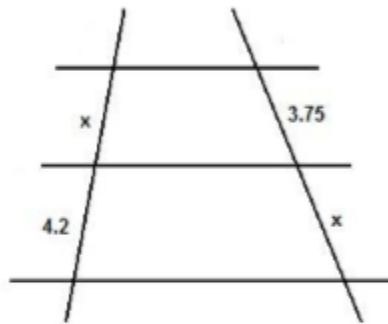

Exercise 3: The sides of a triangle have lengths 5, 6 and 9 cm. The shortest side of another triangle that's similar to the first one has a length of 18 cm. Find the lengths of the other two sides.

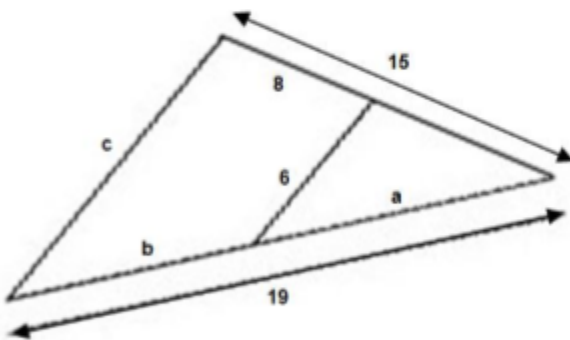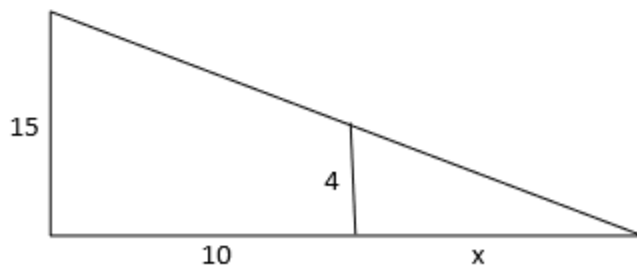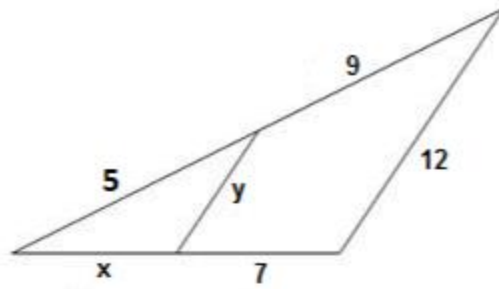**Exercise 4:** Find the values of the unknowns:
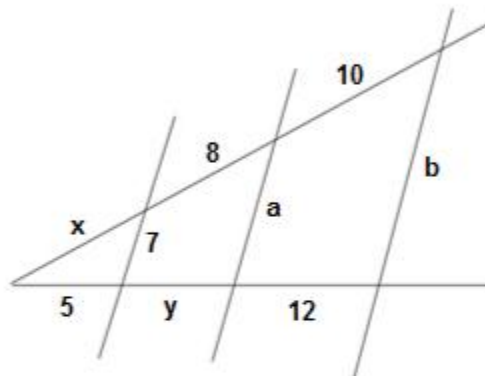
a)

b)

Exercise 5: Find the values of the unknowns:

Exercise 6: Work out the value of x in this figure:

Exercise 7: Work out the values of **x** and **y** in this figure:

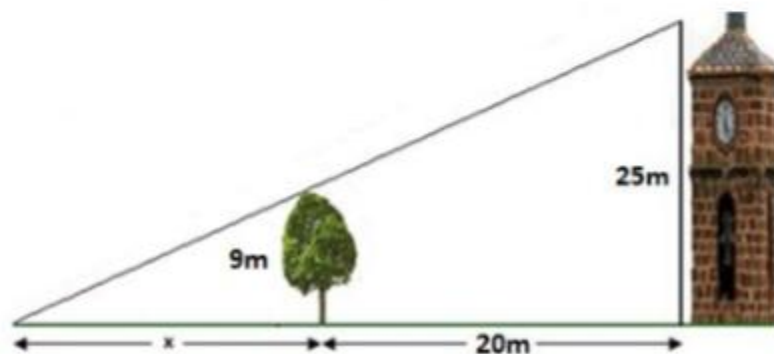**Exercise 8:** Use the intercept theorem to work out the values of the indeterminates (a, b, x, y)

Exercise 9: Use the intercept theorem to work out the values of the indeteºrminates (a, b, x, y)
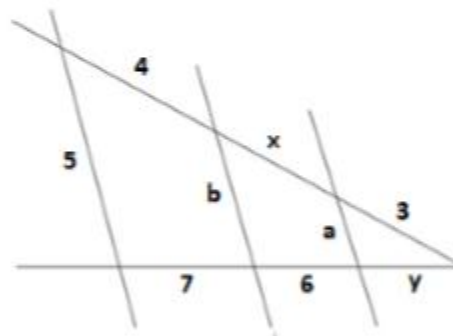

Exercise 10: I know that I like making things difficult. Instead of measuring the shadow of the tree, I climbed to know the height of the tower and the tree. I got these measures. What are the values of the shadows?

Exercise 11: I put my hand one meter away from me. With the height of my hand, 15 cm, I can hide a 400-meter-high mountain standing far away. How far am I from the mountain?

Exercise 12: 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 has a length of 180 m, could you tell me the height of the pyramid?
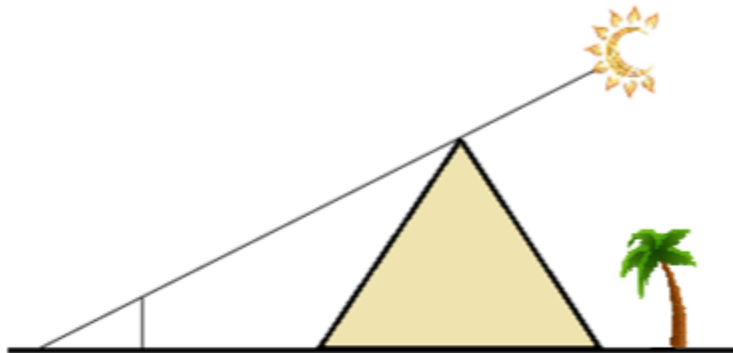

Exercise 13: My height is 1.55 m and I want to find the height of a poplar. I measured the shadows of both me and the tree and got 1.2 m and 8.15 m respectively. What's the height of the tree?
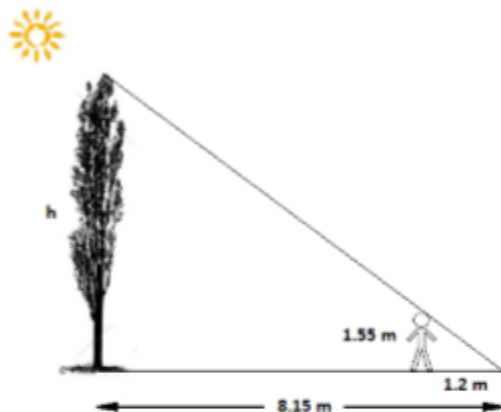
Exercise 14: As you already know, my height is 1.55 (more or less). I know that the building where I live has a height of 14.5 m, and at a certain moment of the day both shadows coincide and mine measures 95 cm. How far am I standing from the base of the building?

Exercise 15: The Big Ben Tower has a height of 96 m, and 35 m from its base there's a tree with a height of 12 m. I measure their shadows when they coincide at a certain moment of the day. Work out the shadow of the tower.

Exercise 16: Find the value of x in the following figures using the intercept theorem:

a)

b)
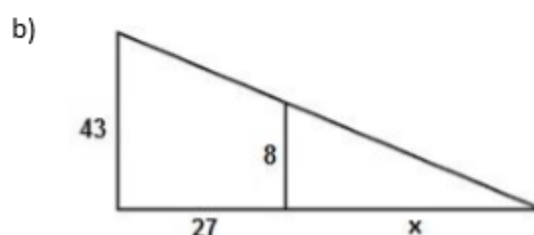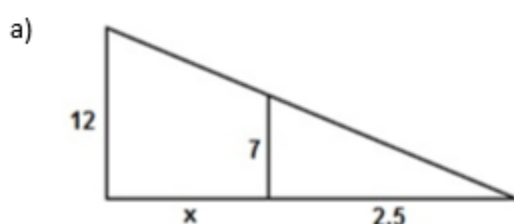
Exercise 17: Find the area of an equilateral triangle if perimeter measures 63 cm

Exercise 18: Find the area of an isosceles triangle it its base measures 10 cm and the length of the equal sides is 12 cm

Exercise 19: If an equilateral triangle has an altitude of 17 m, find the length of each side and work out the value of its area.

Exercise 20: Find the area and the perimeter of a right-angled trapezium if the bases measure 19 cm and 33 cm and the altitude has a length of 18 cm

Exercise 21: Find the area of an isosceles trapezium if the bases measure 83 cm and 107 cm and the slanted side is 37 cm

Exercise 22: Find the area of this parallelogram:
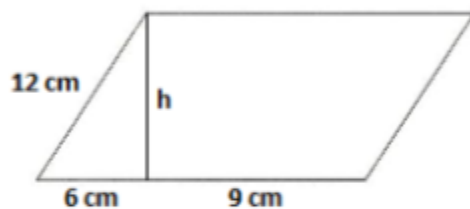
Exercise 23: Find the area and the perimeter of a rhombus if its diagonals measure 25 cm and 35 cm

Exercise 24: Find the area of a regular heptagon if the length of the side is 7 cm and the radius has a length of 9 cm

Exercise 25: Work out the area of a regular octagon if its side has a length of 15 cm and the length of the radius is 11 cm
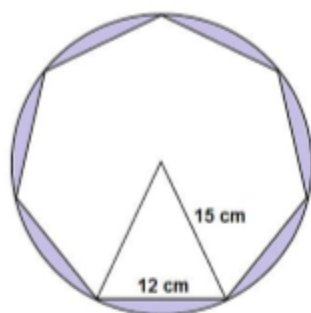
Exercise 26: Find the area of the shadowed region between the square and the circle.

Exercise 27: Find the area of the shadowed region between the circle and the square.
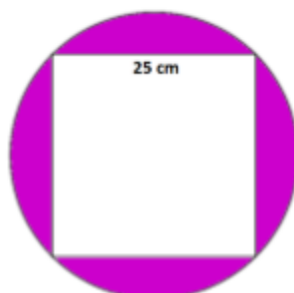
**Exercise 28:** Work out the value of the shadowed area:

Exercise 29: A 35-foot ladder is leaning against the trunk of a tree and is positioned such that the base of the ladder is 21 feet from the base of the tree. How far above the ground is the point where the ladder touches the trunk?

Exercise 30: The main mast of a fishing boat is supported by a sturdy rope that extends from the top of the mast to the deck. If the mast is 20 feet tall and the rope is attached to the deck 15 feet away from the base of the mast, how long is the rope?

Exercise 31: Lori is flying a kite. She let outs 150 m of rope and notices that the kite is 120 m high from the point where she's holding it. How far is Lori from the perpendicular of the kite?

Exercise 32: Work out the value of the sides of this right-angled triangle
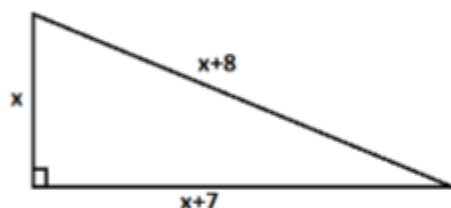
Exercise 33: Ancient Egyptians knew how to draw right-angled triangles so the lengths of their sides are three consecutive numbers. Show me that you can do it too

Exercise 34: Use Pythagoras' theorem to work out the lengths of the sides of a right-angled triangle whose sides measure x, $x-1$, and $x-8$