Name:

Exam Style Questions

Volume of a Pyramid

Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

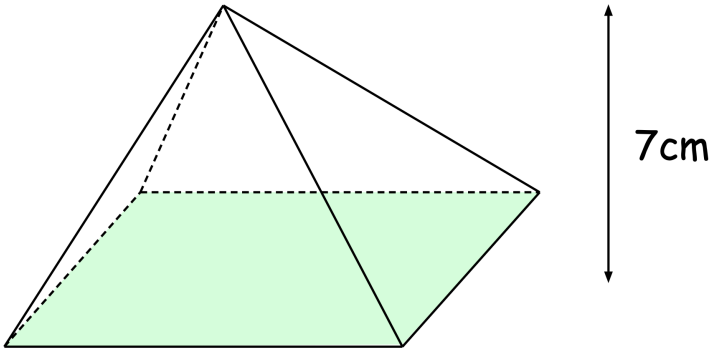
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Video 360

Answers and Video Solutions

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1. A pyramid is shown below.



The perpendicular height of the pyramid is 7cm
The area of the base of the pyramid is 60cm²

Find the volume of the pyramid.

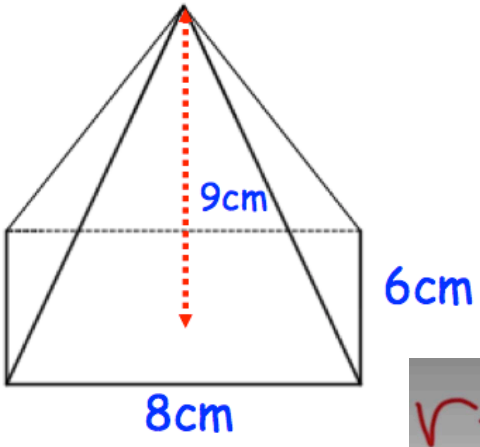
$V = \frac{1}{3} A h$
$= \frac{1}{3}(60) \times 7$
$= 20 \times 7$
$= 140 \text{ cm}^3$

.....cm³
(2)

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2. A rectangular-based pyramid is shown below.

$A = l \times w$
$= 8 \times 6$
$= 48 \text{ cm}^2$



Calculate the volume of the pyramid.

$V = \frac{1}{3} A h$
$= \frac{1}{3} \times 48 \times 9$
$= 144 \text{ cm}^3$

.....cm³
(3)

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3. A square-based pyramid has a base with side length 15cm.
The perpendicular height of the pyramid is 10cm.

Calculate the volume of the pyramid.

$V = \frac{1}{3}AL$

$= \frac{1}{3}(15 \times 15) \times 10$

$= \frac{1}{3}(225) \times 10$

$= 75 \times 10$

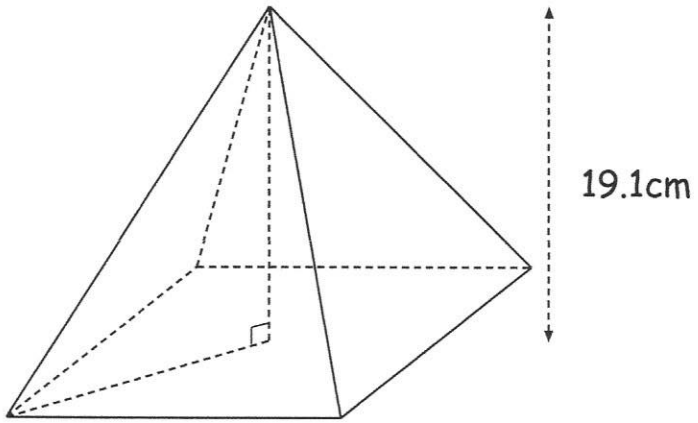
$= 750$

750 ..... cm^3

(3)

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4. Below is a square based pyramid.



Find the volume of the pyramid.

$V = \frac{1}{3}AL$

$= \frac{1}{3}(17.5 \times 17.5) \times 19.1$

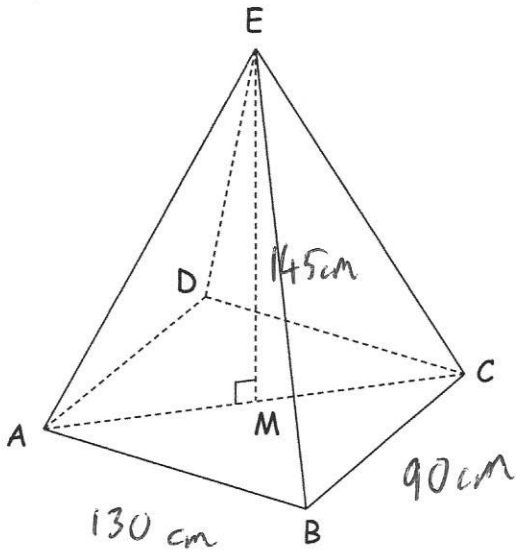
$= 1949.7916...$

1949.8 ..... cm^3 to 1dp

(3)

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5. ABCDE is a pyramid.
M is the midpoint of AC.



AB = 1.3m
BC = 90cm
ME = 1.45m

Work out the volume of the pyramid.

$V = \frac{1}{3}Ah$

$= \frac{1}{3}(130 \times 90) \times 145$

$= 565500\ cm^3$

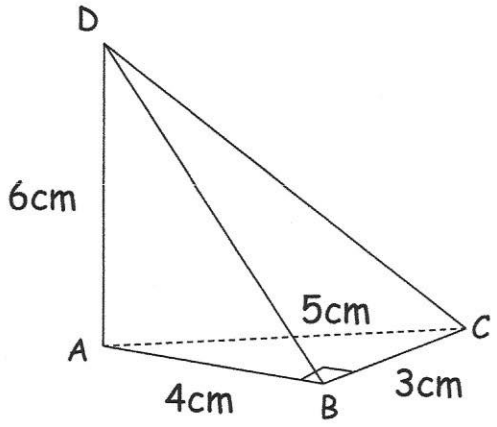
565500

.....cm^3

(3)

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6. A triangular-based pyramid, ABCD, is shown below.



AB = 4cm AC = 5cm BC = 3cm AD = 6cm

ABC is a right angle.

Calculate the volume of the pyramid.

Area of base : $\frac{1}{2}(3 \times 4)$

$= 6\text{ cm}^2$

$V = \frac{1}{3} \times 6 \times 6$

$= 12\text{ cm}^3$

12 .....cm³

(3)

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7. Calculate the volume of a pyramid having a square base of side 2.9cm and perpendicular height of 5cm.

$V = \frac{1}{3}(2.9 \times 2.9) \times 5$

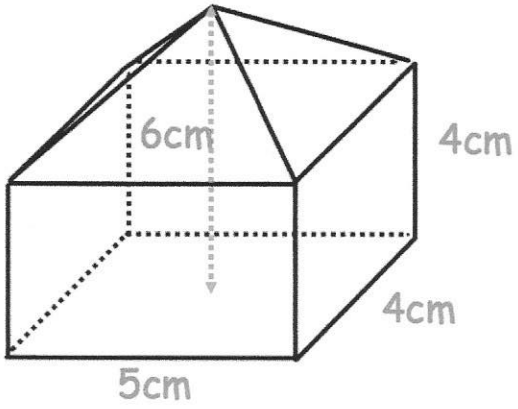
$= 14.0166...$

14.017 .....cm³

to 3dp **(3)**

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8. Shown is a solid that is made of a pyramid and a cuboid.



Calculate the volume of the solid.

Cuboid : $5 \times 4 \times 4 = 80 cm^3$

Pyramid : $\frac{1}{3} \times (5 \times 4) \times 2$

$= 13.333...$

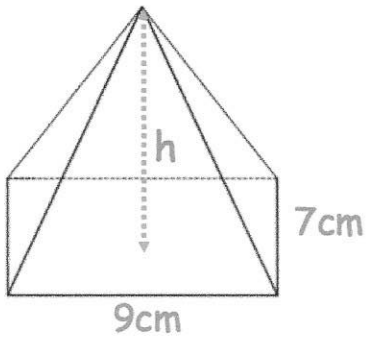
$80 + 13.33...$

93.33 cm^3

(4)

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9. Shown is a pyramid with volume 126cm³



Work out the perpendicular height of the pyramid, h.

$V = \frac{1}{3}Ah$

$126 = \frac{1}{3}(9 \times 7) \times h$

$126 = \frac{1}{3}(63) \times h$

$126 = 21 \times h$

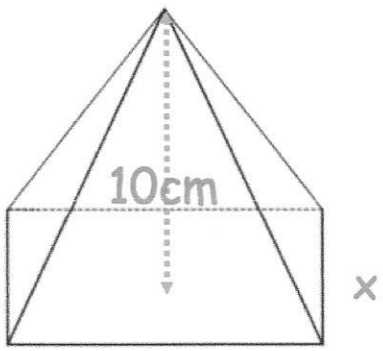
$h = 6$

6 .....cm

(3)

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10. Shown is a square-based pyramid with volume 270cm³



Find the length of the side marked x.

$V = \frac{1}{3}Ah$

$270 = \frac{1}{3} \times x^2 \times 10$

$27 = \frac{1}{3} \times x^2$

$81 = x^2$

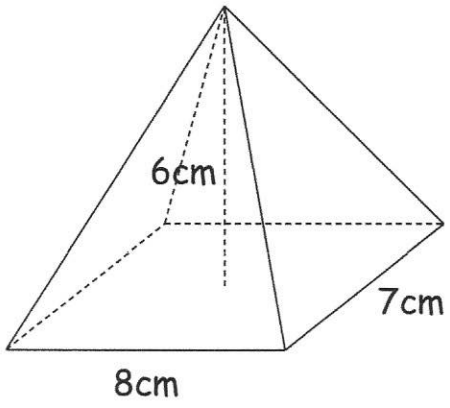
$x = 9$

9 .....cm

(3)

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11. A solid wooden paperweight is shown below.
The paperweight is a rectangular based pyramid.



The density of the wood is 0.65g/cm³

Find the mass of the paperweight.

$V = \frac{1}{3} \times (8 \times 7) \times 6$

$= 112 \text{ cm}^3$

$m = d \times V$

$= 0.65 \times 112$

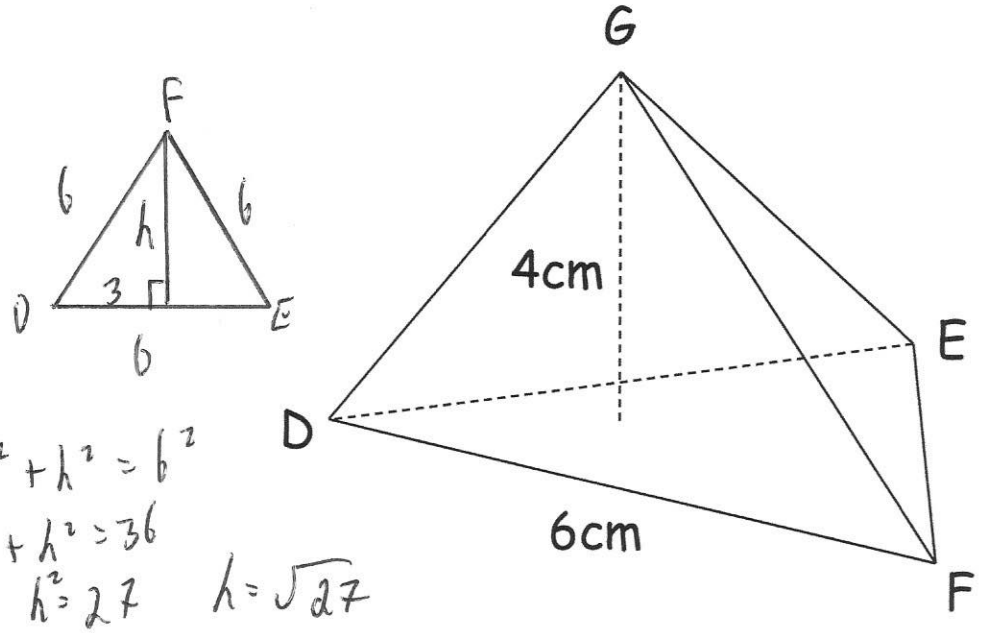
$= 72.8 \text{ g}$

72.8 .....g

(4)

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12. DEFG is a triangle based pyramid.
The base DEF is an equilateral triangle with side 6cm.
The perpendicular height of the pyramid is 4cm.



$3^2 + h^2 = 6^2$
$9 + h^2 = 36$
$h^2 = 27$ $h = \sqrt{27}$

Calculate the volume of the pyramid.

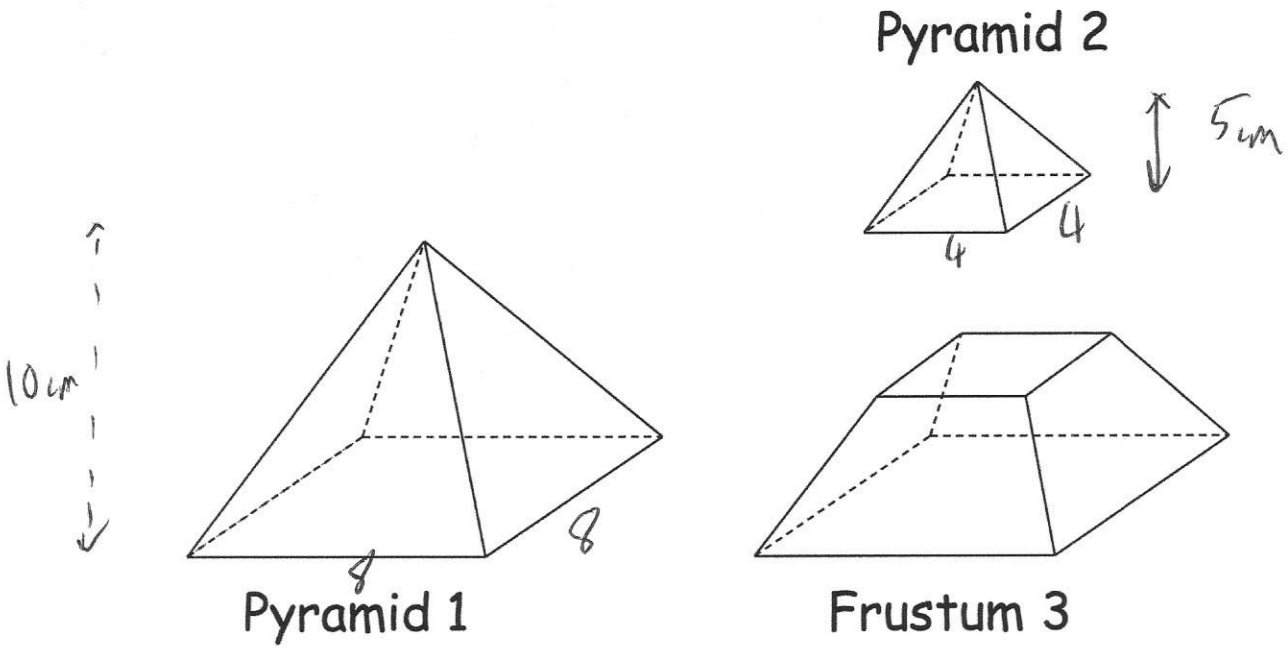
Area of DEF : $\frac{1}{2} \times 6 \times \sqrt{27}$
$= 9\sqrt{3}$ cm^2 (or 15.588...)

$V = \frac{1}{3} Ah$
$= \frac{1}{3} \times 9\sqrt{3} \times 4$
$= 12\sqrt{3}$
$= 20.7846...$ cm^3

20.785 cm^3
to 3dp **(4)**

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13. A square based pyramid 1 is divided into two parts:
a square based pyramid 2 and a frustum 3, as shown.



Pyramid 1 has a base of side length 8cm.
Pyramid 2 has a base of side length 4cm.
The perpendicular height of pyramid 1 is 10cm.

Calculate the volume of frustum 3.

Pyramid 1: $\frac{1}{3} \times (8 \times 8) \times 10$

$= 213.\dot{3}\ cm^3$

Pyramid 2: $\frac{1}{3} \times (4 \times 4) \times 5$

$= 26.\dot{6}\ cm^3$

$213.\dot{3} - 26.\dot{6} = 186.\dot{6}\ cm^3$

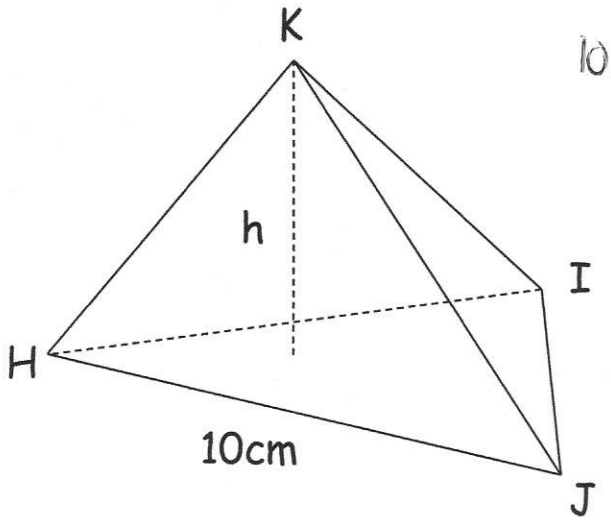
186.67 cm³
to 2dp (4)

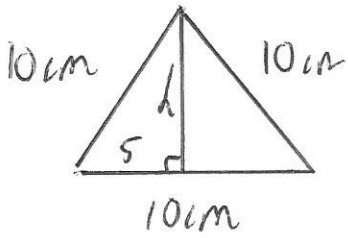
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14. HIJK is a triangle based pyramid.

The base HIJ is an equilateral triangle with side 10cm

The volume of the pyramid is $300cm^3$





$h^2 + 5^2 = 10^2$

$h^2 = 75$

$h = \sqrt{75}$

Calculate the perpendicular height, h, of the pyramid.

Area of HIJ $= \frac{1}{2} \times 10 \times \sqrt{75}$

$= 25\sqrt{3}\ cm^2$

$= 43.301...\ cm^2$

Volume $= 300\ cm^3$

$300 = \frac{1}{3} \times 25\sqrt{3} \times h$

$900 = 25\sqrt{3}\, h$

$h = 12\sqrt{3}$

$= 20.7846...$

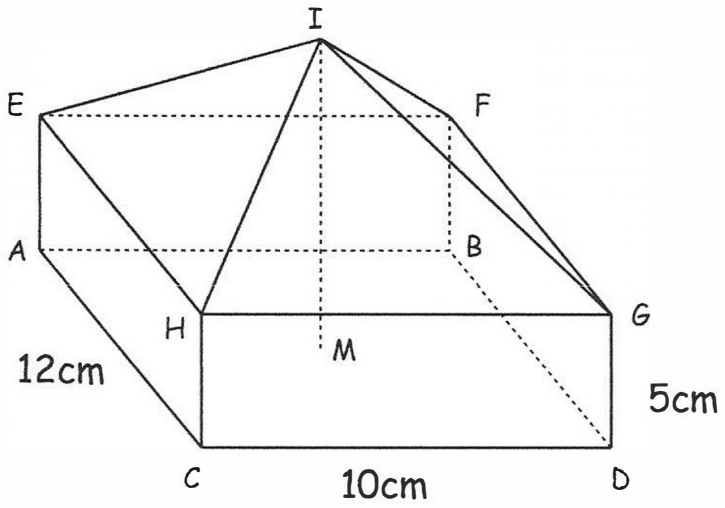
20.785 .....cm

to 3dp **(4)**

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15. Hannah created a glass paperweight.

The apex of the pyramid, I, is directly above the centre, M, of ABDC.



The density of the glass is 2.6g/cm^3
The mass of the paperweight is 1705.6g

Find the height of the paperweight, IM.

Cuboid : $12 \times 10 \times 5 = 600\text{cm}^3$

Pyramid : $\frac{1}{3} \times (12 \times 10) \times h$

$= 40h$

$1705.6 \div 2.6 = 656\text{cm}^3$

$656 - 600 = 56$

$40h = 56$

$h = 1.4$

IM = 5 + 1.4

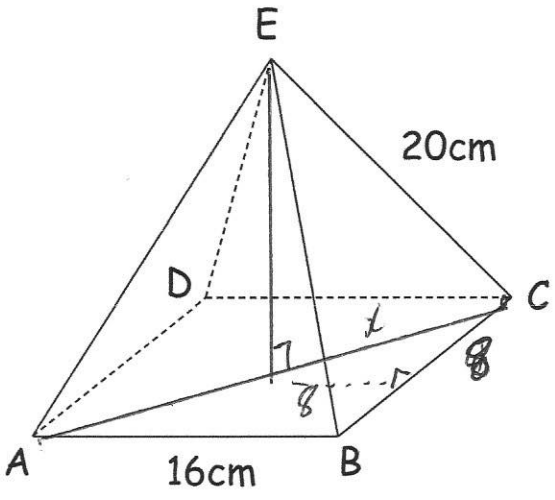
6.4

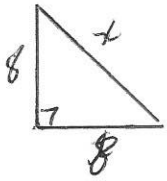
.....cm

(5)

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16. ABCDE is a square based pyramid.





$8^2 + 8^2 = x^2$

$64 + 64 = x^2$

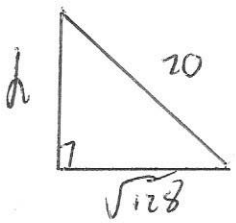
$x^2 = 128$

$x = 8\sqrt{2}$

AB = 16cm CE = 20cm

The point E is directly over the centre of the base ABCD.

Work out the volume of the pyramid.



$h^2 + (\sqrt{128})^2 = 20^2$

$h^2 + 128 = 400$

$h^2 = 272$

$h = \sqrt{272}$

$V = \frac{1}{3} \times 16^2 \times \sqrt{272}$

$= 1407.353...$

1407.35 ..... cm^3

(4)

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