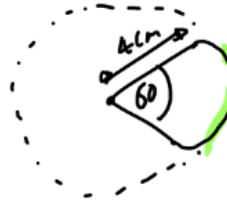
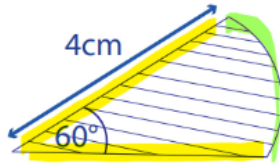


Question 1

Calculate the **perimeter** of this sector to **2** decimal places.



$$\textcircled{1} \pi \times d = 8\pi$$

$$\textcircled{2} \frac{360}{60} = 6$$

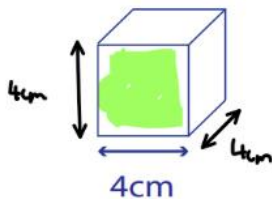
$$\frac{8\pi}{6} = 4.19 \text{ cm}$$

$$4 + 4 = 8 \text{ cm}$$

$$= \underline{12.19 \text{ cm}}$$

Question 2

a) Find the **surface area** of a **cube** of side length 4 cm.

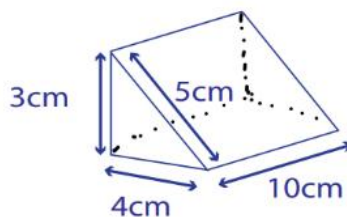


$$(4 \times 4) \times 6$$

$$= 16 \times 6$$

$$= \underline{96 \text{ cm}^2}$$

b) Find the **surface area** of this **triangular prism**.

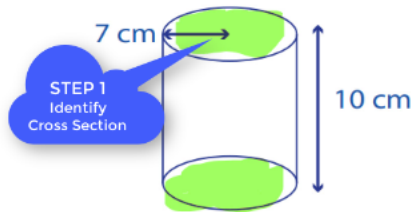


F + B	L + R	Base
6 + 6	30 + 50	40

$$= \begin{array}{r} 30 \\ 50 \\ 40 \\ + 12 \\ \hline 132 \text{ cm}^2 \end{array}$$

Question 3

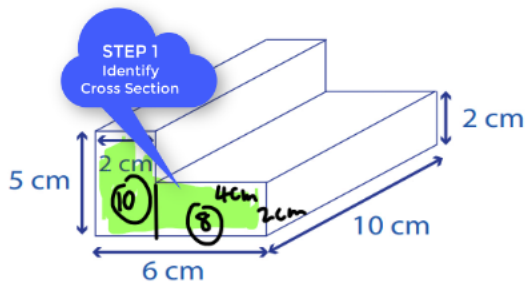
a) Calculate the volume of this cylinder



$$\begin{aligned} &= (\pi \times r^2) \times h \\ &= (\pi \times 7^2) \times 10 \\ &= 49\pi \times 10 \\ &= 1540 \text{ cm}^3 \end{aligned}$$

STEP 2
Multiply by
length

b) Calculate the volume of this shape.



$$\begin{aligned} &= 18 \times 10 \\ &= 180 \text{ cm}^3 \end{aligned}$$

STEP 2
Multiply by
length

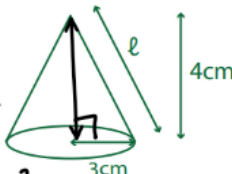
Question 4

a) Find

i) Surface Area $\left[\begin{matrix} \text{Total} \\ \text{Curved} \\ \text{Base} \end{matrix} \right]$

$$= 15\pi + 9\pi = 24\pi = 75.4 \text{ cm}^2$$

ii) Volume $= 12\pi \text{ cm}^3$ or 37.7 cm^3



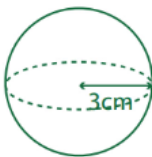
Volume of cone $= \frac{1}{3} \pi r^2 h$

Surface Area of cone (curved) $= \pi r l$

b) Find

i) Surface Area $36\pi \text{ cm}^2$ or 113 cm^2

ii) Volume $36\pi \text{ cm}^3$ or 113 cm^3



Surface Area of sphere $= 4\pi r^2$

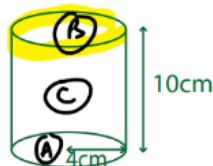
Volume of sphere $= \frac{4}{3} \pi r^3$

c) Find

i) Surface Area $\left[\begin{matrix} \text{A} \\ \text{B} \\ \text{C} \end{matrix} \right]$

$$= 16\pi + 16\pi + 80\pi = 112\pi \text{ cm}^2 \text{ or } 352 \text{ cm}^2$$

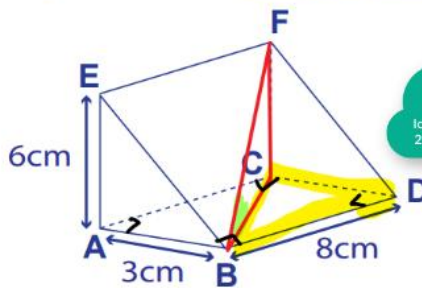
ii) Volume $160\pi \text{ cm}^3$ or 503 cm^3



8π 80π 10π

Question 5

The diagram shows a triangular prism.



Find

a) Length CB (3 s.f.)

b) Length BF (3 s.f.)

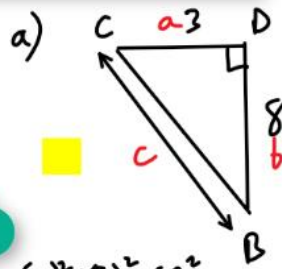
c) Angle FBC (3 s.f.)

Core 5 - Silver

Topic:

3-D Figures/
Circles

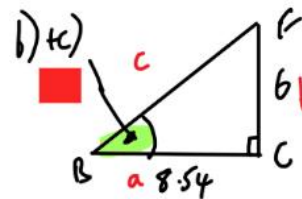
STEP 1
Identify the
2-D shapes



STEP 2
Draw and
Apply EACH
2-D Shape

$$(3)^2 + (8)^2 = CB^2$$

$$9 + 64 = CB^2 \therefore \sqrt{73} = CB \Rightarrow 8.54$$



$$(8.54)^2 + (6)^2 = BF^2$$

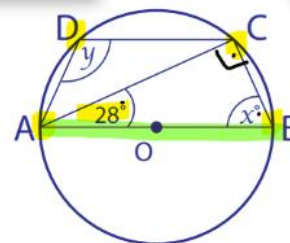
$$BF = 10.4$$

$$c) \left(\frac{6}{8.54}\right) \tan^{-1} = 35.1^\circ$$

Question 6

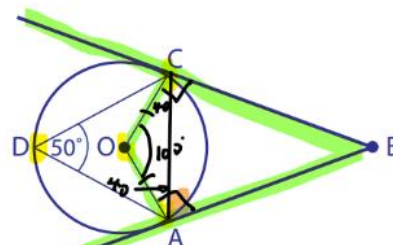
a) ABCD are points on the circumference, centre O.
AOB is a diameter of a circle. Angle CAB = 28° .

- i) $x = 62$ Reason Semi-circle Theorem.
ii) $y = 118$ Reason Cyclic Quad



b) ACD are points on the circumference, centre O.
AB and CB are tangents. Angle ADC = 50° .

- i) Angle AOC = 100 Reason Angle centre is double angle circumference.
ii) Angle ABC = 80 Reason kite [360]
iii) Angle CAB = 50 Reason Isosceles / Alternate angles



Core 6 - Silver

Topic:

3-D Figures/
Circles

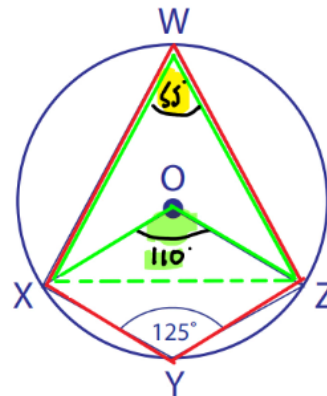
Question 7

WXYZ are points on the circumference, centre O.

Angle XYZ = 125° . XY = YZ

Find angle XOZ. Show your working.

- ① Let's find out $\hat{XWZ}$ first as WXYZ forms a 'Cyclic Quadrilateral'. $\hat{XYZ} + \hat{XWZ} = 180$
[--- = Quadrilateral] $125 + x = 180$
 $\therefore x = 55$



- ② Now we can use the 'Double Angle' theorem and say $\hat{XOZ}$ is double $\hat{XWZ}$. --- = imaginary chord
 $\hat{XOZ} = 110$



Question 8

ABC are points on the circumference, centre O.

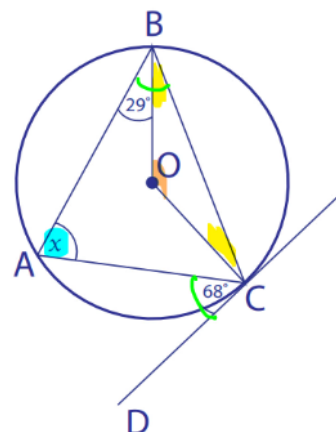
DCE is a tangent to the circle.

Angle ABO = 29° .

Angle DCA = 68° .

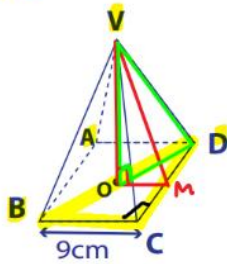
Find angle BAC. Show your working.

- ① Angle $\hat{ACD} = \text{Angle } \hat{ABC}$ [Alternate Segment Theorem]
 $68 = 68$
- ② Hence Angle $\hat{OBC} = 68^\circ - 29^\circ = 39^\circ$ [Isosceles Theorem]
- ③ Angle $\hat{OBC}$ and $\hat{OCB}$ are an isosceles Δ , hence
Angle $\hat{BOC} = 180 - (2 \times 39) = 102$
- ④ Angle $\hat{BAC} = 102 \div 2 = 51$ [Double Angle theorem]



Question 9

The diagram shows square based pyramid $ABCD$ and vertex V .



STEP 1
Identify the
2-D shapes

The angle that face VCD makes with the square base $ABCD$ is 53° .

a) Calculate the height of the pyramid.

b) Length of VD .

STEP 2
Draw and
Apply EACH
2-D Shape

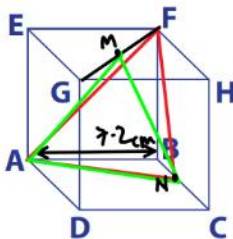
a) $\tan(53^\circ) \times 4.5 = 5.97 \text{ cm}$

b) $BD^2 = 9^2 + 9^2$
 $BD^2 = 162$
 $BD = \sqrt{162}$
 $BD = 12.7$

$5.97^2 + 6.36^2 = 8.7$

Question 10

$ABCDEFGH$ is a cube.



$AB = 7.2 \text{ cm}$,

N is a point on BC such that $BN:NC = 4:3$

a) Calculate angle FNA (3 s.f.)

b) M is a midpoint on FG . Given that $\angle MNA$ is 71° + angle MAN is 73° , calculate length MN (3 s.f.)

a) First let's find FN

① $BN = \frac{4}{7}$ of BC
 $BN = \left(\frac{7.2}{7}\right) \times 4 = 3.6 \text{ cm}$
 $FN^2 = 7.2^2 + 3.6^2$
 $FN = 8.05 \text{ cm}$

② Length AN
 $AN^2 = 7.2^2 + 3.6^2$
 $AN = 8.05$

③ Length AF
 $AF^2 = 7.2^2 + 7.2^2$
 $AF = 10.2 \text{ cm}$

④ Let's pull it all together = Cosine [SSS]
 $\cos A = \frac{8.05^2 + 8.05^2 - 10.2^2}{(2 \times 8.05 \times 8.05)}$
 $= \cos^{-1}(0.197)$
 $FNA = 78.6^\circ$

b) ① Angle $AMN = 180^\circ - (73^\circ + 71^\circ)$
 $AMN = 36^\circ$
 ② Sine Rule (Length)
 $\frac{8.05}{\sin 36^\circ} = \frac{x}{\sin 73^\circ}$
 $MN = 13.1 \text{ cm}$