



## **Maths Questions By Topic:**

### **Number**

### **Edexcel GCSE (Higher)**

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## Old Spec A (Linear)

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1 (a) Work out  $3.67 \times 4.2$

.....  
(3)

(b) Work out  $59.84 \div 1.6$

.....  
(3)

**(Total for Question 1 is 6 marks)**

2 Work out  $4\frac{1}{5} - 2\frac{2}{3}$

Give your answer as a mixed number.

.....  
**(Total for Question 2 is 3 marks)**

---

3 (a) Write down the value of  $7^0$

.....  
(1)

(b) Find the value of  $3 \times 3^6 \times 3^{-6}$

.....  
(1)

(c) Find the value of  $2^{-4}$

.....  
(1)

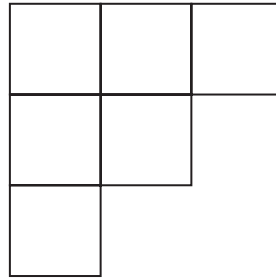
(d) Find the value of  $27^{\frac{1}{3}}$

.....  
(1)

**(Total for Question 3 is 4 marks)**

---

4 The diagram shows a shape made from 6 identical squares.



The total area of the shape is  $5406 \text{ cm}^2$

- (a) Find an estimate for the length of one side of each square.  
Give your answer correct to the nearest whole number.

..... cm  
(3)

- (b) Is your answer to part (a) an underestimate or an overestimate?  
You must give a reason for your answer.

.....  
.....  
.....  
(1)

**(Total for Question 4 is 4 marks)**

5 Ted is trying to change  $0.\dot{4}\dot{3}$  to a fraction.

Here is the start of his method.

$$x = 0.\dot{4}\dot{3}$$

$$10x = 4.\dot{3}\dot{4}$$

$$10x - x = 4.\dot{3}\dot{4} - 0.\dot{4}\dot{3}$$

Evaluate Ted's method so far.

.....

.....

.....

**(Total for Question 5 is 1 mark)**

6 Show that  $\frac{8 + \sqrt{12}}{5 + \sqrt{3}}$  can be written in the form  $\frac{a + \sqrt{3}}{b}$ , where  $a$  and  $b$  are integers.

---

(Total for Question 6 is 4 marks)



7 Show that

$$2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$$

---

(Total for Question 7 is 3 marks)

- 8 Write these numbers in order of size.  
Start with the smallest number.

$6.72 \times 10^5$

$67.2 \times 10^{-4}$

$672 \times 10^4$

$0.000\,672$

---

(Total for Question 8 is 2 marks)

---

9 (a) Find the value of  $\sqrt[4]{81 \times 10^8}$

.....  
(2)

(b) Find the value of  $64^{-\frac{1}{2}}$

.....  
(2)

(c) Write  $\frac{3^n}{9^{n-1}}$  as a power of 3

.....  
(2)

---

(Total for Question 9 is 6 marks)

10 Show that  $\frac{\sqrt{180} - 2\sqrt{5}}{5\sqrt{5} - 5}$  can be written in the form  $a + \frac{\sqrt{5}}{b}$  where  $a$  and  $b$  are integers.

---

(Total for Question 10 is 4 marks)

**11** Find the Lowest Common Multiple (LCM) of 108 and 120

.....  
**(Total for Question 11 is 3 marks)**

---

12 Work out  $1\frac{3}{4} \times 1\frac{1}{3}$

Give your answer as a mixed number.

---

(Total for Question 12 is 3 marks)

- 13 Express  $0.4\dot{1}\dot{8}$  as a fraction.  
You must show all your working.

.....  
(Total for Question 13 is 3 marks)

- 14 (a) Rationalise the denominator of  $\frac{22}{\sqrt{11}}$   
Give your answer in its simplest form.

- ..... (2)  
(b) Show that  $\frac{\sqrt{3}}{2\sqrt{3}-1}$  can be written in the form  $\frac{a+\sqrt{3}}{b}$  where  $a$  and  $b$  are integers.

..... (3)  
(Total for Question 14 is 5 marks)

15 Given that  $9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{x+1}$   
find the exact value of  $x$ .

$x = \dots\dots\dots$

**(Total for Question 15 is 3 marks)**



16 Find the highest common factor (HCF) of 72 and 90

.....  
(Total for Question 16 is 2 marks)

---

17 (a) Work out an estimate for the value of  $\sqrt{63.5 \times 101.7}$

.....  
(2)

$(2.3)^6 = 148$  correct to 3 significant figures.

(b) Find the value of  $(0.23)^6$  correct to 3 significant figures.

.....  
(1)

(c) Find the value of  $5^{-2}$

.....  
(1)

**(Total for Question 17 is 4 marks)**

---

**18** Work out  $3\frac{1}{2} \times 1\frac{3}{5}$

Give your answer as a mixed number in its simplest form.

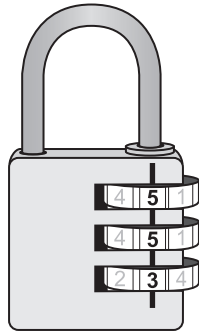
.....  
**(Total for Question 18 is 3 marks)**

---

19 There are three dials on a combination lock.

Each dial can be set to one of the numbers 1, 2, 3, 4, 5

The three digit number 553 is one way the dials can be set, as shown in the diagram.



(a) Work out the number of different three digit numbers that can be set for the combination lock.

.....  
(2)

(b) How many of the possible three digit numbers have three different digits?

.....  
(2)

(Total for Question 19 is 4 marks)

20 (a) Express  $\sqrt{3} + \sqrt{12}$  in the form  $a\sqrt{3}$  where  $a$  is an integer.

.....  
(2)

(b) Express  $\left(\frac{1}{\sqrt{3}}\right)^7$  in the form  $\frac{\sqrt{b}}{c}$  where  $b$  and  $c$  are integers.

.....  
(3)

.....  
**(Total for Question 20 is 5 marks)**

21 Work out the value of  $\frac{3^7 \times 3^{-2}}{3^3}$

.....  
(Total for Question 21 is 2 marks)

22 A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

..... seconds

(3)

(b) Is your answer to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
(1)

(Total for Question 22 is 4 marks)

23 (a) Work out the value of  $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

.....  
(2)

$$3^a = \frac{1}{9} \quad 3^b = 9\sqrt{3} \quad 3^c = \frac{1}{\sqrt{3}}$$

(b) Work out the value of  $a + b + c$

.....  
(2)

**(Total for Question 23 is 4 marks)**

---

24 Prove algebraically that  $0.2\dot{5}\dot{6}$  can be written as  $\frac{127}{495}$

(Total for Question 24 is 3 marks)



25 Show that  $\frac{(\sqrt{18} + \sqrt{2})^2}{\sqrt{8} - 2}$  can be written in the form  $a(b + \sqrt{2})$  where  $a$  and  $b$  are integers.

---

(Total for Question 25 is 3 marks)

26 (a) Work out  $2\frac{1}{7} + 1\frac{1}{4}$

.....  
(2)

(b) Work out  $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

.....  
(2)

**(Total for Question 26 is 4 marks)**

---

27 Renee buys 5 kg of sweets to sell.  
She pays £10 for the sweets.

Renee puts all the sweets into bags.  
She puts 250 g of sweets into each bag.  
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

.....%

**(Total for Question 27 is 4 marks)**

28 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.  
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

.....  
(3)

Juan trains for the race.  
The average speed he can cycle at increases.  
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

.....  
.....  
(1)

**(Total for Question 28 is 4 marks)**

---

29 (a) Write down the value of  $36^{\frac{1}{2}}$

.....  
(1)

(b) Write down the value of  $23^0$

.....  
(1)

(c) Work out the value of  $27^{-\frac{2}{3}}$

.....  
(2)

---

**(Total for Question 29 is 4 marks)**

---

30  $\sqrt{5}(\sqrt{8} + \sqrt{18})$  can be written in the form  $a\sqrt{10}$  where  $a$  is an integer.

Find the value of  $a$ .

$a = \dots\dots\dots$

**(Total for Question 30 is 3 marks)**

---

31 Write 36 as a product of its prime factors.

.....  
(Total for Question 31 is 2 marks)

32 Write these numbers in order of size.  
Start with the smallest number.

$0.2\dot{4}\dot{6}$

$0.24\dot{6}$

$0.\dot{2}4\dot{6}$

$0.246$

.....  
(Total for Question 32 is 2 marks)

33 (a) Write down the value of  $100^{\frac{1}{2}}$

.....  
(1)

(b) Find the value of  $125^{\frac{2}{3}}$

.....  
(2)

(Total for Question 33 is 3 marks)

34  $x = 0.4\dot{3}\dot{6}$

Prove algebraically that  $x$  can be written as  $\frac{24}{55}$

(Total for Question 34 is 3 marks)



35 Show that  $\frac{6 - \sqrt{8}}{\sqrt{2} - 1}$  can be written in the form  $a + b\sqrt{2}$  where  $a$  and  $b$  are integers.

---

(Total for Question 35 is 3 marks)

36 Express 56 as the product of its prime factors.

.....  
**(Total for Question 36 is 2 marks)**

37 Work out  $54.6 \times 4.3$

.....  
**(Total for Question 37 is 3 marks)**

38 (a) Write  $7.97 \times 10^{-6}$  as an ordinary number.

.....  
(1)

(b) Work out the value of  $(2.52 \times 10^5) \div (4 \times 10^{-3})$   
Give your answer in standard form.

.....  
(2)

**(Total for Question 38 is 3 marks)**

---

39 (a) Find the value of  $81^{-\frac{1}{2}}$

.....  
(2)

(b) Find the value of  $\left(\frac{64}{125}\right)^{\frac{2}{3}}$

.....  
(2)

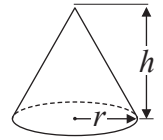
**(Total for Question 39 is 4 marks)**

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40 A cone has a volume of  $98 \text{ cm}^3$ .  
The radius of the cone is  $5.13 \text{ cm}$ .

(a) Work out an estimate for the height of the cone.

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



.....cm  
(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?  
Give reasons for your answer.

.....  
.....  
.....  
(1)

**(Total for Question 40 is 4 marks)**

41 Work out  $6.34 \times 5.2$

.....  
**(Total for Question 41 is 3 marks)**

---

- 42 Work out the value of  $(9 \times 10^{-4}) \times (3 \times 10^7)$   
Give your answer in standard form.

.....

**(Total for Question 42 is 2 marks)**

---

- 43 (a) Write down the value of  $64^{\frac{1}{2}}$

.....

(1)

- (b) Find the value of  $\left(\frac{8}{125}\right)^{-\frac{2}{3}}$

.....

(2)

**(Total for Question 43 is 3 marks)**

---

44 One uranium atom has a mass of  $3.95 \times 10^{-22}$  grams.

(a) Work out an estimate for the number of uranium atoms in 1 kg of uranium.

.....  
(3)

(b) Is your answer to (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
(1)

**(Total for Question 44 is 4 marks)**

---

45 Show that  $\frac{1}{1 + \frac{1}{\sqrt{2}}}$  can be written as  $2 - \sqrt{2}$

---

(Total for Question 45 is 3 marks)



46 The mass of Jupiter is  $1.899 \times 10^{27}$  kg.  
The mass of Saturn is 0.3 times the mass of Jupiter.

- (a) Work out an estimate for the mass of Saturn.  
Give your answer in standard form.

..... kg  
(3)

- (b) Give evidence to show whether your answer to (a) is an underestimate or an overestimate.

.....  
.....  
(1)

**(Total for Question 46 is 4 marks)**

47 Write down the value of  $125^{\frac{2}{3}}$

.....

**(Total for Question 47 is 1 mark)**

48 Simplify fully  $\frac{(6 - \sqrt{5})(6 + \sqrt{5})}{\sqrt{31}}$

You must show your working.

.....

**(Total for Question 48 is 3 marks)**

49 (a) Work out  $2\frac{1}{4} \times 3\frac{1}{3}$

Give your answer as a mixed number in its simplest form.

.....  
(3)

- (b) Write the numbers 3, 4, 5 and 6 in the boxes to give the greatest possible total.  
You may write each number only once.

$$\begin{array}{|c|} \hline \phantom{0} \\ \hline \end{array} \frac{1}{\begin{array}{|c|} \hline \phantom{0} \\ \hline \end{array}} + \begin{array}{|c|} \hline \phantom{0} \\ \hline \end{array} \frac{2}{\begin{array}{|c|} \hline \phantom{0} \\ \hline \end{array}}$$

(1)

(Total for Question 49 is 4 marks)

50 Work out an estimate for  $\sqrt{4.98 + 2.16 \times 7.35}$

.....  
(Total for Question 50 is 3 marks)

---

51 Show that  $\frac{(4 - \sqrt{3})(4 + \sqrt{3})}{\sqrt{13}}$  simplifies to  $\sqrt{13}$

(Total for Question 51 is 2 marks)

52 (a) Find the value of  $\sqrt[3]{8 \times 10^6}$

.....  
(1)

(b) Find the value of  $144^{\frac{1}{2}} \times 64^{-\frac{1}{3}}$

.....  
(2)

(c) Solve  $3^{2x} = \frac{1}{81}$

$x =$  .....  
(2)

(Total for Question 52 is 5 marks)

53 (a) Find the Highest Common Factor (HCF) of 60 and 84

.....  
(2)

(b) Find the Lowest Common Multiple (LCM) of 24 and 40

.....  
(2)

(Total for Question 53 is 4 marks)

**54** In a school there are 16 teachers and 220 students.  
Of these students 120 are girls and 100 are boys.

One teacher, one girl and one boy are going to be chosen to represent the school.

Work out the number of different ways there are to choose one teacher, one girl and one boy.

.....  
**(Total for Question 54 is 2 marks)**

---

55 The time period,  $T$  seconds, of a simple pendulum of length  $l$  cm is given by the formula

$$T = 2\pi \sqrt{\frac{l}{g}}$$

Katie uses a simple pendulum in an experiment to find an estimate for the value of  $g$ .

Here are her results.

$l = 52.0$  correct to 3 significant figures.

$T = 1.45$  correct to 3 significant figures.

Work out the upper bound and the lower bound for the value of  $g$ .

Use  $\pi = 3.142$

You must show all your working.

upper bound = .....

lower bound = .....

**(Total for Question 55 is 4 marks)**

56 (a) Write 84 as a product of its prime factors.

.....  
(2)

(b) Find the lowest common multiple (LCM) of 60 and 84

.....  
(2)

.....  
**(Total for Question 56 is 4 marks)**



57 Jack is in a restaurant.

There are 5 starters, 8 main courses and some desserts on the menu.

Jack is going to choose one starter, one main course and one dessert.

He says there are 240 ways that he can choose his starter, his main course and his dessert.

Could Jack be correct?

You must show how you get your answer.

---

**(Total for Question 57 is 2 marks)**

58 The length of a pencil is 128 mm correct to the nearest millimetre.

Complete the error interval for the length of the pencil.

..... mm  $\leq$  length  $<$  ..... mm

**(Total for Question 58 is 2 marks)**

---

59 Work out  $(3.42 \times 10^{-7}) \div (7.5 \times 10^{-6})$

Give your answer in standard form.

.....  
**(Total for Question 59 is 2 marks)**

---

60 Sadia is going to buy a new car.

For the car, she can choose one body colour, one roof colour and one wheel type.

She can choose from

19 different body colours

25 different wheel types

The total number of ways Sadia can choose the body colour and the roof colour and the wheel type is 3325

Work out the number of different roof colours that Sadia can choose from.

.....  
**(Total for Question 60 is 2 marks)**

61  $d = \frac{1}{8}c^3$

$c = 10.9$  correct to 3 significant figures.

By considering bounds, work out the value of  $d$  to a suitable degree of accuracy.  
Give a reason for your answer.

---

(Total for Question 61 is 4 marks)

62 Sally used her calculator to work out the value of a number  $y$ .

The answer on her calculator display began

8.3

Complete the error interval for  $y$ .

.....  $\leq y <$  .....

**(Total for Question 62 is 2 marks)**

63 (a) Write 0.00562 in standard form.

.....  
(1)

(b) Write  $1.452 \times 10^3$  as an ordinary number.

.....  
(1)

**(Total for Question 63 is 2 marks)**

64 (a) Write the number 0.000 086 23 in standard form.

.....  
(1)

(b) Work out  $\frac{3.2 \times 10^3 + 5.1 \times 10^{-2}}{4.3 \times 10^{-4}}$

Give your answer in standard form, correct to 3 significant figures.

.....  
(2)

**(Total for Question 64 is 3 marks)**

65 Martin truncates the number  $N$  to 1 digit.

The result is 7

Write down the error interval for  $N$ .

.....  
(Total for Question 65 is 2 marks)

66 In a restaurant there are

9 starter dishes

15 main dishes

8 dessert dishes

Janet is going to choose one of the following combinations for her meal.

a starter dish and a main dish

or a main dish and a dessert dish

or a starter dish, a main dish and a dessert dish

Show that there are 1335 different ways to choose the meal.

(Total for Question 66 is 3 marks)

67 (a) Find the lowest common multiple (LCM) of 40 and 56

.....  
(2)

$$A = 2^3 \times 3 \times 5 \qquad B = 2^2 \times 3 \times 5^2$$

(b) Write down the highest common factor (HCF) of  $A$  and  $B$ .

.....  
(1)

**(Total for Question 67 is 3 marks)**

---

68 Martin did this question.

Rationalise the denominator of  $\frac{14}{2 + \sqrt{3}}$

Here is how he answered the question.

$$\begin{aligned}\frac{14}{2 + \sqrt{3}} &= \frac{14 \times (2 - \sqrt{3})}{(2 + \sqrt{3})(2 - \sqrt{3})} \\ &= \frac{28 - 14\sqrt{3}}{4 + 2\sqrt{3} - 2\sqrt{3} + 3} \\ &= \frac{28 - 14\sqrt{3}}{7} \\ &= 4 - 2\sqrt{3}\end{aligned}$$

Martin's answer is wrong.

(a) Find Martin's mistake.

(1)

Sian did this question.

Rationalise the denominator of  $\frac{5}{\sqrt{12}}$

Here is how she answered the question.

$$\begin{aligned}\frac{5}{\sqrt{12}} &= \frac{5\sqrt{12}}{\sqrt{12} \times \sqrt{12}} \\ &= \frac{5 \times 3\sqrt{2}}{12} \\ &= \frac{5\sqrt{2}}{4}\end{aligned}$$

Sian's answer is wrong.

(b) Find Sian's mistake.

(1)

(Total for Question 68 is 2 marks)

**69** Jackson is trying to find the density, in  $\text{g/cm}^3$ , of a block of wood.  
The block of wood is in the shape of a cuboid.

He measures

the length as 13.2 cm, correct to the nearest mm  
the width as 16.0 cm, correct to the nearest mm  
the height as 21.7 cm, correct to the nearest mm

He measures the mass as 1970 g, correct to the nearest 5 g.

By considering bounds, work out the density of the wood.  
Give your answer to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

(Total for Question 69 is 5 marks)



70 Use your calculator to work out  $\sqrt{\frac{\sin 25^\circ + \sin 40^\circ}{\cos 25^\circ - \cos 40^\circ}}$

(a) Write down all the figures on your calculator display.

.....  
(2)

(b) Write your answer to part (a) correct to 2 decimal places.

.....  
(1)

**(Total for Question 70 is 3 marks)**

71 Tracey is going to choose a main course and a dessert in a cafe.  
She can choose from 8 main courses and 7 desserts.

Tracey says that to work out the number of different ways of choosing a main course and a dessert you add 8 and 7

(a) Is Tracey correct?

You must give a reason for your answer.

.....  
.....  
(1)

12 teams play in a competition.

Each team plays each other team exactly once.

(b) Work out the total number of games played.

.....  
(2)

**(Total for Question 71 is 3 marks)**

72 A number,  $n$ , is rounded to 2 decimal places.  
The result is 4.76

Using inequalities, write down the error interval for  $n$ .

.....  
**(Total for Question 72 is 2 marks)**

---

73 The table shows some information about eight planets.

Planet	Distance from Earth (km)	Mass (kg)
Earth	0	$5.97 \times 10^{24}$
Jupiter	$6.29 \times 10^8$	$1.898 \times 10^{27}$
Mars	$7.83 \times 10^7$	$6.42 \times 10^{23}$
Mercury	$9.17 \times 10^7$	$3.302 \times 10^{23}$
Neptune	$4.35 \times 10^9$	$1.024 \times 10^{26}$
Saturn	$1.28 \times 10^9$	$5.68 \times 10^{26}$
Uranus	$2.72 \times 10^9$	$8.683 \times 10^{25}$
Venus	$4.14 \times 10^7$	$4.869 \times 10^{24}$

(a) Write down the name of the planet with the greatest mass.

.....  
(1)

(b) Find the difference between the mass of Venus and the mass of Mercury.

..... kg  
(1)

Nishat says that Neptune is over a hundred times further away from Earth than Venus is.

(c) Is Nishat right?

You must show how you get your answer.

(2)

(Total for Question 73 is 4 marks)

74 Using algebra, prove that  $0.1\dot{3}\dot{6} \times 0.\dot{2}$  is equal in value to  $\frac{1}{33}$

(Total for Question 74 is 3 marks)

75 Prove algebraically that the recurring decimal  $0.2\dot{5}$  has the value  $\frac{23}{90}$

(Total for Question 75 is 2 marks)

---

76  $m = \frac{\sqrt{s}}{t}$   $s = 3.47$  correct to 3 significant figures  
 $t = 8.132$  correct to 4 significant figures

By considering bounds, work out the value of  $m$  to a suitable degree of accuracy.  
Give a reason for your answer.

---

(Total for Question 76 is 5 marks)

77. (a) Find the reciprocal of 2.5

.....  
(1)

(b) Work out  $\sqrt[3]{\frac{4.3 \times \tan 39^\circ}{23.4 - 6.06}}$

Give your answer correct to 3 significant figures.

.....  
(2)

**(Total for Question 77 is 3 marks)**

---

78.  $D = \frac{x}{y}$

$x = 99.7$  correct to 1 decimal place.

$y = 67$  correct to 2 significant figures.

Work out an upper bound for  $D$ .

---

**(Total for Question 78 is 3 marks)**



79 Marie has 25 cards.

Each card has a different symbol on it.

Marie gives one card to Shelley and one card to Pauline.

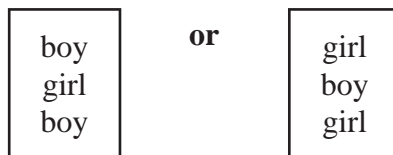
(a) In how many different ways can Marie do this?

.....  
(2)

There are 12 boys and 10 girls in David's class.

David is going to pick three different students from his class and write their names in a list in order.

The order will be



(b) How many different lists can David write?

.....  
(3)

(Total for Question 79 is 5 marks)

80 (i) Find the value of  $\sqrt[5]{3.2 \times 10^{11}}$

.....

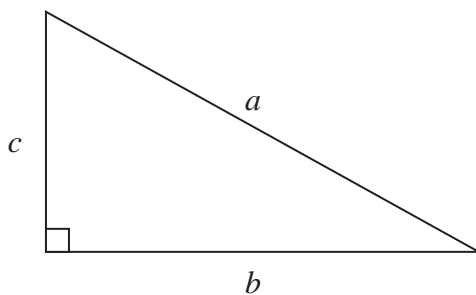
(ii) Find the value of  $10^{\frac{3}{4}}$

Give your answer correct to 1 decimal place.

.....

(Total for Question 80 is 2 marks)

81



$a$  is 8.3 cm correct to the nearest mm

$b$  is 6.1 cm correct to the nearest mm

Calculate the upper bound for  $c$ .

You must show your working.

..... cm

(Total for Question 81 is 4 marks)

82 (a) Write  $4.5 \times 10^5$  as an ordinary number.

.....  
(1)

(b) Write 0.007 in standard form.

.....  
(1)

(c) Work out  $4.2 \times 10^3 + 5.3 \times 10^2$   
Give your answer in standard form.

.....  
(2)

---

**(Total for Question 82 is 4 marks)**

---

**83** On Monday, 12 people took 5 hours to clean a number of cars.  
On Tuesday, 15 people cleaned the same number of cars.

Assuming that all the people worked at the same rate,

(a) work out how many hours the 15 people took to clean the cars.

..... hours

(2)

The assumption is wrong.

(b) How might this affect the time taken for the 15 people to clean the cars?

.....  
.....  
.....

(1)

**(Total for Question 83 is 3 marks)**

84 Freya writes down the value of  $x$ , correct to 1 decimal place.

She writes  $x = 6.4$

Complete the error interval for  $x$ .

.....  $\leq x <$  .....

**(Total for Question 84 is 2 marks)**

---

85 A number,  $m$ , is rounded to 1 decimal place.  
The result is 9.4

Complete the error interval for  $m$ .

.....  $\leq m <$  .....

(Total for Question 85 is 2 marks)

86 Prove algebraically that  $0.7\dot{3}$  can be written as  $\frac{11}{15}$

(Total for Question 86 is 2 marks)

87 A person's heart beats approximately  $10^5$  times each day.  
A person lives for approximately 81 years.

- (a) Work out an estimate for the number of times a person's heart beats in their lifetime.  
Give your answer in standard form correct to 2 significant figures.

.....  
(2)

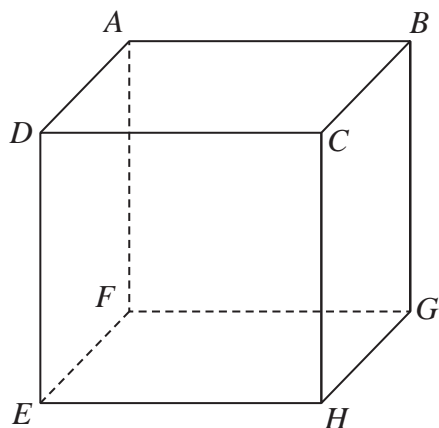
$2 \times 10^{12}$  red blood cells have a total mass of 90 grams.

- (b) Work out the average mass of 1 red blood cell.  
Give your answer in standard form.

..... grams  
(2)

**(Total for Question 87 is 4 marks)**

88 The diagram shows a cube.



$AH = 11.3$  cm correct to the nearest mm.

Calculate the lower bound for the length of an edge of the cube.  
You must show all your working.

..... cm

(Total for Question 88 is 4 marks)



89 Here is a list of five numbers.

$$98^{53} \quad 98^{64} \quad 98^{73} \quad 98^{88} \quad 98^{91}$$

Find the lowest common multiple of these five numbers.

.....  
(Total for Question 89 is 1 mark)

90 (a) Use your calculator to work out  $\frac{29^2 - 4.6}{\sqrt{35 - 1.9^3}}$

Write down all the figures on your calculator display.

.....  
(2)

(b) Write your answer to part (a) correct to 4 significant figures.

.....  
(1)

(Total for Question 90 is 3 marks)

91 (a) Write 32 460 000 in standard form.

.....  
(1)

(b) Write  $4.96 \times 10^{-3}$  as an ordinary number.

.....  
(1)

Asma was asked to compare the following two numbers.

$$A = 6.212 \times 10^8 \quad \text{and} \quad B = 4.73 \times 10^9$$

She says,

“6.212 is bigger than 4.73 so  $A$  is bigger than  $B$ .”

(c) Is Asma correct?

You must give a reason for your answer.

.....  
.....  
.....  
(1)

---

(Total for Question 91 is 3 marks)

92 Work out

$$\sqrt{\frac{2.5 \times \sin 43^\circ}{8.2^2 - 50.5}}$$

Give your answer correct to 3 significant figures.

.....  
(Total for Question 92 is 2 marks)

---

93 In May 2019, the distance between Earth and Mars was  $3.9 \times 10^7$  km.

In May 2019, a signal was sent from Earth to Mars.

Assuming that the signal sent from Earth to Mars travelled at a speed of  $3 \times 10^5$  km per second,

(a) how long did the signal take to get to Mars?

..... seconds  
(2)

The speed of the signal sent from Earth to Mars in May 2019 was actually less than  $3 \times 10^5$  km per second.

(b) How will this affect your answer to part (a)?

.....  
.....  
.....  
(1)

**(Total for Question 93 is 3 marks)**

94 Patrick has to work out the exact value of  $64^{\frac{1}{4}}$

Patrick says,

“ $\frac{1}{4}$  of 64 is 16 so  $64^{\frac{1}{4}} = 16$ ”

Explain what is wrong with what Patrick says.

.....  
.....  
.....  
(Total for Question 94 is 1 mark)

95  $D = \frac{u^2}{2a}$

$u = 26.2$  correct to 3 significant figures

$a = 4.3$  correct to 2 significant figures

- (a) Calculate the upper bound for the value of  $D$ .  
Give your answer correct to 6 significant figures.  
You must show all your working.

.....  
(3)

The lower bound for the value of  $D$  is 78.6003 correct to 6 significant figures.

- (b) By considering bounds, write down the value of  $D$  to a suitable degree of accuracy.  
You must give a reason for your answer.

.....  
.....  
(2)

(Total for Question 95 is 5 marks)

---

96 (a) Write 7357 correct to 3 significant figures.

.....  
(1)

(b) Work out  $\frac{\sqrt{17 + 4^2}}{7.3^2}$

Write down all the figures on your calculator display.

.....  
(2)

**(Total for Question 96 is 3 marks)**

---

97 A high speed train travels a distance of 487 km in 3 hours.

The distance is measured correct to the nearest kilometre.

The time is measured correct to the nearest minute.

By considering bounds, work out the average speed, in km/minute, of the train to a suitable degree of accuracy.

You must show all your working and give a reason for your answer.

.....km/minute

(Total for Question 97 is 5 marks)

98  $T = \sqrt{\frac{w}{d^3}}$

$$w = 5.6 \times 10^{-5}$$

$$d = 1.4 \times 10^{-4}$$

Work out the value of  $T$ .

Give your answer in standard form correct to 3 significant figures.

$$T = \dots\dots\dots (2)$$

**(Total for Question 98 is 2 marks)**



99 Here are three lamps.

lamp A



lamp B



lamp C



Lamp A flashes every 20 seconds.

Lamp B flashes every 45 seconds.

Lamp C flashes every 120 seconds.

The three lamps start flashing at the same time.

How many times in one hour will the three lamps flash at the same time?

.....  
(Total for Question 99 is 3 marks)

**100** There are 16 hockey teams in a league.  
Each team played two matches against each of the other teams.  
Work out the total number of matches played.

.....  
**(Total for Question 100 is 2 marks)**

---

- 101** (a) Find the value of the reciprocal of 1.6  
Give your answer as a decimal.

.....  
(1)

Jess rounds a number,  $x$ , to one decimal place.  
The result is 9.8

- (b) Write down the error interval for  $x$ .

.....  
(2)

**(Total for Question 101 is 3 marks)**

- 102** Work out  $(13.8 \times 10^7) \times (5.4 \times 10^{-12})$   
Give your answer as an ordinary number.

.....  
**(Total for Question 102 is 2 marks)**

**103** The petrol consumption of a car, in litres per 100 kilometres, is given by the formula

$$\text{Petrol consumption} = \frac{100 \times \text{Number of litres of petrol used}}{\text{Number of kilometres travelled}}$$

Nathan's car travelled 148 kilometres, correct to 3 significant figures.  
The car used 11.8 litres of petrol, correct to 3 significant figures.

Nathan says,

“My car used less than 8 litres of petrol per 100 kilometres.”

Could Nathan be wrong?

You must show how you get your answer.

---

(Total for Question 103 is 3 marks)

**104** Jeff is choosing a shrub and a rose tree for his garden.

At the garden centre there are 17 different types of shrubs and some rose trees.

Jeff says,

“There are 215 different ways to choose one shrub and one rose tree.”

Could Jeff be correct?

You must show how you get your answer.

---

**(Total for Question 104 is 2 marks)**

**105** A train travelled along a track in 110 minutes, correct to the nearest 5 minutes.

Jake finds out that the track is 270 km long.

He assumes that the track has been measured correct to the nearest 10 km.

- (a) Could the average speed of the train have been greater than 160 km/h?  
You must show how you get your answer.

(4)

Jake's assumption was wrong.

The track was measured correct to the nearest 5 km.

- (b) Explain how this could affect your decision in part (a).

(1)

**(Total for Question 105 is 5 marks)**

106 Write 0.000068 in standard form.

.....  
(Total for Question 106 is 1 mark)

107 There are 17 men and 26 women in a choir.  
The choir is going to sing at a concert.

One of the men and one of the women are going to be chosen to make a pair to sing the first song.

(a) Work out the number of different pairs that can be chosen.

.....  
(2)

Two of the men are to be chosen to make a pair to sing the second song.

Ben thinks the number of different pairs that can be chosen is 136

Mark thinks the number of different pairs that can be chosen is 272

(b) Who is correct, Ben or Mark?  
Give a reason for your answer.

.....  
.....  
.....  
.....  
(1)

(Total for Question 107 is 3 marks)

108 The length,  $L$  cm, of a line is measured as 13 cm correct to the nearest centimetre.

Complete the following statement to show the range of possible values of  $L$

.....  $\leq L <$  .....

(Total for Question 108 is 2 marks)

109 There are 14 boys and 12 girls in a class.

Work out the total number of ways that 1 boy and 1 girl can be chosen from the class.

.....

(Total for Question 109 is 2 marks)

110 A virus on a computer is causing errors.

An antivirus program is run to remove these errors.

An estimate for the number of errors at the end of  $t$  hours is  $10^6 \times 2^{-t}$

(a) Work out an estimate for the number of errors on the computer at the end of 8 hours.

.....

(2)

(b) Explain whether the number of errors on this computer ever reaches zero.

.....

.....

.....

(1)

(Total for Question 110 is 3 marks)



**111** (a) Write 0.000423 in standard form.

.....  
(1)

(b) Write  $4.5 \times 10^4$  as an ordinary number.

.....  
(1)

**(Total for Question 111 is 2 marks)**

---

**112** Jim rounds a number,  $x$ , to one decimal place.

The result is 7.2

Write down the error interval for  $x$ .

.....  
**(Total for Question 112 is 2 marks)**

---

**113.** Prove algebraically that the recurring decimal  $0.3\dot{1}\dot{8}$  can be written as  $\frac{7}{22}$

**(Total for Question 113 is 2 marks)**

114 (a) Write 5 400 000 as a number in standard form.

.....  
(1)

(b) Write  $3.2 \times 10^{-4}$  as an ordinary number.

.....  
(1)

The mass of the Sun is  $2 \times 10^{30}$  kg.

The mass of the largest known star is 315 times the mass of the Sun.

(c) Work out the mass of this star.

Give your answer in kg in standard form.

.....kg  
(2)

**(Total for Question 114 is 4 marks)**

---

115

**Train tickets**

day return £6.45

monthly saver £98.50

Sue goes to work by train.

Sue worked for 18 days last month.

She bought a day return ticket each day she worked.

A monthly saver ticket is cheaper than 18 day return tickets.

How much cheaper?

£ .....

**(Total for Question 115 is 4 marks)**

- 116** There are 892 litres of oil in Mr Aston's oil tank.  
He uses 18.7 litres of oil each day.

**Estimate** the number of days it will take him to use all the oil in the tank.

.....  
(Total for Question 116 is 2 marks)

- 117** Work out the value of  $(3.5 \times 10^6) \div (5 \times 10^{-3})$   
Give your answer in standard form.

.....  
(Total for Question 117 is 2 marks)

118 (a) Work out  $1\frac{1}{5} \times 2\frac{1}{3}$

Give your answer as a mixed number in its simplest form.

.....  
(3)

(b) Work out  $2\frac{7}{15} - 1\frac{2}{3}$

.....  
(3)

(Total for Question 118 is 6 marks)

**119** Use the fact that

$$5.4 \times 36 = 194.4$$

to find the value of

(i)  $5.4 \times 3.6$

.....

(ii)  $54 \times 360$

.....

---

**(Total for Question 119 is 2 marks)**

**120** Rationalise the denominator of  $\frac{10}{\sqrt{5}}$

Give your answer in its simplest form.

.....

---

**(Total for Question 120 is 2 marks)**

**121** John buys some boxes of pencils and some packets of pens for people to use at a conference.

There are 40 pencils in a box.

There are 15 pens in a packet.

John gives one pencil and one pen to each person at the conference.

He has no pencils left.

He has no pens left.

How many boxes of pencils and how many packets of pens did John buy?

..... boxes of pencils

..... packets of pens

**(Total for Question 121 is 3 marks)**

---



122  $x = 0.0\dot{4}\dot{5}$

Prove algebraically that  $x$  can be written as  $\frac{1}{22}$

---

(Total for Question 122 is 3 marks)

**123** (a) Find the value of  $2^{-3}$

.....  
(1)

$5\sqrt{5}$  can be written in the form  $5^k$

(b) Find the value of  $k$ .

.....  
(1)

(c) Work out the value of  $(\sqrt{12} - \sqrt{3})^2$

.....  
(2)

---

**(Total for Question 123 is 4 marks)**

---

**124** Using the information that

$$6.7 \times 52 = 348.4$$

find the value of

(i)  $6.7 \times 520$

.....

(ii)  $67 \times 0.52$

.....

(iii)  $3484 \div 5.2$

.....

---

**(Total for Question 124 is 3 marks)**

**\*125** Karen got 32 out of 80 in a maths test.  
She got 38% in an English test.

Karen wants to know if she got a higher percentage in maths or in English.

Did Karen get a higher percentage in maths or in English?

---

**(Total for Question 125 is 2 marks)**

**\*126** Steve wants to put a hedge along one side of his garden.

He needs to buy 27 plants for the hedge.

Each plant costs £5.54

Steve has £150 to spend on plants for the hedge.

Does Steve have enough money to buy all the plants he needs?

---

**(Total for Question 126 is 4 marks)**

127 (a) Express 180 as a product of its prime factors.

.....  
(3)

Martin thinks of two numbers.

He says,

“The Highest Common Factor (HCF) of my two numbers is 6

The Lowest Common Multiple (LCM) of my two numbers is a multiple of 15”

(b) Write down **two** possible numbers that Martin is thinking of.

.....  
(2)

(Total for Question 127 is 5 marks)

---

**128** Expand  $(1 + \sqrt{2})(3 - \sqrt{2})$

Give your answer in the form  $a + b\sqrt{2}$  where  $a$  and  $b$  are integers.

.....  
**(Total for Question 128 is 2 marks)**

---

129 (a) Work out  $\frac{1}{7} \times \frac{2}{3}$

.....  
(1)

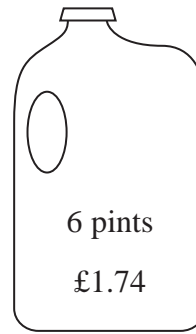
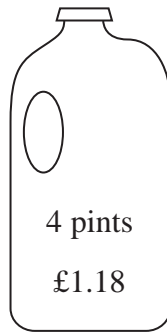
(b) Work out  $\frac{3}{5} - \frac{1}{3}$

.....  
(2)

**(Total for Question 129 is 3 marks)**

---

**\*130** Milk is sold in two sizes of bottle.



A 4 pint bottle of milk costs £1.18

A 6 pint bottle of milk costs £1.74

Which bottle of milk is the best value for money?

You must show all your working.

---

(Total for Question 130 is 3 marks)



**\*131**

**Competition**

a prize every 2014 seconds

In a competition, a prize is won every 2014 seconds.

Work out an estimate for the number of prizes won in 24 hours.  
You must show your working.

---

**(Total for Question 131 is 4 marks)**

132 (a) Write down the value of  $10^0$

.....  
(1)

(b) Write down the value of  $10^{-2}$

.....  
(1)

(c) Write these numbers in order of size.  
Start with the smallest number.

$2.73 \times 10^3$        $27.3 \times 10^{-3}$        $273 \times 10^2$       0.00273

.....  
(2)

**(Total for Question 132 is 4 marks)**

---

133 (a) Rationalise the denominator of  $\frac{12}{\sqrt{3}}$

.....  
(2)

(b) Work out the value of  $(\sqrt{2} + \sqrt{8})^2$

.....  
(2)

**(Total for Question 133 is 4 marks)**

---

**134** Rita is going to make some cheeseburgers for a party.  
She buys some packets of cheese slices and some boxes of burgers.

There are 20 cheese slices in each packet.

There are 12 burgers in each box.

Rita buys exactly the same number of cheese slices and burgers.

(i) How many packets of cheese slices and how many boxes of burgers does she buy?

..... packets of cheese slices

..... boxes of burgers

Rita wants to put one cheese slice and one burger into each bread roll.

She wants to use all the cheese slices and all the burgers.

(ii) How many bread rolls does Rita need?

..... bread rolls

**(Total for Question 134 is 4 marks)**

---

**135** (a) Write down the reciprocal of 5

.....  
(1)

(b) Evaluate  $3^{-2}$

.....  
(1)

(c) Calculate  $9 \times 10^4 \times 3 \times 10^3$   
Give your answer in standard form.

.....  
(2)

---

**(Total for Question 135 is 4 marks)**

**136** Given that  $1793 \times 185 = 331\,705$

write down the value of

(a)  $1.793 \times 185$

(b)  $331\,705 \div 1.85$

.....  
.....  
**(Total for Question 136 is 2 marks)**

**137** Write 525 as a product of its prime factors.

.....  
**(Total for Question 137 is 3 marks)**

---

**138** Margaret has some goats.  
The goats produce an average total of 21.7 litres of milk per day for 280 days.  
Margaret sells the milk in  $\frac{1}{2}$  litre bottles.

Work out an estimate for the total number of bottles that Margaret will be able to fill with the milk.

You must show clearly how you got your estimate.

.....  
**(Total for Question 138 is 3 marks)**

**139** Matt and Dan cycle around a cycle track.  
Each lap Matt cycles takes him 50 seconds.  
Each lap Dan cycles takes him 80 seconds.

Dan and Matt start cycling at the same time at the start line.

Work out how many laps they will each have cycled when they are next at the start line together.

Matt..... laps

Dan..... laps

**(Total for Question 139 is 3 marks)**

**\*140** One sheet of paper is  $9 \times 10^{-3}$  cm thick.

Mark wants to put 500 sheets of paper into the paper tray of his printer.  
The paper tray is 4 cm deep.

Is the paper tray deep enough for 500 sheets of paper?  
You must explain your answer.

---

(Total for Question 140 is 3 marks)

**141** Write these numbers in order of size.  
Start with the smallest number.

$5^{-1}$

$0.5$

$-5$

$5^0$

.....  
(Total for Question 141 is 2 marks)



142 Work out  $1.83 \times 47$

.....  
**(Total for Question 142 is 3 marks)**

---

**143** Trams leave Piccadilly

to Eccles every 9 minutes

to Didsbury every 12 minutes

A tram to Eccles and a tram to Didsbury both leave Piccadilly at 9 am.

At what time will a tram to Eccles and a tram to Didsbury next leave Piccadilly at the same time?

.....  
**(Total for Question 143 is 3 marks)**

---

144 (a) Write  $8.2 \times 10^5$  as an ordinary number.

.....  
(1)

(b) Write 0.000 376 in standard form.

.....  
(1)

(c) Work out the value of  $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$   
Give your answer in standard form.

.....  
(2)

**(Total for Question 144 is 4 marks)**

---

\*145 Here is part of Gary's electricity bill.

Electricity bill	
New reading	7155 units
Old reading	7095 units
Price per unit	15p

Work out how much Gary has to pay for the units of electricity he used.

---

(Total for Question 145 is 4 marks)

146 Work out an estimate for  $\frac{31 \times 9.87}{0.509}$

.....

---

(Total for Question 146 is 3 marks)

147 Write the following numbers in order of size.  
Start with the smallest number.

$$0.038 \times 10^2 \quad 3800 \times 10^{-4} \quad 380 \quad 0.38 \times 10^{-1}$$

---

(Total for Question 147 is 2 marks)

148 (a) Rationalise the denominator of  $\frac{5}{\sqrt{2}}$

(2)

(b) Expand and simplify  $(2 + \sqrt{3})^2 - (2 - \sqrt{3})^2$

(2)

(Total for Question 148 is 4 marks)

- 149** Buses to Acton leave a bus station every 24 minutes.  
Buses to Barton leave the same bus station every 20 minutes.

A bus to Acton and a bus to Barton both leave the bus station at 9 00 am.

When will a bus to Acton and a bus to Barton next leave the bus station at the same time?

.....  
**(Total for Question 149 is 3 marks)**

- 150** (a) Write down the value of  $10^0$

.....  
**(1)**

- (b) Write  $6.7 \times 10^{-5}$  as an ordinary number.

.....  
**(1)**

- (c) Work out the value of  $(3 \times 10^7) \times (9 \times 10^6)$   
Give your answer in standard form.

.....  
**(2)**

**(Total for Question 150 is 4 marks)**

151 Express the recurring decimal  $0.2\dot{8}\dot{1}$  as a fraction in its simplest form.

.....  
(Total for Question 151 is 3 marks)

---

**152** (a) Express 66 as a product of its prime factors.

(2)

(b) Express  $132^2$  as a product of its prime factors.

(2)

**(Total for Question 152 is 4 marks)**



**153** The population of Algeria is 34 million.

(a) Write 34 million in standard form.

(1)

.....

The total land area of Algeria is  $2.4 \times 10^{12} \text{ m}^2$ .  
5% of the total land area is used to grow crops.

(b) Work out the area of land in Algeria which is used to grow crops.  
Write your answer in standard form, in  $\text{km}^2$ .

(2)

.....  $\text{m}^2$

**(Total for Question 153 is 3 marks)**

154  $\sqrt{3} = 3^k$

(a) Write down the value of  $k$

(1)

.....

(b) Expand and simplify  $(2 + \sqrt{3})(1 + \sqrt{3})$

Give your answer in the form  $a + b\sqrt{3}$

where  $a$  and  $b$  are integers

(2)

.....

**(Total for Question 154 is 3 marks)**

---

155  $a = \frac{v - u}{t}$

$v = 37.6$  correct to 3 significant figures.

$u = 11.3$  correct to 3 significant figures.

$t = 8.4$  correct to 2 significant figures.

Work out the upper bound for the value of  $a$ .

Show your working clearly.

---

(Total for Question 155 is 3 marks)

---

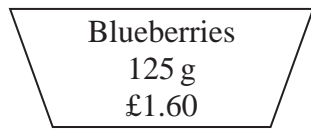
156 Use your calculator to work out  $\frac{1.45^2}{3.89 - \sqrt{5.75}}$

Write down all the figures on your calculator display.  
You must give your answer as a decimal.

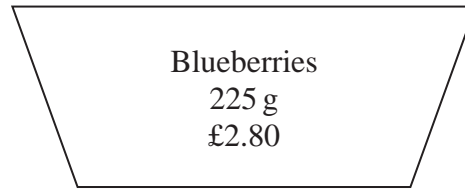
.....  
**(Total for Question 156 is 2 marks)**

---

\*157 Blueberries are sold in small cartons and in large cartons.



small carton



large carton

There are 125 g of blueberries in a small carton.  
Each small carton costs £1.60

There are 225 g of blueberries in a large carton.  
Each large carton costs £2.80

Which size of carton is the better value for money?  
You must show your working.

---

(Total for Question 157 is 3 marks)

158 Jarek uses the formula

$$\text{Area} = \frac{1}{2} ab \sin C$$

to work out the area of a triangle.

For this triangle,

$a = 7.8$  cm correct to the nearest mm.

$b = 5.2$  cm correct to the nearest mm.

$C = 63^\circ$  correct to the nearest degree.

Calculate the lower bound for the area of the triangle.

..... cm<sup>2</sup>

---

**(Total for Question 158 is 3 marks)**

\*159 A shop sells bags of crisps in different size packs.

There are

18 bags of crisps in a small pack

20 bags of crisps in a medium pack

26 bags of crisps in a large pack



Which size pack is the best value for money?

You must show all your working.

---

(Total for Question 159 is 4 marks)

**160**  $I = 5(v - u)$

$v = 14$  correct to 2 significant figures

$u = 8.7$  correct to 2 significant figures

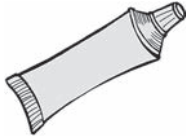
Work out the upper bound for the value of  $I$ .  
You must show your working.

.....  
**(Total for Question 160 is 3 marks)**

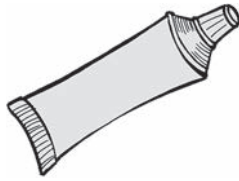
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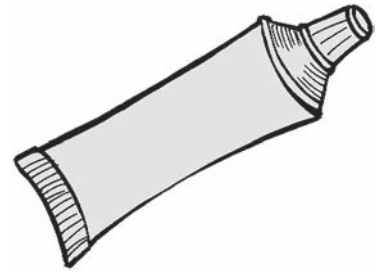
**\*161** Toothpaste is sold in three different sizes of tube.



50ml



75ml



125ml

A 50ml tube costs £1.09

A 75ml tube costs £1.68

A 125ml tube costs £2.69

Which tube of toothpaste is the best value for money?

You must show all your working.

---

(Total for Question 161 is 4 marks)

162 (a) Write 640 000 000 in standard form.

.....  
(1)

(b) Work out  $(3 \times 10^7) \div (6 \times 10^4)$   
Give your answer in standard form.

.....  
(2)

**(Total for Question 162 is 3 marks)**

163 The value of  $p$  is 4.3  
The value of  $q$  is 0.4

Both  $p$  and  $q$  are given correct to the nearest 0.1

(a) Write down the lower bound for  $p$ .

.....  
(1)

$$r = p + \frac{1}{q}$$

(b) Work out the upper bound for  $r$ .  
You must show all your working.

.....  
(3)

**(Total for Question 163 is 4 marks)**

**164** Use your calculator to work out  $\frac{\sqrt{70.25}}{4.2 - 2.37}$

- (a) Write down all the figures on your calculator display.  
You must give your answer as a decimal.

.....  
(2)

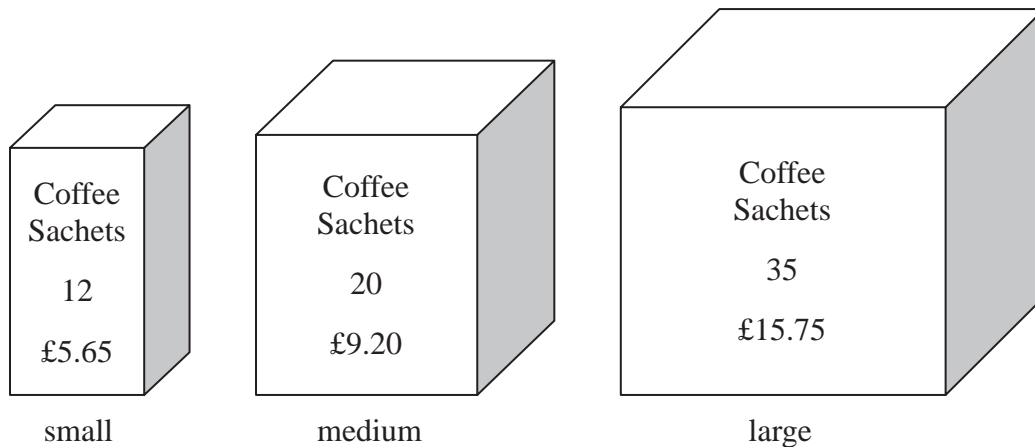
- (b) Write your answer to part (a) correct to 4 decimal places.

.....  
(1)

**(Total for Question 164 is 3 marks)**

---

\*165 Coffee sachets are sold in three different sizes of box.



A small box has 12 coffee sachets and costs £5.65

A medium box has 20 coffee sachets and costs £9.20

A large box has 35 coffee sachets and costs £15.75

Work out which size of box gives the best value for money.  
You must show all your working.

---

(Total for Question 165 is 4 marks)

166 (a) Work out the value of  $25^{-3}$

.....  
(1)

(b) Work out the value of  $350^3$   
Give your answer in standard form.

.....  
(2)

(Total for Question 166 is 3 marks)

167 Steve travelled from Ashton to Barnfield.

He travelled 235 miles, correct to the nearest 5 miles.

The journey took him 200 minutes, correct to the nearest 5 minutes.

Calculate the lower bound for the average speed of the journey.

Give your answer in **miles per hour**, correct to 3 significant figures.

You must show all your working.

..... mph

(Total for Question 167 is 4 marks)

**\*168** A road is 4530 m long, correct to the nearest 10 metres.  
Kirsty drove along the road in 205 seconds, correct to the nearest 5 seconds.

The average speed limit for the road is 80 km/h.

Could Kirsty's average speed have been greater than 80 km/h?  
You must show your working.

---

(Total for Question 168 is 5 marks)

**169** Sue is driving home from her friend's house.

Sue drives

10 miles from her friend's house to the motorway  
240 miles on the motorway  
5 miles from the motorway to her home

Sue

takes 20 minutes to drive from her friend's house to the motorway  
drives at an average speed of 60 mph on the motorway  
takes 25 minutes to drive from the motorway to her home

Sue stops for a 30 minute rest on her drive home.

Sue leaves her friend's house at 9.00 am.

What time does Sue get home?  
You must show all your working.

.....  
**(Total for Question 169 is 3 marks)**

**170** Ali is planning a party.

He wants to buy some cakes and some sausage rolls.

The cakes are sold in boxes.

There are 12 cakes in each box.

Each box of cakes costs £2.50

The sausage rolls are sold in packs.

There are 8 sausage rolls in each pack.

Each pack of sausage rolls costs £1.20

Ali wants to buy more than 60 cakes and more than 60 sausage rolls.

He wants to buy exactly the same number of cakes as sausage rolls.

What is the least amount of money Ali will have to pay?

£.....

**(Total for Question 170 is 5 marks)**



**171** Work out the value of  $(7.5 \times 10^4) \times (2.5 \times 10^3)$   
Give your answer in standard form.

.....  
**(Total for Question 171 is 2 marks)**

---

172 (a) Use your calculator to work out  $\frac{\sqrt{7056}}{0.35 \times 12.8}$

Write down all the figures on your calculator display.  
You must give your answer as a decimal.

.....  
(2)

(b) Write your answer to part (a) correct to 1 significant figure.

.....  
(1)

**(Total for Question 172 is 3 marks)**

---

**173** There are 130 adults at a language school.  
Each adult studies one of French or Spanish or German.

96 of the adults are women.

12 of the women study French.

73 of the adults study Spanish.

55 of the women study Spanish.

9 of the men study German.

How many of the adults study French?

.....  
(Total for Question 173 is 4 marks)

**\*174** Plants are sold in three different sizes of tray.

A small tray of 30 plants costs £6.50

A medium tray of 40 plants costs £8.95

A large tray of 50 plants costs £10.99

Kaz wants to buy the tray of plants that is the best value for money.

Which size tray of plants should she buy?

You must show all your working.

---

**(Total for Question 174 is 4 marks)**

**175** (a) Write  $7.8 \times 10^{-4}$  as an ordinary number.

.....  
(1)

(b) Write 95 600 000 as a number in standard form.

.....  
(1)

**(Total for Question 175 is 2 marks)**

**176** Tame Valley is a company that makes yoghurt.

A machine fills trays of 20 pots with yoghurt.

In one hour, the machine fills a total of 15 000 pots.

Work out how many seconds the machine takes to fill each tray of 20 pots.

..... seconds

**(Total for Question 176 is 4 marks)**

---

177 Dan does an experiment to find the value of  $\pi$ .  
He measures the circumference and the diameter of a circle.

He measures the circumference,  $C$ , as 170 mm to the nearest millimetre.  
He measures the diameter,  $d$ , as 54 mm to the nearest millimetre.

Dan uses  $\pi = \frac{C}{d}$  to find the value of  $\pi$ .

Calculate the upper bound and the lower bound for Dan's value of  $\pi$ .

upper bound = .....

lower bound = .....

**(Total for Question 177 is 4 marks)**

---

178 Calculate the value of  $\sqrt{\frac{\tan 60^\circ + 1}{\tan 60^\circ - 1}}$

Write down all the figures on your calculator display.  
You must give your answer as a decimal.

.....  
**(Total for Question 178 is 2 marks)**

---

\*179  $m = \frac{\sqrt{s}}{t}$

$s = 3.47$  correct to 2 decimal places

$t = 8.132$  correct to 3 decimal places

By considering bounds, work out the value of  $m$  to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

---

(Total for Question 179 is 5 marks)



**180** Use a calculator to work out

$$\frac{\sqrt{20.4}}{6.2 \times 0.48}$$

Write down all the figures on your calculator display.  
Give your answer as a decimal.

.....  
**(Total for Question 180 is 2 marks)**

---

181 (a) Use your calculator to work out  $\frac{38.5 \times 14.2}{18.4 - 5.9}$

Write down all the figures on your calculator display.  
You must give your answer as a decimal.

.....  
(2)

(b) Write your answer to part (a) correct to 1 significant figure.

.....  
(1)

**(Total for Question 181 is 3 marks)**

\*182 Potatoes cost £9 for a 12.5 kg bag at a farm shop.  
The same type of potatoes cost £1.83 for a 2.5 kg bag at a supermarket.

Where are the potatoes the better value, at the farm shop or at the supermarket?  
You must show your working.

**(Total for Question 182 is 4 marks)**