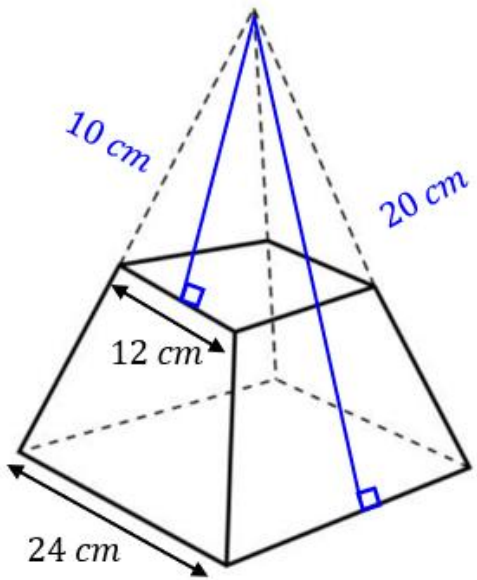
SURFACE AREA OF FRUSTUMS

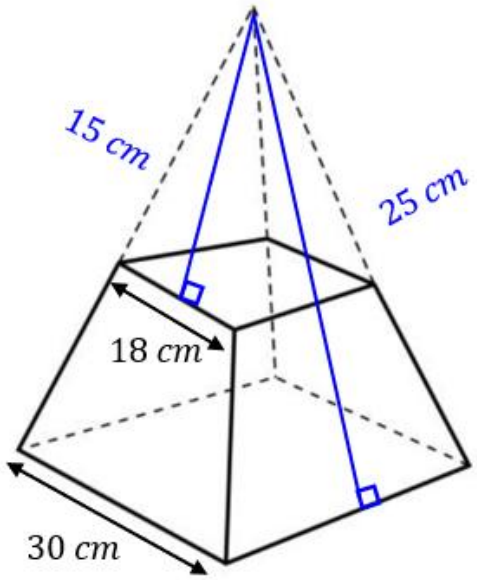
1) A frustum is formed by removing the top of a square-based pyramid that was cut parallel to the base. The dimensions are as follows:
   - Large square base side length = 24 cm
   - Small square top side length = 12 cm
   - Height of each large triangular face = 20 cm
   - Height of each small triangular face = 10 cm

   Calculate the total surface area of the frustum.



2) A frustum is formed by removing the top of a square-based pyramid that was cut parallel to the base. The dimensions are as follows:
   - Large square base side length = 30 cm
   - Small square top side length = 18 cm
   - Height of each large triangular face = 25 cm
   - Height of each small triangular face = 15 cm

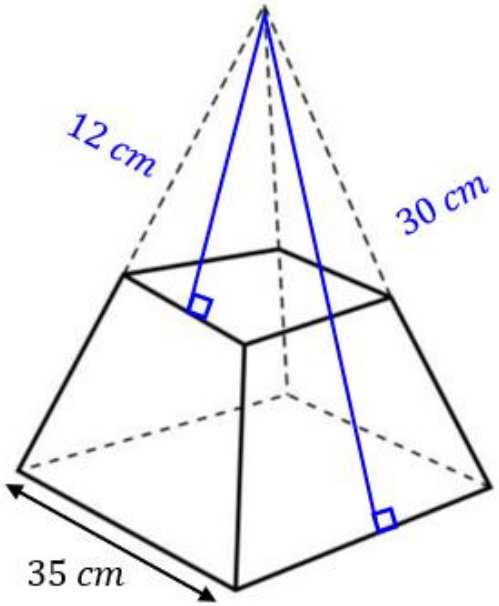
   Calculate the total surface area of the frustum.



3) A frustum is formed by removing the top of a square-based pyramid that was cut parallel to the base. The dimensions are as follows:

- Large square base side length = 35 cm
- Height of each large triangular face = 30 cm
- Height of each small triangular face = 12 cm

Calculate the total surface area of the frustum.

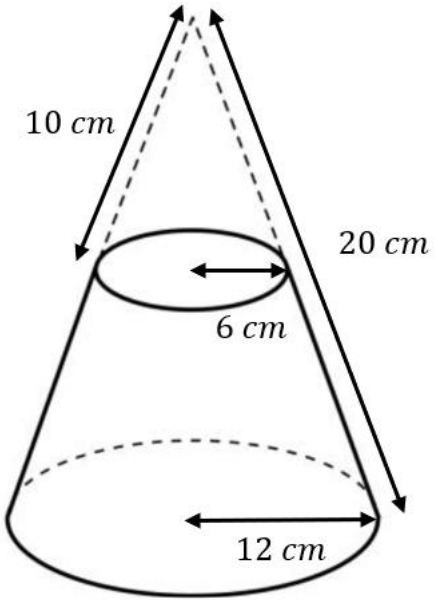


4) A frustum is formed by removing the top of a cone. The dimensions are as follows:

- Large radius = 12 cm
- Small radius = 6 cm
- Large slant height = 20 cm
- Small slant height = 10 cm

Calculate the total surface area of the frustum.

Give your answer in terms of π.

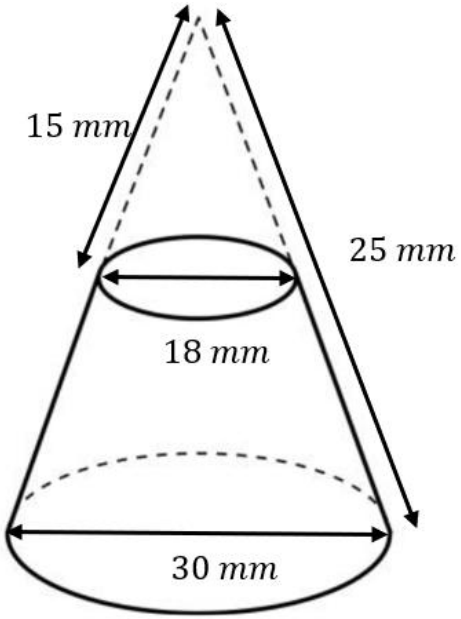


5) A frustum is formed by removing the top of a cone. The dimensions are as follows:

- Large diameter = 30 mm
- Small diameter = 18 mm
- Large slant height = 25 mm
- Small slant height = 15 mm

Calculate the total surface area of the frustum.

Give your answer to 1 decimal place.

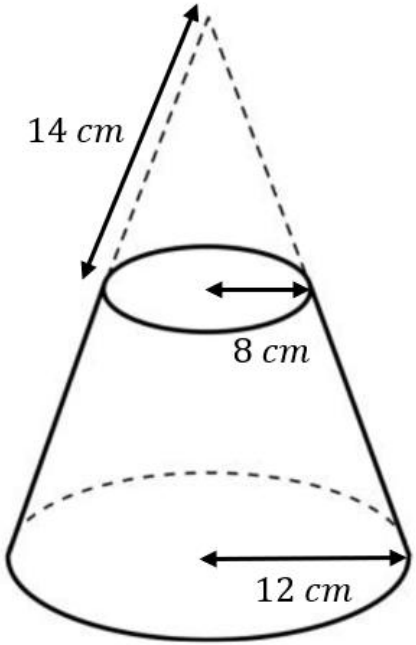


6) A frustum is formed by removing the top of a cone using a plane parallel to the base. The dimensions are as follows:

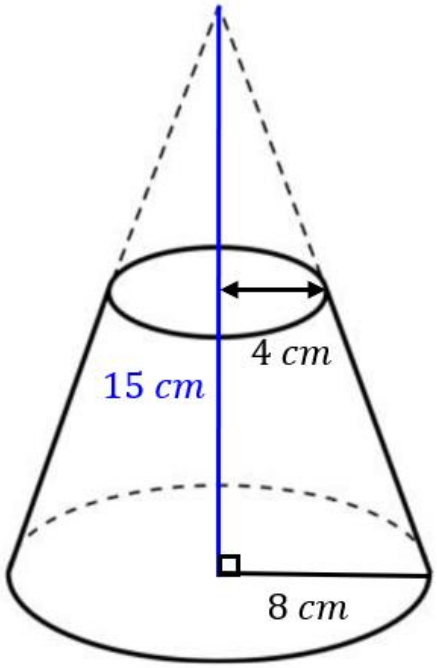
- Large radius = 12 cm
- Small radius = 8 cm
- Small slant height = 14 cm

Calculate the total surface area of the frustum.

Give your answer to the nearest square centimetre.

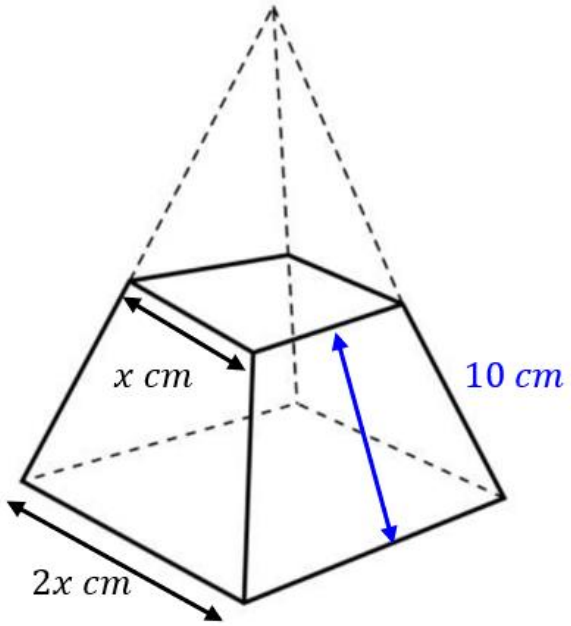


7) A cone has a radius of 8 cm and a perpendicular height of 15 cm.
A frustum is formed by removing the top of the cone using a plane parallel to the base.
The smaller cone has a radius of 4 cm.
Work out the total surface area of the frustum.
Give your answer to 2 decimal places.

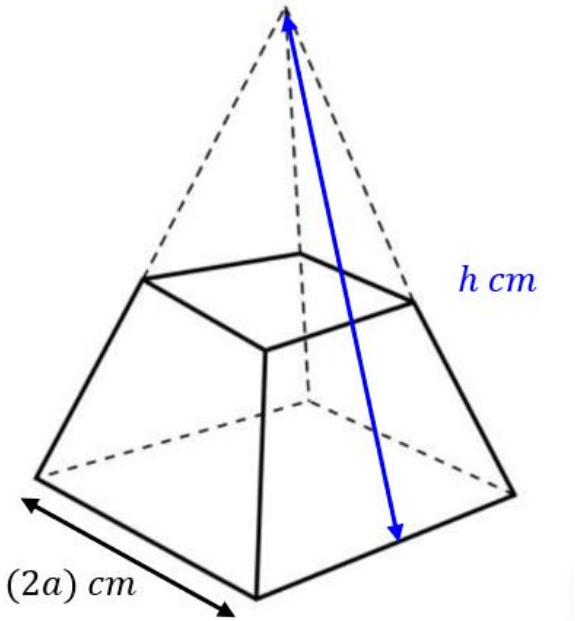


Challenge

8) The frustum of a square-based pyramid has a slant height of 10 cm, a top side length of x cm and a bottom side length of $2x$ cm. The total surface area of the frustum is 320 cm^2.
Work out the value of x.



9) A square-based pyramid has slant height h cm and base side length $(2a)$ cm.
The top third of the pyramid is removed by a plane parallel to the base.
Show that the total surface area of the remaining frustum is $\left(\frac{40}{9}a^2 + \frac{32}{9}ah\right)$ cm^2.



10) A cone has a slant height of $3h$ and a radius of $2r$.
A frustum is formed by removing the top of a cone that was cut by a plane parallel to the base.
The small cone has a slant height of h.
Work out the total surface area of the frustum.
Give your answer in terms of π, r and h.