

Examination Practice Questions

You should have:

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.
For some questions, you may need tracing paper.

Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

Advice

- Read each question carefully before you start to answer it.
- Don't forget to have fun.
- Check your answers at the end.

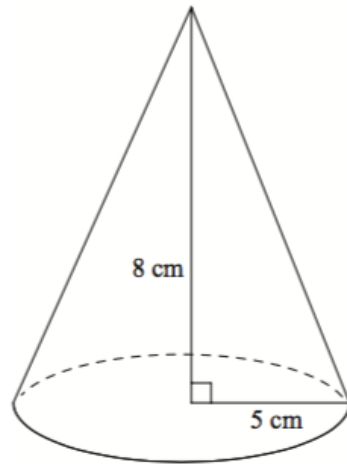


Diagram NOT
accurately drawn

A cone has a base radius of 5 cm and a vertical height of 8 cm.

Calculate the volume of the cone.

Give your answer correct to 3 significant figures.

$$\frac{\pi \times 5^2 \times 8}{3} = 209.4395$$

m1

$$\text{A1 } 209 \text{ cm}^3$$

(2 marks)

A candle is in the shape of a cone.

The radius of the base of the cone is 3.5 cm and its height is 10 cm.

Calculate the volume of the candle.

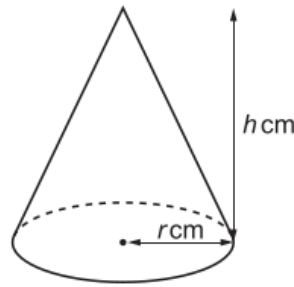
$$\frac{\pi \times 3.5^2 \times 10}{3} = 128 \text{ cm}^3$$

m1

A1

(2 marks)

A cone has radius r cm and height h cm.



The height is three times the radius.

$$h = 3r$$

The volume of the cone is 2100 cm^3

Calculate the radius of the cone.

Give your answer to 2 decimal places.

M1

$$\frac{\pi \times r^2 \times 3r}{3} = 2100$$

A1

M1 $\pi \times r^2 = 2100$

$$\frac{2100}{\pi} = r^2$$

$$r = \sqrt{\frac{2100}{\pi}} = 8.74 \text{ cm}$$

M1 $r = \sqrt{\frac{2100}{\pi}}$ **A1** $r = 8.74 \text{ cm}$ (4 marks)

A cone has a volume of 10 m^3

The vertical height of the cone is 1.5 m.

Calculate the radius of the base of the cone.

Give your answer correct to 3 significant figures.

$$\pi \times r^2 \times 1.5 = 10$$

M1

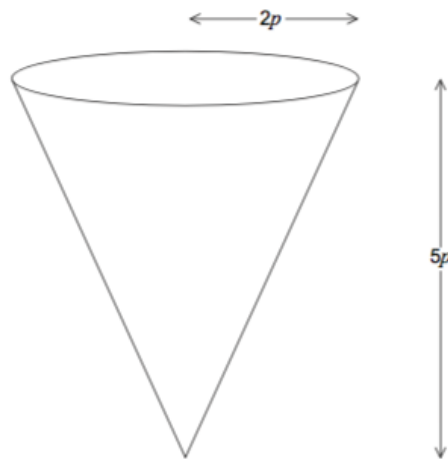
$$\frac{10}{1.5\pi} = r^2$$

A1 $r = 2.53$

(3 marks)

M1 $r = \sqrt{\frac{10}{1.5\pi}}$

This right circular cone has radius $2p$ and height $5p$.
The dimensions are in centimetres.



The volume of the cone is $22500\pi \text{ cm}^3$.

Work out the value of p .

(M1)

$$\left[\frac{1}{3}\pi \times (2p)^2 \times 5p = 22500\pi \right]$$

$$\frac{1}{3}\pi \times 4p^2 \times 5p = 22500\pi$$

$$\frac{20}{3}p^3\pi = 22500\pi$$

(M1)

$$\left[p^3 = \frac{22500\pi}{20/3\pi} \right]$$

(M1)

$$p = \sqrt{\frac{22500\pi}{20/3\pi}} = \underline{15} \quad (A1)$$

Q6.

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The following formula is for the area, A , of the curved surface area of a cone.

$A = \pi r l$, where r is the radius and l is the slant height of the cone.

Calculate the total surface area of a cone with radius 5 cm and slant height 12 cm.

$$\begin{aligned} \pi \times 5 \times 12 &= 60\pi \quad (M1) \\ \pi \times 5^2 &= 25\pi \quad (M1) \\ 60\pi + 25\pi &= 85\pi \quad (A1) \end{aligned}$$

(3 marks)

Q7.

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Calculate the total surface area of a cone with radius 8 cm and slant height 20 cm.

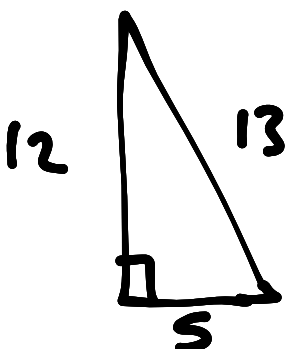
$$\begin{aligned} \pi \times 8 \times 20 &= 160\pi \quad (M1) \\ \pi \times 8^2 &= 64\pi \quad (M1) \\ \text{Total} &= 224\pi \quad (A1) \end{aligned}$$

(3 marks)

Q8.

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Calculate the total surface area of a cone with radius 5 cm and perpendicular height 12 cm.



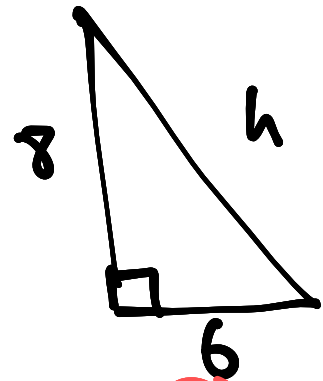
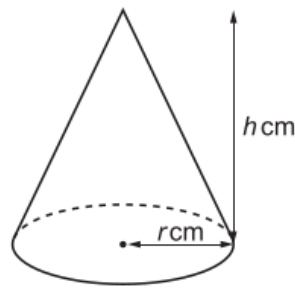
$$\begin{aligned} \text{SLANT} &= \sqrt{12^2 + 5^2} \quad (M1) \\ &= 13 \\ \text{SA:} \\ \pi \times 5 \times 13 &= 65\pi \quad (M1) \\ \pi \times 5^2 &= 25\pi \quad (M1) \\ \hline &90\pi \quad (A1) \end{aligned}$$

(4 marks)

Q9.

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A cone has radius r cm and height h cm.



Calculate the total surface area of the cone when $r = 6$ and $h = 8$.

Give your answer in terms of π

$$h = \sqrt{8^2 + 6^2} = 10 \quad (M_1)$$

$$SA: \pi \times 6 \times 10 = 60\pi \quad (M_1)$$

$$\pi \times 6^2 = 36\pi +$$

$$96\pi$$

(M1)

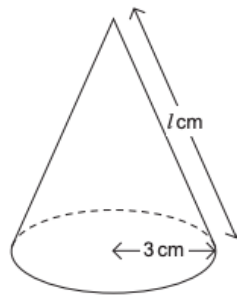
$$96\pi$$

(4 marks)

Q10.

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The cone below has radius 3 cm and slant height l cm.



The **total** surface area, including the base, is $24\pi \text{ cm}^2$.

Work out the length l .

$$\pi \times 3^2 + \pi \times 3 \times l = 24\pi$$

$$9\pi + 3\pi l = 24\pi$$

$$9 + 3l = 24$$

$$\div 3$$

$$3 + l = 8 \quad \therefore l = 5$$

(A1)

(3 marks)

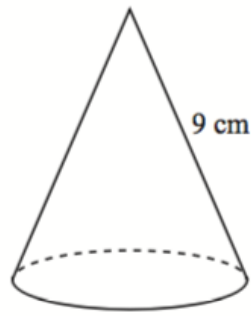


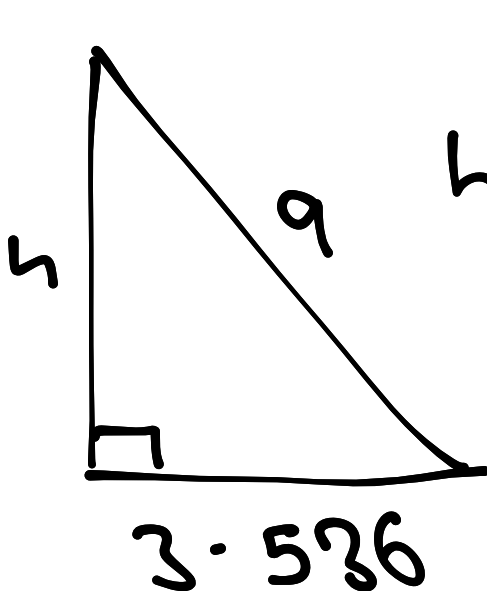
Diagram NOT
accurately drawn

A solid cone has a slant height of 9 cm.
The curved surface area of the cone is 100 cm^2 .

Calculate the volume of the cone.
Give your answer correct to 3 significant figures.

$$\pi \times r \times 9 = 100 \quad \text{[M1]}$$

$$\frac{100}{9\pi} = r = 3.536$$



$$h = \sqrt{9^2 - 3.536^2} \quad \text{[M1]}$$

$$= 8.27 \quad \text{[A1]}$$

$$\left[\frac{1}{3} \times \pi \times 3.536^2 \times 8.27 = 108 \text{ cm}^3 \right] \quad \text{[A1]}$$

3 s.f. (5 marks)

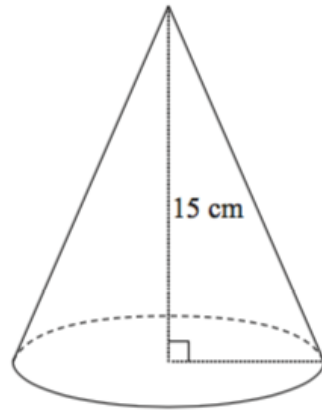


Diagram NOT
accurately drawn

A solid cone has a height of 15 cm.
The volume of the cone is $320\pi \text{ cm}^3$.

Work out the curved surface area of the cone.
Give your answer correct to 3 significant figures.

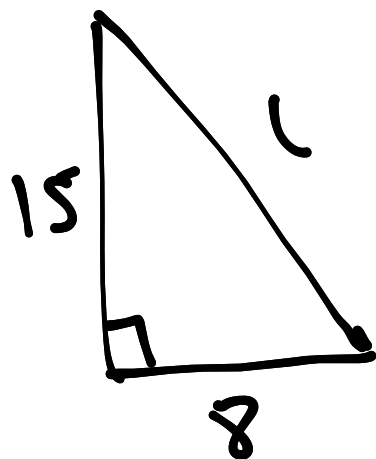
$$\frac{1}{3} \times \pi \times r^2 \times 15 = 320\pi \quad] \quad (M_1)$$

$$5\pi r^2 = 320\pi$$

$$5r^2 = 320$$

$$r^2 = 64$$

$$r = 8 \quad] \quad (M_1)$$



$$l = \sqrt{15^2 + 8^2} \quad] \quad (M_1)$$

$$= 17 \quad] \quad (A_1)$$

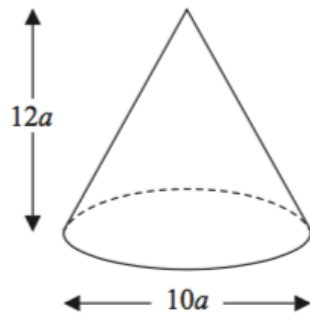
Curved S.A.

$$\pi \times 8 \times 17 = 427\text{cm}^2 \quad (A_1)$$

(5 marks)

The diagram shows a solid cone.

Diagram NOT
accurately drawn



The diameter of the base of the cone is $10a$ cm.

The height of the cone is $12a$ cm.

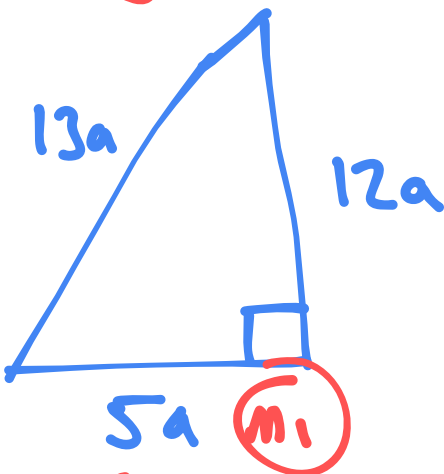
The total surface area of the cone is 360π cm².

The volume of the cone is $k\pi$ cm³, where k is an integer.

Find the value of k .

S.A.

$$\pi \times (5a)^2 + \pi \times 5a \times 13a$$



$$L = \sqrt{(12a)^2 + (5a)^2} = 13a$$

$$25a^2\pi + 65a^2\pi = 90a^2\pi$$

VOLUME:

$$90a^2\pi = 360\pi$$

$$a^2 = \frac{360}{90} = 4$$

$$a = 2$$

$$\frac{1}{3} \times \pi \times 10^2 \times 24 = 800\pi \therefore k = 800$$

(4 marks)