

Marks are indicated in brackets after each question number

2014 Paper 1 Question 12, (4)

Consider the right-angled triangle PAC

$PC = 15$ since it is the radius

$AC = 27 - 15 = 12$ since $CB = 15$

Using Pythagoras' Theorem gives

$$(PC)^2 = (PA)^2 + (AC)^2$$

$$15^2 = (PA)^2 + 12^2$$

$$15^2 - 12^2 = (PA)^2$$

$$81 = (PA)^2$$

$$PA = 9$$

$$\text{So, } PQ = 2 \times 9 = 18 \text{ cm}$$

2014 Paper 2 Question 13, (5)

$$\text{Area of sector MON} = \frac{50}{360} \times \pi \times 7^2 = 21.4 \text{ m}^2$$

$$\text{Area of triangle MON} = \frac{1}{2} \times 7 \times 7 \times \sin 50^\circ = 18.8 \text{ m}^2$$

$$\text{Area of Chord at MN} = 2.6 \text{ m}^2$$

$$\text{Area of circle} = \pi \times 7^2 = 153.9 \text{ m}^2$$

$$\text{Area of cross-section} = 153.9 - 2.6 = 151.3 \text{ m}^2$$

2015 Paper 1 Question 3, (3)

$\angle DFE = 90^\circ$ since triangle inscribed in a circle with one side being the diameter

$$\text{So, } \angle FDE = 180 - 90 - 64 = 26^\circ$$

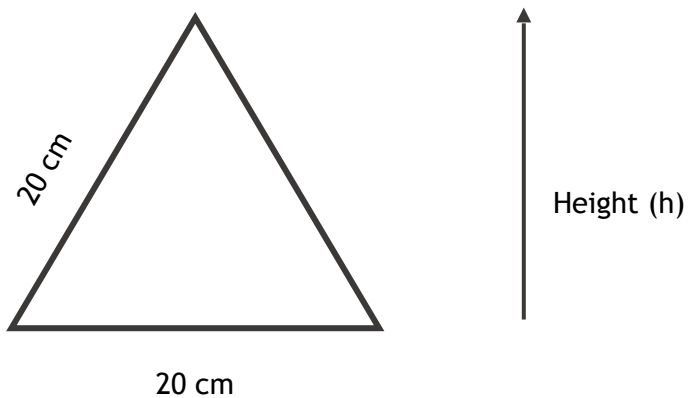
$\angle ABO = 90^\circ$ since tangent to the circle

$$\text{So, } \angle OBD = 90 - 77 = 13^\circ$$

And $\angle BDO = 13^\circ$ since isosceles triangle

$$\text{So, } \angle BDF = 26 + 13 = 39^\circ$$

2015 Paper 2 Question 11, (4)



Using Pythagoras to calculate height gives

$$20^2 = 10^2 + h^2$$

$$400 = 100 + h^2$$

$$300 = h^2$$

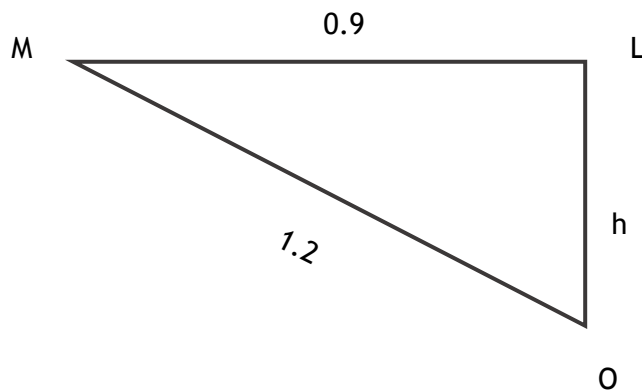
$$h = \sqrt{300} = 17.32 \text{ cm}$$

$$\text{Area of triangle} = \frac{1}{2} \times 17.32 \times 20 = 173.2 \text{ cm}^2$$

$$\text{Area of table top} = 173.2 \times 6 = 1,039.2 \text{ cm}^2$$

2015 Paper 2 Question 12, (4)

Construct a right triangle from the midpoint of ML with O & M



Using Pythagoras gives

$$1.2^2 = 0.9^2 + h^2$$

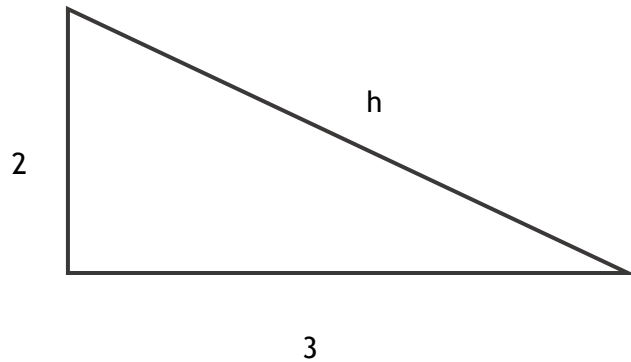
Solving gives $h = 0.79 \text{ m}$

So, depth of milk = $0.79 + \text{radius} = 0.79 + 1.2 = 2.78 \text{ m}$

2016 Paper 1 Question 7, (1) (3)

a) $B = (8, 4, 0)$ by inspection of the graph

b) Create a right-angled triangle in the base



Using Pythagoras, we have

$$h = \sqrt{2^2 + 3^2} = \sqrt{13}$$

$$(AV)^2 = 6^2 + (\sqrt{13})^2$$

$$= 49$$

$$AV = 7$$

2016 Paper 2 Question 5, (3)

$$EOA = 180 - 143 = 37^\circ$$

So, $OAC = 37^\circ$ since Z angle

So, $CAB = 90 - 37 = 53^\circ$ since tangent to circle makes 90° angle with radius

$ACB = 53^\circ$ since same angle as CAB

$$\text{So, } B = 180 - (53 \times 2) = 74^\circ$$

2016 Paper 2 Question 15, (4)

Let M be the midpoint of AB

$$MB = 4.5$$

Make a right triangle OMB giving

$$6.6^2 = (OM)^2 + 4.5^2 \text{ by Pythagoras}$$

$$(OM)^2 = 6.6^2 - 4.5^2 = 23.31$$

$$OM = \sqrt{23.31} = 4.8 \text{ cm}$$

$$\text{Height} = OM + \text{radius}$$

$$= 4.8 + 6.6$$

$$= 11.4 \text{ cm}$$

2017 Paper 1 Question 9, (3)

$$OBE = 90^\circ$$

$$OBD = 90 - 58 = 32^\circ$$

ODB = 32° since isosceles triangle

$$DOB = 180 - (32 \times 2) = 116^\circ$$

$$BOC = 180 - 116 = 64^\circ$$

$$CAB = 180 - 90 - 64 = 26^\circ$$

2017 Paper 2 Question 3, (3)

Using the Cosine Rule gives

$$p^2 = q^2 + r^2 - 2qr \cos P$$

$$= 180^2 + 150^2 - 2 \times 180 \times 150 \times \cos 147$$

$$= 170,380$$

$$p = \sqrt{170,380} = 413$$

$$\text{Length} = 413 \text{ m}$$

2017 Paper 2 Question 13, (4)

Let C be the midpoint of AB

$$\text{Then, } AC = 24 \text{ cm}$$

Let D be the midpoint of AC

$$\text{Then, } AD = 12 \text{ cm}$$

Construct a right angled triangle A, C_1 , D

Using Pythagoras gives

$$14^2 + 12^2 = (DC_1)^2$$

$$196 + 144 = (DC_1)^2$$

$$DC_1 = \sqrt{340} = 7.2 \text{ cm}$$

$$\text{Height} = (7.2 \times 2) + (14 \times 2) = 42.4 \text{ cm}$$

2018 Paper 1 Question 9, (4)

$$360 \div 10 = 36$$

$$180 - 36 = 144$$

$$144 \div 2 = 72$$

$$180 - 72 = 108$$

$$17 + 108 = 125$$

$$\text{Shaded Area} = 180 - 125 = 55^\circ$$

2019 Paper 1 Question 11, (3)

All of the angles at $O = 360 \div 5 = 72^\circ$

$$AOB = 72^\circ$$

$$FOB = 180 - 72 = 108^\circ$$

$$OFB = \frac{180 - 108}{2}$$

$$= 36^\circ$$

2019 Paper 2 Question 5, (2)

$$A = (3, 0, 0)$$

$$B = (3, 3, 8)$$

2019 Paper 2 Question 18, (4)

Create a right angled triangle TSB

Since TS & SB are the radius of the circle they have length 7.5 cm

$$\text{By Pythagoras, } TB = \sqrt{7.5^2 + 7.5^2}$$

$$= 10.6 \text{ cm}$$

TB is the radius of the larger circle, so TD also has length 10.6 cm

$$\text{So, height} = 10.6 + 15 = 25.6 \text{ cm}$$