Maths White Board

Higher Formula Sheet Rehearsal

Written by Matt Woodfine

Higher Formula Sheet 2024

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium = $\frac{1}{2}(a + b)h$

Volume of a prism = area of cross section x length

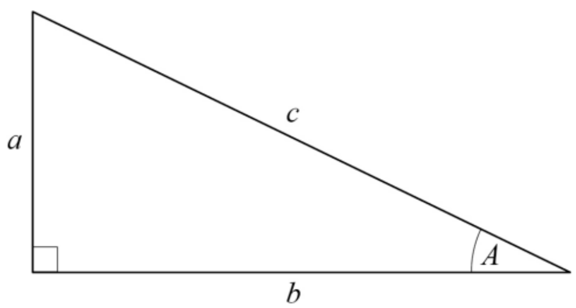
Where r is the radius and d is the diameter:
Circumference of a circle = $2\pi r = \pi d$
Area of a circle = πr^2

Quadratic formula

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

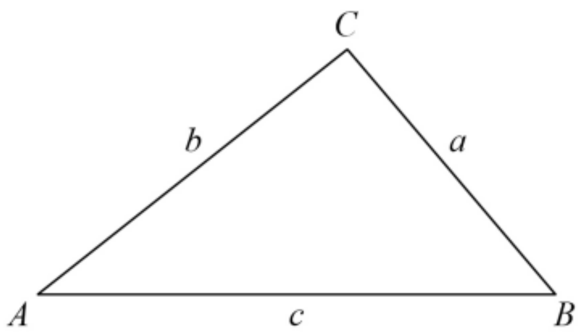
Pythagoras' Theorem and Trigonometry



In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:
$a^2 + b^2 = c^2$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

sin $A = \frac{a}{c}$ cos $A = \frac{b}{c}$ tan $A = \frac{a}{b}$



In any triangle ABC where a, b and c are the length of the sides:

Sine rule: $\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc\ cosA$

Area of triangle = $\frac{1}{2}\ ab\ sinC$

Compound interest

Where P is the principal amount, r is the interest rate over a given period and n is the number of times that the interest is compounded:

Total accrued = $P(1 + \frac{r}{100})^n$

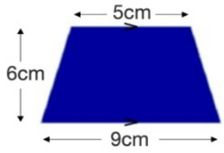
Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B:

$P(A$ or $B) = P(A) + P(B) - P(A$ and $B)$
$P(A$ and $B) = P(A$ given $B)\ P(B)$

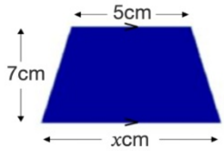
QU 1 - Area of 2D shapes

Calculate the area.



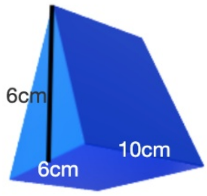
QU 2 - Reverse area of 2D shapes

Calculate the value of x if the area is 49cm^2.



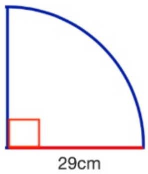
QU 3 - Volume of 3D shapes

Calculate the volume.



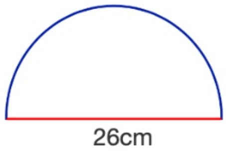
QU 4 - Circumference of a circle

Find the perimeter to 1dp.



QU 5 - Area of a circle

Find the area to 1dp.



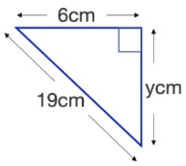
QU 6 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$5x^2 + 11x - 8 = 0$

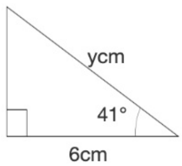
QU 7 - Apply Pythagoras' Theorem

Calculate y to 1dp.



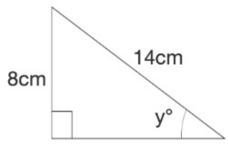
QU 8 - Apply SOH CAH TOA

Find y to 1dp.



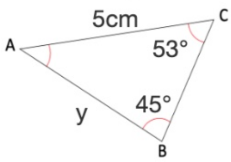
QU 9 - Apply SOH CAH TOA

Find y to 1dp.



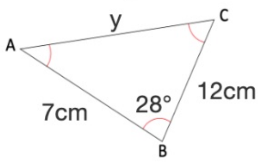
QU 10 - Sine and cosine rules

Calculate y to 1dp.



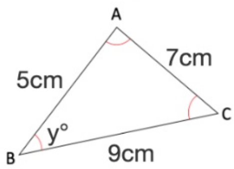
QU 11 - Sine and cosine rules

Calculate y to 1dp.



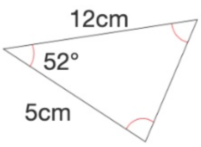
QU 12 - Sine and cosine rules

Calculate y to 1dp.



QU 13 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:

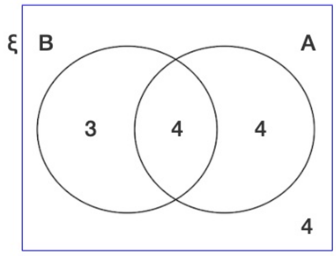


QU 14 - Calculate growth/decay

Ruth lost 4% on the value of a car worth £500 each year for 2 years. How much is the vehicle now worth?

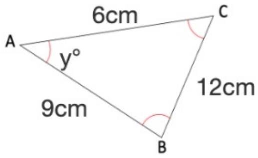
QU 15 - Complete and interpret a venn diagram

Find P(B∪A).



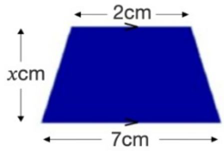
QU 1 - Sine and cosine rules

Calculate y to 1dp.



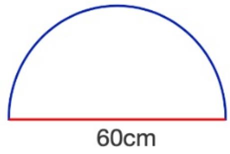
QU 2 - Reverse area of 2D shapes

Calculate the value of x if the area is 36cm^2.



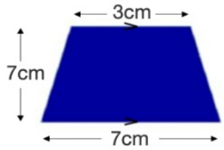
QU 3 - Area of a circle

Find the area to 1dp.



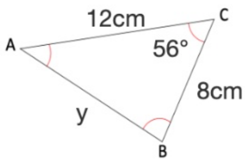
QU 4 - Area of 2D shapes

Calculate the area.



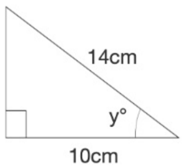
QU 5 - Sine and cosine rules

Calculate y to 1dp.



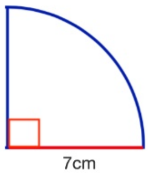
QU 6 - Apply SOH CAH TOA

Find y to 1dp.



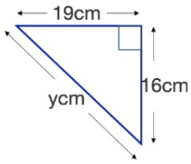
QU 7 - Circumference of a circle

Find the arc length to 1dp.



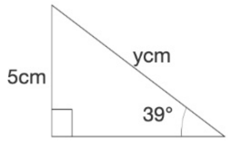
QU 8 - Apply Pythagoras' Theorem

Calculate y to 1dp.



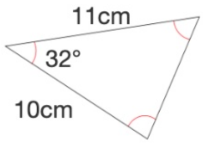
QU 9 - Apply SOH CAH TOA

Find y to 1dp.



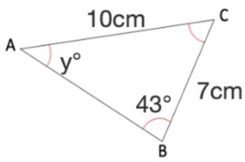
QU 10 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



QU 11 - Sine and cosine rules

Calculate y to 1dp.

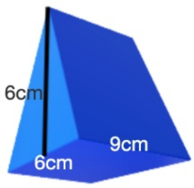


QU 12 - Calculate growth/decay

Brad invests £60 into a bank account returning 2% each year for 4 years. How much does Brad have in the account after 4 years?

QU 13 - Volume of 3D shapes

Calculate the volume.



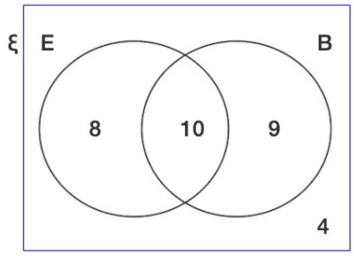
QU 14 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$4x^2 - 7x + 1 = 0$

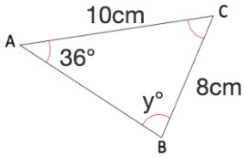
QU 15 - Complete and interpret a venn diagram

Find P(E∪B).



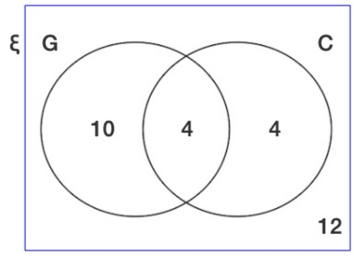
QU 1 - Sine and cosine rules

Calculate y to 1dp.



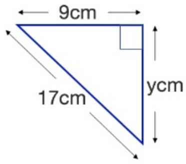
QU 2 - Complete and interpret a venn diagram

Find P(G∪C).



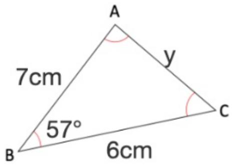
QU 3 - Apply Pythagoras' Theorem

Calculate y to 1dp.



QU 4 - Sine and cosine rules

Calculate y to 1dp.

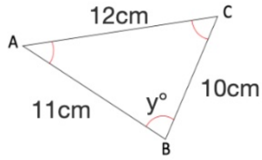


QU 5 - Calculate growth/decay

Tia invests £30 into a bank account returning 6% each year for 2 years. How much does Tia have in the account after 2 years?

QU 6 - Sine and cosine rules

Calculate y to 1dp.



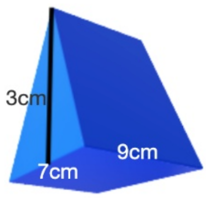
QU 7 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$2x^2 - 9x - 7 = 0$

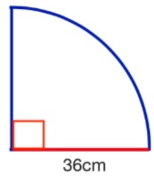
QU 8 - Volume of 3D shapes

Calculate the volume.



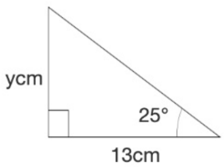
QU 9 - Area of a circle

Find the area to 1dp.



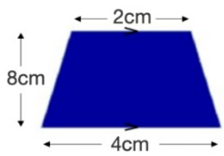
QU 10 - Apply SOH CAH TOA

Find y to 1dp.



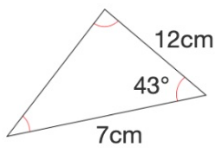
QU 11 - Area of 2D shapes

Calculate the area.



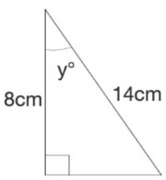
QU 12 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



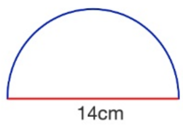
QU 13 - Apply SOH CAH TOA

Find y to 1dp.



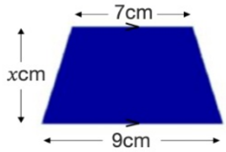
QU 14 - Circumference of a circle

Find the arc length to 1dp.



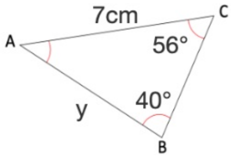
QU 15 - Reverse area of 2D shapes

Calculate the value of x if the area is $16cm^2$.



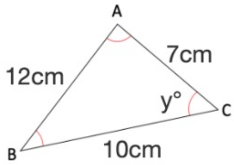
QU 1 - Sine and cosine rules

Calculate y to 1dp.



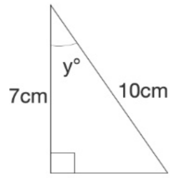
QU 2 - Sine and cosine rules

Calculate y to 1dp.



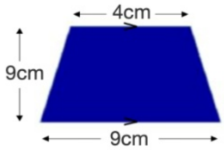
QU 3 - Apply SOH CAH TOA

Find y to 1dp.



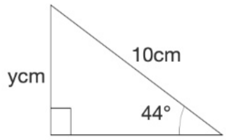
QU 4 - Area of 2D shapes

Calculate the area.



QU 5 - Apply SOH CAH TOA

Find y to 1dp.

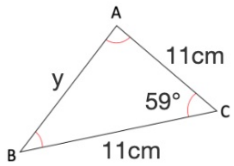


QU 6 - Calculate growth/decay

Ruth lost 4% on the value of a car worth £300 each year for 4 years. How much is the vehicle now worth?

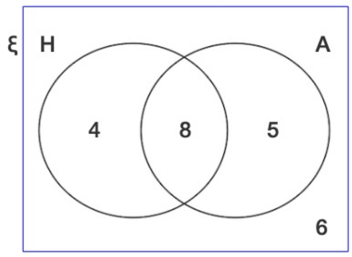
QU 7 - Sine and cosine rules

Calculate y to 1dp.



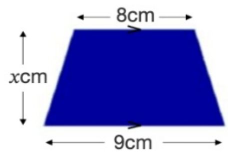
QU 8 - Complete and interpret a venn diagram

Find P(H∪A).



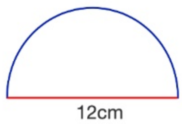
QU 9 - Reverse area of 2D shapes

Calculate the value of x if the area is 76.5cm^2.



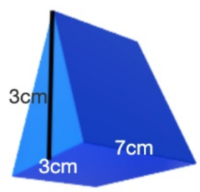
QU 10 - Circumference of a circle

Find the perimeter to 1dp.



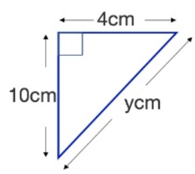
QU 11 - Volume of 3D shapes

Calculate the volume.



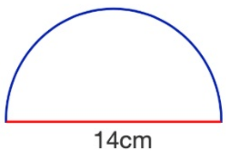
QU 12 - Apply Pythagoras' Theorem

Calculate y to 1dp.



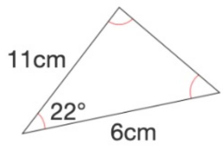
QU 13 - Area of a circle

Find the area to 1dp.



QU 14 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



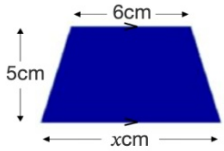
QU 15 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$8x^2 + 2x - 1 = 0$

QU 1 - Reverse area of 2D shapes

Calculate the value of x if the area is $35cm^2$.



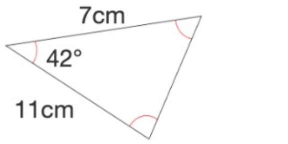
QU 2 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$-3x^2 + 11x + 12 = 0$

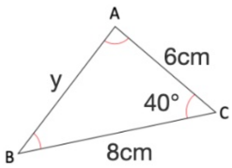
QU 3 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



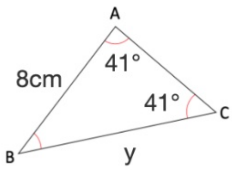
QU 4 - Sine and cosine rules

Calculate y to 1dp.



QU 5 - Sine and cosine rules

Calculate y to 1dp.



QU 6 - Apply SOH CAH TOA

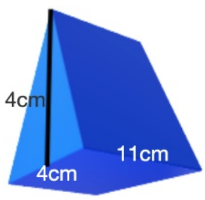
Find y to 1dp.

QU 7 - Calculate growth/decay

Brad lost 2% on the value of a car worth £200 each year for 2 years. How much is the vehicle now worth?

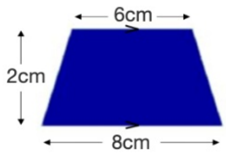
QU 8 - Volume of 3D shapes

Calculate the volume.



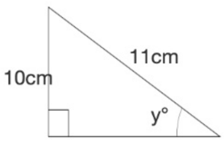
QU 9 - Area of 2D shapes

Calculate the area.



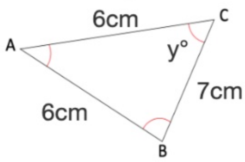
QU 10 - Apply SOH CAH TOA

Find y to 1dp.



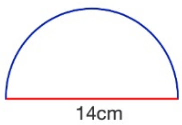
QU 11 - Sine and cosine rules

Calculate y to 1dp.



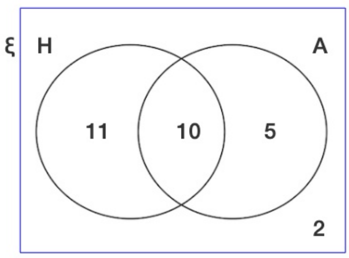
QU 12 - Circumference of a circle

Find the perimeter to 1dp.



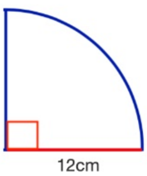
QU 13 - Complete and interpret a venn diagram

Find P(H∪A).



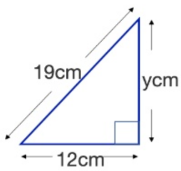
QU 14 - Area of a circle

Find the area to 1dp.



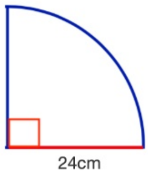
QU 15 - Apply Pythagoras' Theorem

Calculate y to 1dp.



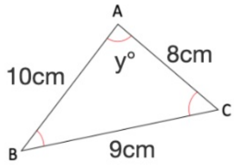
QU 1 - Circumference of a circle

Find the perimeter to 1dp.



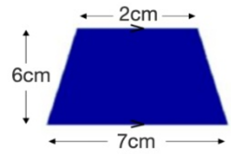
QU 2 - Sine and cosine rules

Calculate y to 1dp.



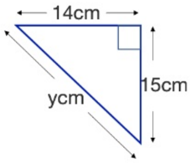
QU 3 - Area of 2D shapes

Calculate the area.



QU 4 - Apply Pythagoras' Theorem

Calculate y to 1dp.

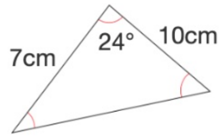


QU 5 - Calculate growth/decay

Brad invests £60 into a bank account returning 3% each year for 5 years. How much does Brad have in the account after 5 years?

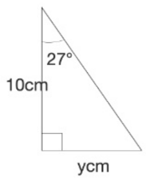
QU 6 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



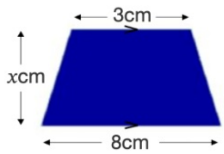
QU 7 - Apply SOH CAH TOA

Find y to 1dp.



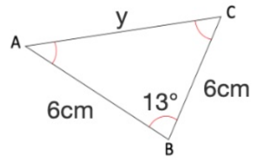
QU 8 - Reverse area of 2D shapes

Calculate the value of x if the area is 16.5cm^2.



QU 9 - Sine and cosine rules

Calculate y to 1dp.



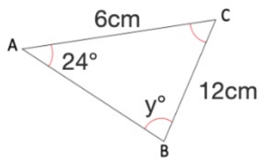
QU 10 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$4x^2 - 6x - 3 = 0$

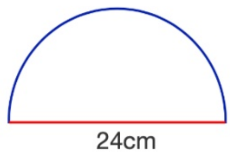
QU 11 - Sine and cosine rules

Calculate y to 1dp.



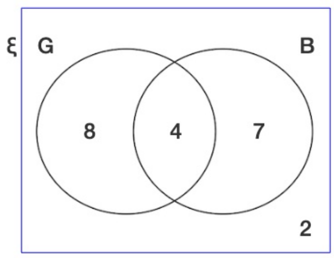
QU 12 - Area of a circle

Find the area to 1dp.



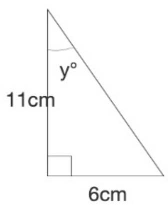
QU 13 - Complete and interpret a venn diagram

Find P(G∪B).



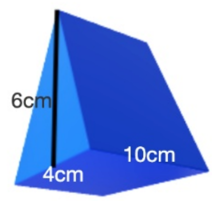
QU 14 - Apply SOH CAH TOA

Find y to 1dp.



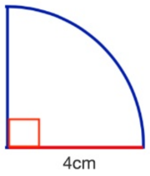
QU 15 - Volume of 3D shapes

Calculate the volume.



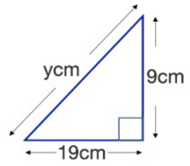
QU 1 - Circumference of a circle

Find the arc length to 1dp.



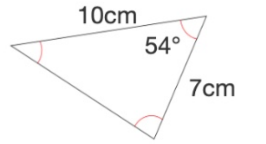
QU 2 - Apply Pythagoras' Theorem

Calculate y to 1dp.



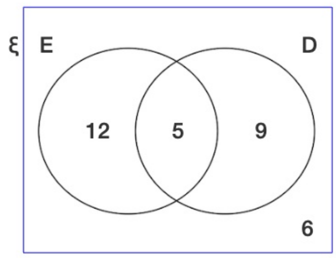
QU 3 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



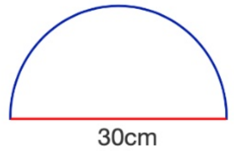
QU 4 - Complete and interpret a venn diagram

Find P(E∪D).



QU 5 - Area of a circle

Find the area to 1dp.

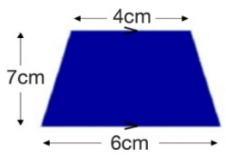


QU 6 - Calculate growth/decay

Will lost 2% on the value of a car worth £400 each year for 2 years. How much is the vehicle now worth?

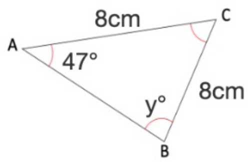
QU 7 - Area of 2D shapes

Calculate the area.



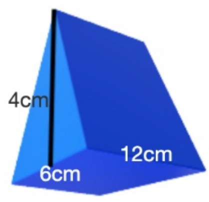
QU 8 - Sine and cosine rules

Calculate y to 1dp.



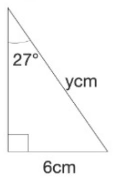
QU 9 - Volume of 3D shapes

Calculate the volume.



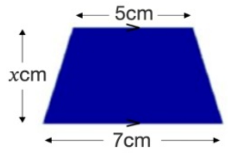
QU 10 - Apply SOH CAH TOA

Find y to 1dp.



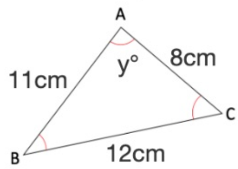
QU 11 - Reverse area of 2D shapes

Calculate the value of x if the area is 42cm^2.



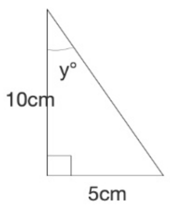
QU 12 - Sine and cosine rules

Calculate y to 1dp.



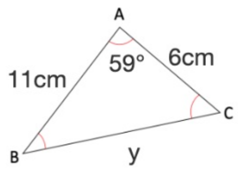
QU 13 - Apply SOH CAH TOA

Find y to 1dp.



QU 14 - Sine and cosine rules

Calculate y to 1dp.



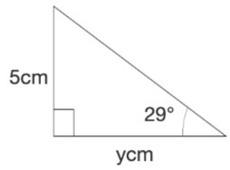
QU 15 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$2x^2 - 8x - 4 = 0$

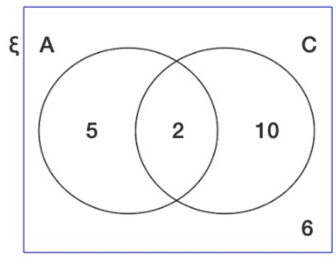
QU 1 - Apply SOH CAH TOA

Find y to 1dp.



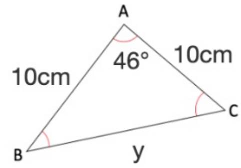
QU 2 - Complete and interpret a venn diagram

Find P(A∪C).



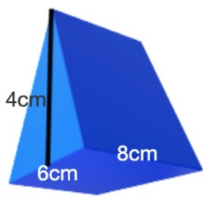
QU 3 - Sine and cosine rules

Calculate y to 1dp.



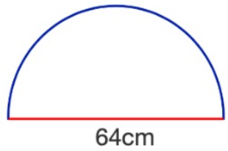
QU 4 - Volume of 3D shapes

Calculate the volume.



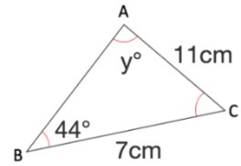
QU 5 - Area of a circle

Find the area to 1dp.



QU 6 - Sine and cosine rules

Calculate y to 1dp.



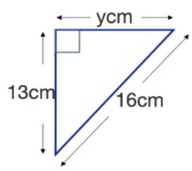
QU 7 - Solve a quadratic by using the formula

Using the quadratic formula, solve the following equation (to 2 d.p.):

$-11x^2 + 9x + 6 = 0$

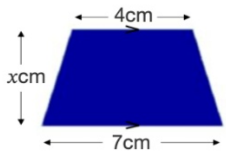
QU 8 - Apply Pythagoras' Theorem

Calculate y to 1dp.



QU 9 - Reverse area of 2D shapes

Calculate the value of x if the area is 49.5cm^2.

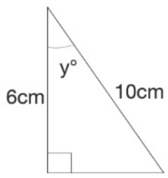


QU 10 - Calculate growth/decay

Dave invests £70 into a bank account returning 2% each year for 5 years. How much does Dave have in the account after 5 years?

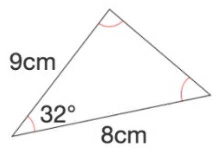
QU 11 - Apply SOH CAH TOA

Find y to 1dp.



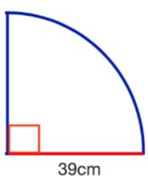
QU 12 - Area of a triangle (trigonometry)

Calculate the area of the following triangle to 2 dp:



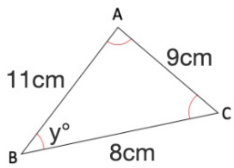
QU 13 - Circumference of a circle

Find the arc length to 1dp.



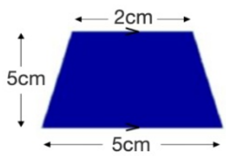
QU 14 - Sine and cosine rules

Calculate y to 1dp.



QU 15 - Area of 2D shapes

Calculate the area.



ANS 1 - Area of 2D shapes	ANS 2 - Reverse area of 2D shapes	ANS 3 - Volume of 3D shapes
$42cm^2$	9cm	$180cm^3$
ANS 4 - Circumference of a circle	ANS 5 - Area of a circle	ANS 6 - Solve a quadratic by using the formula
103.6cm	$265.5cm^2$	x = 0.58 or x = -2.78
ANS 7 - Apply Pythagoras' Theorem	ANS 8 - Apply SOH CAH TOA	ANS 9 - Apply SOH CAH TOA
18.0cm	8.0cm	34.8°
ANS 10 - Sine and cosine rules	ANS 11 - Sine and cosine rules	ANS 12 - Sine and cosine rules
5.6cm	6.7cm	50.7°
ANS 13 - Area of a triangle (trigonometry)	ANS 14 - Calculate growth/decay	ANS 15 - Complete and interpret a venn diagram
$23.64cm^2$	£460.80	$\frac{11}{15}$

ANS 1 - Sine and cosine rules	ANS 2 - Reverse area of 2D shapes	ANS 3 - Area of a circle
104.5°	8cm	$1413.7cm^2$
ANS 4 - Area of 2D shapes	ANS 5 - Sine and cosine rules	ANS 6 - Apply SOH CAH TOA
$35cm^2$	10.0cm	44.4°
ANS 7 - Circumference of a circle	ANS 8 - Apply Pythagoras' Theorem	ANS 9 - Apply SOH CAH TOA
11.0cm	24.8cm	7.9cm
ANS 10 - Area of a triangle (trigonometry)	ANS 11 - Sine and cosine rules	ANS 12 - Calculate growth/decay
$29.15cm^2$	28.5°	£64.95
ANS 13 - Volume of 3D shapes	ANS 14 - Solve a quadratic by using the formula	ANS 15 - Complete and interpret a venn diagram
$162cm^3$	$x = 1.59$ or $x = 0.16$	$\frac{27}{31}$

ANS 1 - Sine and cosine rules	ANS 2 - Complete and interpret a venn diagram	ANS 3 - Apply Pythagoras' Theorem
47.3°	$\frac{3}{5}$	14.4cm
ANS 4 - Sine and cosine rules	**ANS 5 - Calculate growth/decay**	**ANS 6 - Sine and cosine rules**
6.3cm	£33.71	69.5°
ANS 7 - Solve a quadratic by using the formula	**ANS 8 - Volume of 3D shapes**	**ANS 9 - Area of a circle**
x = 5.18 or x = -0.68	94.5cm^3	1017.9cm^2
ANS 10 - Apply SOH CAH TOA	**ANS 11 - Area of 2D shapes**	**ANS 12 - Area of a triangle (trigonometry)**
6.1cm	24cm^2	28.64cm^2
ANS 13 - Apply SOH CAH TOA	**ANS 14 - Circumference of a circle**	**ANS 15 - Reverse area of 2D shapes**
55.2°	22.0cm	2cm

ANS 1 - Sine and cosine rules	ANS 2 - Sine and cosine rules	ANS 3 - Apply SOH CAH TOA
9.0cm	88.0°	45.6°
ANS 4 - Area of 2D shapes	ANS 5 - Apply SOH CAH TOA	ANS 6 - Calculate growth/decay
58.5cm^2	6.9cm	£254.80
ANS 7 - Sine and cosine rules	ANS 8 - Complete and interpret a venn diagram	ANS 9 - Reverse area of 2D shapes
10.8cm	$\frac{17}{23}$	9cm
ANS 10 - Circumference of a circle	ANS 11 - Volume of 3D shapes	ANS 12 - Apply Pythagoras' Theorem
30.8cm	31.5cm^3	10.8cm
ANS 13 - Area of a circle	ANS 14 - Area of a triangle (trigonometry)	ANS 15 - Solve a quadratic by using the formula
77.0cm^2	12.36cm^2	x = 0.25 or x = -0.50

ANS 1 - Reverse area of 2D shapes	ANS 2 - Solve a quadratic by using the formula	ANS 3 - Area of a triangle (trigonometry)
8cm	x = -0.88 or x = 4.55	25.76cm^2
ANS 4 - Sine and cosine rules	ANS 5 - Sine and cosine rules	ANS 6 - Apply SOH CAH TOA
5.1cm	8.0cm	8.0cm
ANS 7 - Calculate growth/decay	ANS 8 - Volume of 3D shapes	ANS 9 - Area of 2D shapes
£192.08	88cm^3	14cm^2
ANS 10 - Apply SOH CAH TOA	ANS 11 - Sine and cosine rules	ANS 12 - Circumference of a circle
65.4°	54.3°	36.0cm
ANS 13 - Complete and interpret a venn diagram	ANS 14 - Area of a circle	ANS 15 - Apply Pythagoras' Theorem
$\frac{13}{14}$	113.1cm^2	14.7cm

ANS 1 - Circumference of a circle	ANS 2 - Sine and cosine rules	ANS 3 - Area of 2D shapes
85.7cm	58.8°	27cm^2
ANS 4 - Apply Pythagoras' Theorem	ANS 5 - Calculate growth/decay	ANS 6 - Area of a triangle (trigonometry)
20.5cm	£69.56	14.24cm^2
ANS 7 - Apply SOH CAH TOA	ANS 8 - Reverse area of 2D shapes	ANS 9 - Sine and cosine rules
5.1cm	3cm	1.4cm
ANS 10 - Solve a quadratic by using the formula	ANS 11 - Sine and cosine rules	ANS 12 - Area of a circle
x = 1.90 or x = -0.40	11.7°	226.2cm^2
ANS 13 - Complete and interpret a venn diagram	ANS 14 - Apply SOH CAH TOA	ANS 15 - Volume of 3D shapes
$\frac{19}{21}$	28.6°	120cm^3

ANS 1 - Circumference of a circle	ANS 2 - Apply Pythagoras' Theorem	ANS 3 - Area of a triangle (trigonometry)
6.3cm	21.0cm	28.32cm^2
ANS 4 - Complete and interpret a venn diagram	ANS 5 - Area of a circle	ANS 6 - Calculate growth/decay
$\frac{13}{16}$	353.4cm^2	£384.16
ANS 7 - Area of 2D shapes	ANS 8 - Sine and cosine rules	ANS 9 - Volume of 3D shapes
35cm^2	47.0°	144cm^3
ANS 10 - Apply SOH CAH TOA	ANS 11 - Reverse area of 2D shapes	ANS 12 - Sine and cosine rules
13.2cm	7cm	76.5°
ANS 13 - Apply SOH CAH TOA	ANS 14 - Sine and cosine rules	ANS 15 - Solve a quadratic by using the formula
26.6°	9.4cm	x = 4.45 or x = -0.45

ANS 1 - Apply SOH CAH TOA	ANS 2 - Complete and interpret a venn diagram	ANS 3 - Sine and cosine rules
9.0cm	$\frac{17}{23}$	7.8cm
ANS 4 - Volume of 3D shapes	ANS 5 - Area of a circle	ANS 6 - Sine and cosine rules
96cm^3	1608.5cm^2	26.2°
ANS 7 - Solve a quadratic by using the formula	ANS 8 - Apply Pythagoras' Theorem	ANS 9 - Reverse area of 2D shapes
$x = -0.44$ or $x = 1.25$	9.3cm	9cm
ANS 10 - Calculate growth/decay	ANS 11 - Apply SOH CAH TOA	ANS 12 - Area of a triangle (trigonometry)
£77.29	53.1°	19.08cm^2
ANS 13 - Circumference of a circle	ANS 14 - Sine and cosine rules	ANS 15 - Area of 2D shapes
61.3cm	53.8°	17.5cm^2