Question	ANSWER	MARKS R	T

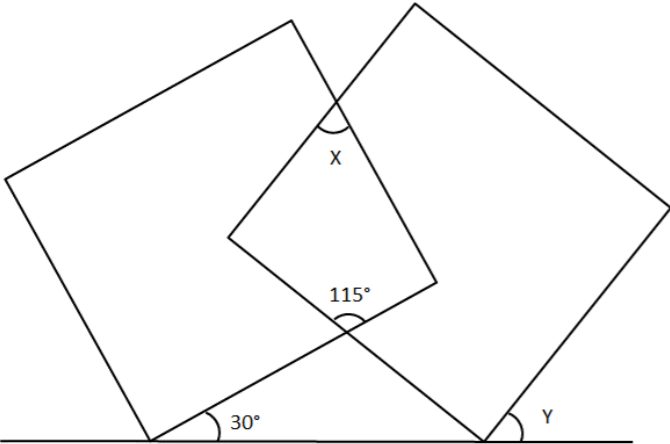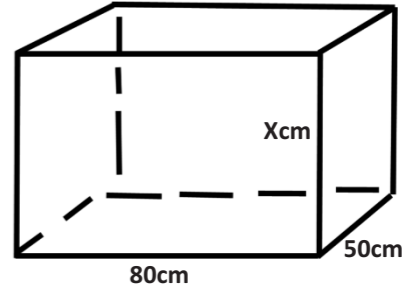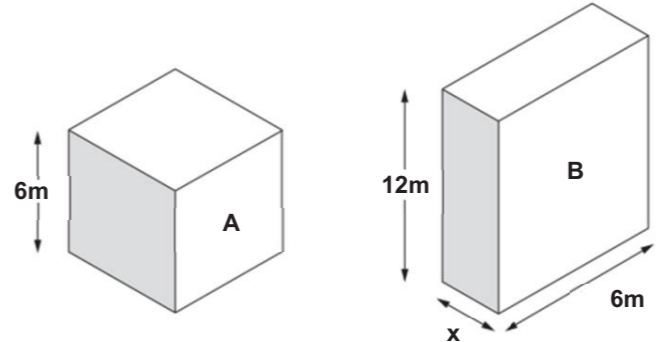**6** A nautical mile is a measure of distance used for navigation by sea or air.

A distance of 1 nautical mile is equivalent to 1.16 normal miles

A ship sales **5 nautical miles** in in a **time of 43.5 minutes**.

(a) Sailing at the same speed, how many minutes and seconds does it take for the ship to travel 1 nautical mile?

(1)

(b) In minutes and seconds, how long does it take for the ship to sail five normal miles?

(1)

(c) The ship travels another 10 nautical miles in 1 hour and 16.5 mins. What was the ships average speed in **nautical miles per hour**?

nmph (1)

7 The diagram below shows two squares on a straight line. Calculate the value of **angle 'x'** and **angle 'y'**

X: °

(2)

Y: °

115°

X

30° Y

SCORE
5

4

Question	ANSWER	MARKS R	T

8 Jadon's fish tank has a length of 80cm, width 50cm and a height which is three quarters of its length.

The tank can hold 1 goldfish for every 10 litres of water.

Jadon buys a 0.36kg pack of fish food for £28.80.

Eat goldfish eats 0.5g of fish food twice a day.

Xcm

80cm   50cm

(a) How many litres of water does Jadon need to fill his fish tank?

Litres (1)

(b) The tank can be filled with 200cm³ of water every <u>second</u>. How many <u>minutes</u> will it take to fill the tank?

minutes (1)

(c) Jadon adds the maximum number of fish to the tank. How many does he add in total?

(1)

(d) How many days will a pack last if Jadon feeds all his fish every day.

days (1)

(e) How much does it cost to feed one fish per week?

pence (1)

SCORE
5

5

Question	ANSWER	MARKS R	T

8 An online shop offers four different appliances for sale.

Appliance	Price	Delivery Charge
Washing Machine	£490	£40
Dishwasher	£370	£45
Fridge	£1100	£90
Tumble Dryer	£400	£35

The delivery charges shown are for weekdays only are per appliance.

The delivery charge is increased by 10% for a delivery on a weekend.

(a) How much more expensive is the Fridge as a percentage compared to the Tumble Dryer?

% (1)

(b) Henry buys a washing machine and dishwasher.
What is the total amount he pays if both items are delivered on Saturday?

£ (1)

(c) Discount vouchers apply only to the items and not the delivery charge. If Henry has a 13% voucher, how much will he save?

£ (1)

(d) Sarah has a 30% discount voucher. Which appliance did she buy if she paid £315 in total including delivery on a Monday?

(1)

SCORE
4

Question	ANSWER	MARKS R	T

9 Susan cycles for 2.25 hours. During that time, Susan takes three breaks, with each break twice as long as the previous one. Her first break was after 30 minutes cycling.

(a) If Susan's total break time was 35 minutes, how long was her shortest break?

min (1)

(b) If Susan started cycling at 16:57, at what time did she end her first break?

(1)

10 Cube A and cuboid B below have **equal** volumes.

6m A
12m B 6m x

(a) What is the width 'x' of cuboid B?

m (1)

(b) What is the surface area of cuboid B?

m² (1)

(c) A five-litre tin of paint can cover 20m². Exactly how many litres of paint do I need to cover all sides of cuboid B?

litres (1)

SCORE
5

Question			ANSWER	MARKS R	T

11 The table below shows the tax band in four towns. The band varies depending on the value of the house. *For example, a house valued at £750,000 in Chelmsford would be classified as a 'Band B' house as it is greater than £750,000.*

House Value	Chelmsford	Colchester	Southend	Westcliff
> = £250,000	Band A	Band A	Band A	Band A
> = £500,000	Band A	Band A	Band B	Band A
> = £750,000	Band B	Band B	Band C	Band C
> = £1,000,000	Band B	Band C	Band D	Band D

The second table shows the monthly tax bill for each band. *For example, in 'Band A', a couple would pay £80 per month, or a student would pay £60 per month.*

Council Band	Single	Student	Pensioner	Couple
Band A	£50	£60	£70	£80
Band B	£70	£80	£89	£93
Band C	£100	£90	£100	£128
Band D	£101	£110	£129	£150

(a) How much tax will a pensioner pay each month for a house worth £740,000 in Colchester?

£   (1)

(b) If a couple pay £80 tax for a house in Southend.
What is the lowest amount that their house is worth?

£   (1)

(c) A single person pays £101 monthly tax. How much more would a couple pay living in the same house over 1 year?

£   (1)

(d) Only couples and singles live on Ashton Road. All live in Band A. The couples pay £4,240 a month and the singles £850 a month in tax. How many houses are there on Ashton Road?

(1)

SCORE
4

Surname ....

First Name ....

Start Time: ....

End Time: ....

11+ CSSE Stretch

Mathematics Paper 3

40 Minutes

The questions in this paper are worth thirty marks

Attempt all the questions, writing your answers clearly

If you cannot answer a question, leave it, and go on to the next one

Use any time you have left to check your answers and go back to any unanswered questions

The numbers in brackets are the marks available for each question

Do NOT use a calculator

PAGE	SCORE	
	Marks	Total
18		6
19		5
20		5
21		5
22		4
23		5
TOT:		30

Question	ANSWER	MARKS R	T

5 The table below shows what dosage of medicine to administer to children of different age groups from birth to 12. Using this information, answer the questions below.

Age	Timings	Dose
3 to 6 months	Up to 3 times in 24 hours	2.5ml
6 to 12 months	3 times a day	2.5ml
1 to 2 years	3-4 times a day	2.5ml
3 to 7 years	3-4 times a day	5ml
8 to 12 years	3-4 times a day	10ml

Do not give more than 4 doses in any 24 hour period
Leave at least 4 hours between doses.

(a) What is the maximum dose of medicine an 18-month-old child can have in one day?

ml (1)

(b) If one tablespoon holds 5ml of medicine, how many spoons will a 10-year-old have after 3 doses?

(1)

(c) If a 7-year-old had her first dose at 9am, what is the earliest time she can have her 4th and final dose?

(1)

6 There are 20 square and triangle shapes in a bag.

Each is either black or white.

The ratio of black shapes to white shapes is 3:2

The ratio of black triangles to black squares is 1:2

The ratio of black squares to white squares is 4:1

Next to each shape, write down the quantity of each in the bag.

▲

■

△

□

(4)

SCORE
7

Question	ANSWER	MARKS R	T

7 The chart below shows four different classifications of typing speed.

The more words you can type per minute, the higher the classification of your speed.

(a) Annie writes 600 words in 20 minutes. What classification is she?

(1)

(b) What is the minimum number of words Annie needs to achieve a 'Fast' classification within a 20-minute period?

(1)

(c) Annie achieves a classification of Advanced. What is the slowest time she could have typed 800 words to achieve this?

mins (1)

(d) Adam has two '15 minute' attempts at typing. First, he types 553 words and then 652 words. What classification is he?

(1)

SCORE
4

Question	ANSWER	MARKS R	T

10 The table below shows the price list for different sized flyers.
A discount is applied only to quantities over 50.
e.g., 50 A3 flyers will cost 25p each and any additional ones will cost 15p each

A3 Flyer	1 to 50, 25p each, over 50, 15p each
A4 Flyer	1 to 50, 21p each, over 50, 18p each
A5 Flyer	1 to 50, 15p each, over 50, 12p each
A6 Flyer	15p each
Colour	Additional 60p for every 10 prints on all sizes

(a) Claire wants to order 40 A3 flyers, 60 A4 flyers and 20 A5 flyers. How much will she pay?

(1)

(b) If Claire wants to order colour copies instead, how much extra will she need to pay?

(1)

(c) The company want to charge one price instead of two for all orders of 250 A3 flyers. What price should they charge per flyer so the average cost remains the same?

(1)

(d) All prices shown include 20% tax. How much profit does the company make on 250 A3 Flyers if the cost of each print is 5p?

(1)

SCORE
4

Question	ANSWER	MARKS R	T

11 The weight of a round glass fish bowl depends on its height, radius and thickness.

The weight can be calculated using the formula:

$$\text{Weight (g)} = \frac{\text{Height (cm) x Radius (cm) x 0.5}}{\text{Thickness (mm)}}$$

The units for each measurement are provided in brackets ()

(a) What is the weight of a bowl, whose height is twice its radius of 7cm and thickness of glass is 2mm?

g (1)

(b) What is the radius of a bowl whose weight is 0.3kg, thickness is 3mm and height is 30cm?

cm (1)

(c) What is the thickness of a bowl that has a weight of 50g, a radius of 200mm and a height of 40cm?

mm (1)

(d) A bowl contains 800g of oranges and 1.1kg of apples. Both the height and radius is 35cm. The thickness is 1cm. What is the total weight of the bowl including the fruit to 2 decimal places?

KG (1)

SCORE
4

Question	ANSWER	MARKS R	T

5 The diagram below shows a square with a side length of 8cm. It is surrounded by 8 identical trapeziums. The longest length on the trapezium is also 8cm.
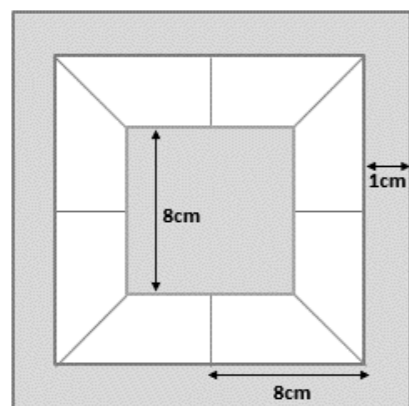
(a) Calculate the total area of the shaded parts of the diagram.

cm² (1)

(b) Calculate the area of one trapezium.

cm² (1)

(c) Calculate the perimeter of the outer square shown in the diagram

cm (1)

6 There are 1.7 pints in a litre and 3.8 litres in a gallon.

(a) How many pints are there in 5 gallons?

(1)

(b) What is the difference in litres between 8.5 pints and 3 gallons?

(1)

SCORE 5

Question	ANSWER	MARKS R	T

7 A website sells a pack of four batteries for £6.00. A pack cannot be split. The table below shows the discounted price when buying multiple packs. For example, buying 7 packs will save you 6% i.e., 36p saving per pack.

Number of Packs	Price per Pack	Saving per Pack
1 to 5	£6.00	0%
6+	£5.64	Save 6%
10+	(a)	Save 8%
15+	£5.46	(b)

(a) How much will eleven packs cost?

£ (1)

(b) Fifteen or more packs cost £5.46.
What is the percentage saving per pack?

(1)

(c) How much will I spend in total if I need 45 batteries?

£ (1)

8 (a) Round each number below to the nearest hundredth and place the new number in decreasing order.

2.317,   2.249,   2.599,   2.286,   2.573

_____,   _____,   _____,   _____,   _____

(1)

(b) A 3-decimal number is rounded to 15.5.
What is the smallest number this could have been?
Answer to 3 decimal places.

(1)

SCORE 5

Qn	Part	Answer	Explain
1	a	15 **+** 6 = 3 **x** 7	15 + 6 = 21 and 3 x 7 = 21
	b	13 − (3 − 2) x 5 = 8	13 - 1 x 5, using BODMAS, 13 - 5 = 8
2	a	$6^2 - 4^2$	36 - 16 = 20
	b	29 and 31 (2 marks)	29 x 10 = 290, rounded to nearest 100 = 300 31 x 10 = 310, rounded to nearest 100 = 300 23 rounds to 200 and 37 rounds to 400, so not valid answers
3	a	300	$\frac{3}{4}$ X + $\frac{1}{2}$ X = 375, so $\frac{5}{4}$ X = 375, therefore X= 300
4	a	34%	Descending order: $\frac{7}{10}$, $\frac{6}{15}$, 0.352, 34%, $\frac{1}{3}$ Descending order in decimals: 0.7, 0.4, 0.352, 0.34, 0.333
	b	0.352	0.34 - 0.349 = -0.009 0.352 - 0.349 = 0.003, therefore closer to 0.0349
5	a	Woolworths	Fresh World = (£8.50 for 3 bottles) x 4 packs = £34 Woolworths (£3.75 for 9 bottles) + 3 free = £33.75
	b	£0.25	The question asks how much <u>more</u> change, not how much change. Therefore £34 - £33.75
6	a	8 mins 42 seconds	43.5 minutes ÷ 5 nautical miles = 8.7 minutes 0.7 minutes = 0.7 x 60 = 42 seconds
	b	37 mins 30 seconds	5 nautical miles = 5 x 1.16 normal miles = 5.8 miles 5.8 miles = 43.5mins 1 mile = 43.5 ÷ 5.8 = 7.5 mins **per mile**, x 5 miles = 37.5 mins
	c	7.5 nautical mph	Total Distance = 5 + 10 = 15 nautical miles Total Time = 43.5 mins + 76.5 mins = 2 hours Speed = Distance/Time = 15 / 2 = 7.5
7	X	65°	Two angles are part of the square, 360° - 90° - 90° - 115°
	Y	55°	First calculate angle adjacent to Y: 180 - 30 - 115 = 35 Then, 180 - 35 - 90 = 55
8	a	240 litres	Volume = 80 x 50 x $\frac{3}{4}$ of 80 = 240,000 = 240 litres
	b	20 minutes	240,000 ÷ 200 = 1,200 seconds ÷ 60 = 20 minutes
	c	24	240 litres ÷ 10 litres per fish = 24 fish
	d	15 days	Each fish eats 0.5g x2 a day, therefore 24g per day for all fish. 360g ÷ 24 = 15 days
	e	56 pence	360 grams = £28.80 1 gram = £28.80 ÷ 360 = 8p per gram We know a fish eats 1g per day, so 1 week = 7g of food 7 x 8p = 56p

Qn	Part	Answer	Explain
9	a	4 and 1	C = D - B, substitute this into A =2B + C. We know A=9, D = 5 9 = 2B + (D-B), so B = 9 - D, so B = 4 and C = 1
	b	17 and 10	B = 7, C = 3. So A = 2(7) + 3 = 17 D = 7 + 3 = 10
	c	12 and 24	C = A - 2B, so 36 - 2(12) = 12 D = B + C = 12 + 12 = 24
10	a	6	Each parent will have a shoe size of 7, so (7 + 7 + 4) ÷ 3
	b	9	We know the family sum of shoe size is 7 + 7 + 4 = 18* Mum and Teresa = $4\frac{1}{2} + 4\frac{1}{2}$ = 9, therefore 18 - 9 = 9
	c	8 Years	Sum of new size = 3 x 7 $\frac{1}{3}$ = 22. This is 4 higher than *18, therefore a difference of 4 sizes. Each year = 0.5, therefore 8 years have passed to grow 4 sizes
11	a	Germany and United States	Only Germany and US 2020 bars are shorter than their 2019 bars
	b	6.5 BT	2019 = 3.25, 2020 = 9.75. This is a difference of 6.5
	c	150 %	(2.5 - 1) ÷ 1 x 100 = 150
	d	7 Years	US had reduced its emissions by 0.75 BT 5.25 ÷ 0.75 = 7 Years

Paper 2			
1	a	7	59 ÷ $\frac{59}{7}$ = 59 x $\frac{7}{59}$
	b	$\frac{1}{2}$	$\frac{22}{4}$ ÷ 11 Note, 5 $\frac{2}{4}$ is exactly half of 11
2	a	248 miles	1 cm = 16 miles, 15.5 x 16 =
	b	2 cm	$\frac{5}{80}$ x 32 = 2
3	-	104 ml	2600 ml ÷ 25 = 104
4	a	60	Multiply the number of possible outcomes for the first number by the number of possible outcomes for the second number. Repeat for the third number, 1st number could be 0,2,4,6 or 8 i.e., 5 outcomes 2nd number could be any 4 of the above as 1 no. can't repeat No. of outcomes = 5 x 4 x 3 = 60
	b	8	8 is the only even cubic number from the choice of 0 to 9
	c	6	2, 4 and 8 are factors of 8, leaving just the number 6
	d	2863	19 – 8 – 6 – 3 = 6, so 1st digit is 2