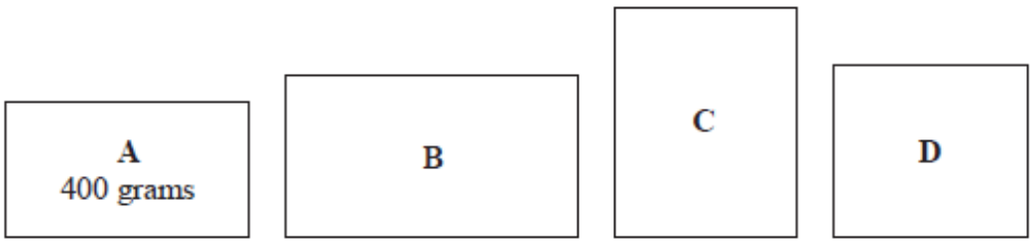
Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Pat has 4 parcels **A**, **B**, **C** and **D**



The weight of parcel **A** is 400 grams.

The weight of parcel **B** is 350 grams more than the weight of parcel **A**
The weight of parcel **C** is twice the weight of parcel **A**

The total weight of the 4 parcels is 2.5 kilograms.

Work out the weight, in grams, of parcel **D**

A
400

B
400 + 350
750

C
400 × 2
= 800

400 + 800 + 750
= 1950

2500 − 1950
= 550

550 ..... grams

(Total for Question 1 is 4 marks)

2 Zoya buys a book and some pencils.

The book costs £6.90
Each pencil costs £0.55

Zoya has a total of £15 to spend on the book and the pencils.
She buys as many pencils as she can.

Work out how many pencils she buys.

6.90 + ?

15 - 6.90 = 8.10

8.10 ÷ 0.55 = 14.727...

so 14

14

.....

(Total for Question 2 is 3 marks)

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3 Hermann changed £500 into euros.
The exchange rate was £1 = 1.18 euros.

(*a*) Work out how much money, in euros, Hermann received.

£1 = 1·18 euro ×500
×500 500 = 590

590 ..... euros
(2)

Anita changed $350 into pounds (£)
The exchange rate was £1 = $1.40

(*b*) Work out how much money, in pounds (£), Anita received.

£1 = $1·40
= 350 ÷ 1·4 = 250

£ 250 .....
(2)

(Total for Question 3 is 4 marks)

4 Asif has 200 beads.

Asif gives $\frac{1}{4}$

of the 200 beads to Bernadette.

Asif gives $\frac{2}{5}$

of the 200 beads to Claudio.

Asif gives 43 beads to Derek.

What fraction of the 200 beads does Asif have left?

LOOK!

A

~~200~~

B

$\frac{1}{4}$ of 50

C

$\frac{2}{5}$ of 200

$(200 \div 5) \times 2$

$= 80$

D

43

$200 - (50 + 80 + 43)$

$= 200 - 173$

$= 27$

$\frac{27}{200}$

.....

(Total for Question 4 is 4 marks)

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5 Here are the first five terms of a number sequence.

4 10 16 22 28

(*a*) (i) Write down the next term of the sequence.

28 + 6

34

(1)

(ii) Explain how you worked out your answer.

add 6 to the previous term

(1)

(*b*) Work out the 13th term of the sequence.

nth term rule = 6n - 2

so 13th term = 6 × 13 - 2

= 76

76

(1)

(*c*) Explain why 467 cannot be a number in the sequence.

all the terms in the sequence are even

but 467 is odd.

(1)

(Total for Question 5 is 4 marks)

6 Ella started watching television at 10 50 am.

Ella watched

a comedy programme lasting 45 minutes
a sports programme lasting 1 hour 10 minutes
a history programme

There were no breaks and no advertisements between the programmes.
Ella finished watching television at 2 20 p.m.

How long did the history programme last?
Give your answer in minutes.

10:50

comedy + 45 = 11:35

sports 1hr 10 = 12:45

15mins

1) 1hr

2) 20 mins

2:20pm

1hr 35 minutes
= 95 minutes

95 ..... minutes

(Total for Question 6 is 3 marks)

7 In a field, there are 60 sheep and 24 cows.

(*a*) Find the ratio of the number of sheep to the number of cows.
Give your ratio in its simplest form.

60 : 24

5 : 2

.....

(2)

In a barn, there are only white ducks and brown ducks.
In the barn, the ratio

number of white ducks : number of brown ducks = 3 : 7

(*b*) What fraction of the ducks in the barn are white?

W B
3 7
3 out of 10

$\frac{3}{10}$

.....

(1)

Giles and Sarah share some bales of hay in the ratio 11 : 4

Sarah receives 20 bales of hay.

(*c*) Work out how many bales of hay are shared in total.

G S
11 : 4
x5 (55 20) x5

Total = 75

75

.....

(3)

(Total for Question 7 is 6 marks)

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8 (*a*) Work out the value of $\dfrac{2.5+3.6}{12.7}+\dfrac{8.2}{5\times 3.6}$

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

$\frac{6.1}{12.7} + \frac{8.2}{18}$

0.935870516 2

.....

(2)

(*b*) Write your answer to part (*a*) correct to 3 significant figures.

0.935870.

0.936

.....

(1)

(Total for Question 8 is 3 marks)

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9 Divya and Yuan each pay for a holiday at a special offer price.

Divya's holiday	**Yuan's holiday**
Normal price: \$1600	Normal price: \$1400
Special offer: 16% off the normal price	Special offer: k% off the normal price

The amount that Divya pays is the same as the amount that Yuan pays.

Work out the value of k

D

100% − 16% = 84%

= 0·84

1600 × 0·84

= 1344

same price

Y

1400 − 1344

= 56

$\frac{56}{1400} \times 100$

= 4%

k = 4

(Total for Question 9 is 4 marks)

10 Find the highest common factor (HCF) of 200 and 420

$200 = 20 \times 10 = 2 \times 10 \times 10$
$= 2 \times 2 \times 5 \times 2 \times 5$

$420 = 42 \times 10 = 7 \times 6 \times 2 \times 5$
$= 7 \times 2 \times 3 \times 2 \times 5$

$200 = 2 \times 2 \times 2 \times 5 \times 5$
$420 = 2 \times 2 \times 3 \times 5 \times 7$

HCF $= 2 \times 2 \times 5$
$= 20$

20

(Total for Question 10 is 2 marks)

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11 (*a*) Write down all the factors of 10

1 10
2 5
~~5 2~~

1, 2, 5 10

(1)

(*b*) Find the lowest common multiple (LCM) of 18 and 60

60
120 $120 \div 18 = 6.\dot{6}$ ×
180 $180 \div 18 = 10$ ✓

180

(2)

(Total for Question 11 is 3 marks)

---

12 Aarav uses this rule to estimate the time, in minutes, that a bus journey takes.

Time	=	2.5 × length of journey in kilometres	+	1.5 × number of bus stops

Aarav's bus journey to work has a length of 12 kilometres.
There are 5 bus stops on the route.

(*a*) Use Aarav's rule to work out an estimate for the time this bus journey takes.

Time = 2·5 × 12 + 1·5 × 5
= 30 + 7·5
= 37·5

..... 37·5 ..... minutes
(2)

A different bus journey takes 55 minutes.
There are 8 bus stops on the route.

(*b*) Use Aarav's rule to work out an estimate for the distance of this bus journey.

(12)
55 = 2·5 × distance + 1·5 × 8

55 − 12 =

43 = distance
2·5

= 17·2

..... 17·2 ..... km
(3)

(Total for Question 12 is 5 marks)

13

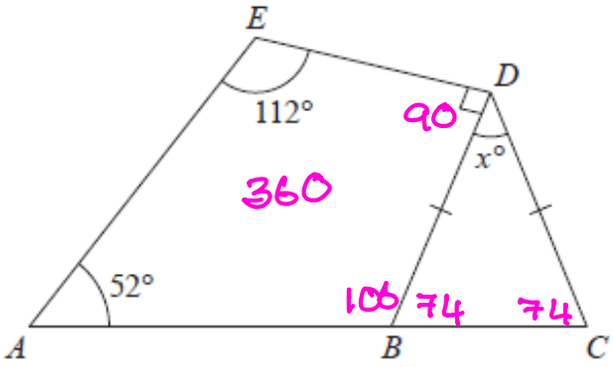


Diagram **NOT** accurately drawn

BCD is an isosceles triangle with *BD* = *CD*
ABC is a straight line.
ABDE is a quadrilateral.

Work out the value of *x*
Give a reason for each stage of your working.

ABD = 360 - (90 + 52 + 112)
= 360 - 254
= 106

angles in a quadrilateral = 360°

DBC = 180 - 106
= 74

angles on a straight line = 180

DCB = 74

2 angles in an isosceles triangle are equal

x = 180 - (74 + 74)
= 180 - 148
= 32

angles in a triangle = 180

x = 32

(Total for Question 13 is 4 marks)

14 The diagram shows the plan of a floor.

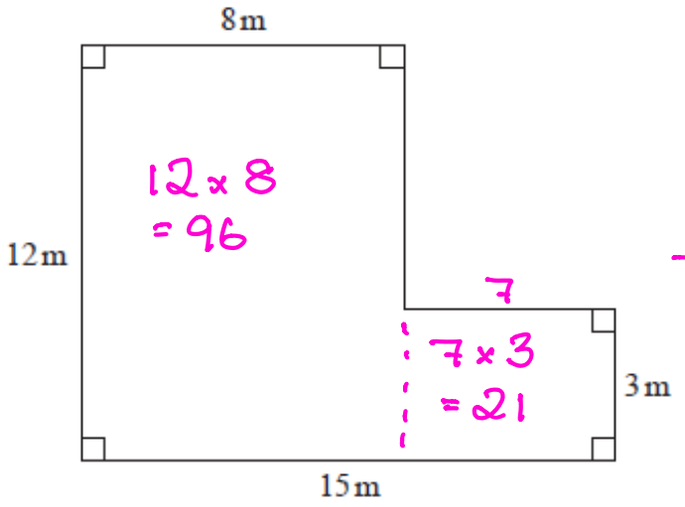


Diagram **NOT** accurately drawn

12 × 8
= 96

7 × 3
= 21

Total area
= 96 + 21
= 117

Indira is going to paint the floor.
She needs to buy enough tins of paint to cover the floor with one coat of paint.

Each tin of paint covers an area of 7 m^2
Each tin of paint costs £23.90

Indira buys the least possible number of tins of paint.

Work out the total cost of the tins of paint that Indira buys.
Show your working clearly.

Paint needed : 117 m^2 ÷ 7 m^2
= 16.71.. tins
so 17 tins

Cost => 17 × 23.90
= 406.30

£ 406.30

(Total for Question 14 is 5 marks)

15 Teresa invests £2000 for 3 years in a savings account.
She gets 4% each year compound interest.

(*a*) How much money will Teresa have in her savings account at the end of 3 years?
Give your answer correct to the nearest pound.

4% → 104% → 1·04

$2000 \times 1.04^3 = 2249.728$

2250

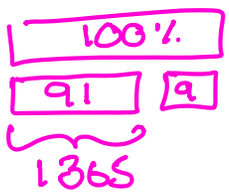
£. 2250

(3)

Sam invested £*T*
The value of his investment decreased by 9% each year.

At the end of the first year, the value of Sam's investment was £1365

(*b*) Work out the value of *T*



÷91 → 91% = 1365
→ 1% = 15
×100 → 100% = 1500

£1500

(3)

(Total for Question 15 is 6 marks)

16 The table shows information about the frame size, in cm, of 60 bicycles sold in a shop.

Frame size (S cm)	Frequency
$30 < S \leq 36$	4
$36 < S \leq 42$	14
$42 < S \leq 48$	18
$48 < S \leq 54$	19
$54 < S \leq 60$	5

(a) Write down the modal class.

$48 < S \leq 54$

(1)

(b) Work out an estimate for the mean frame size.

$33 \times 4 = 132$

$39 \times 14 = 546$

$45 \times 18 = 810$

$51 \times 19 = 969$

$57 \times 5 = 285$

2742

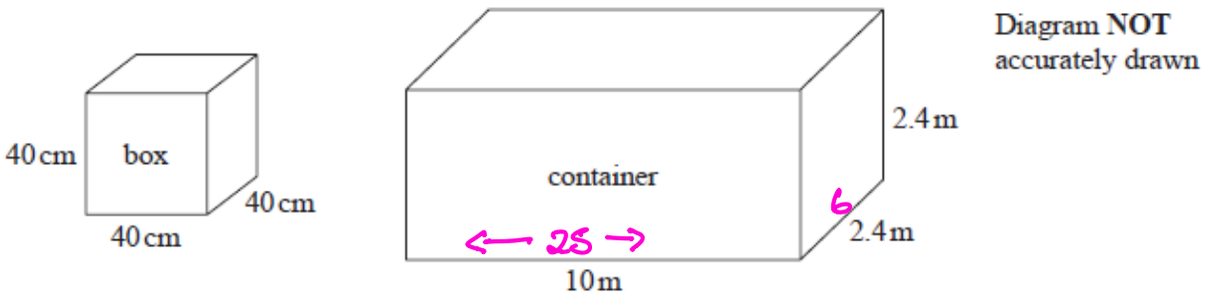
$2742 \div 60 = 45.7$

45.7 cm

(4)

(Total for Question 16 is 5 marks)

17



Tom puts boxes into a shipping container.

The container is a cuboid 10 metres by 2.4 metres by 2.4 metres.
Each box is a cube of side 40 centimetres.

Work out the greatest number of these boxes that Tom can put into the container.

10 m ⟷ 10 ÷ 0·4 = 25.

2·4 ↙↗ 2·4 ÷ 0·4 = 6

so 25 x 6 = 150 boxes on the bottom layer

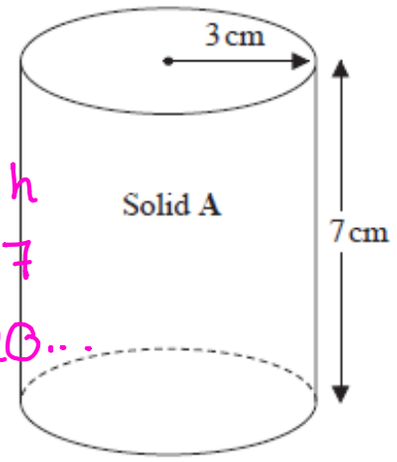
6 layers high

150 x 6 = 900 boxes

900

(Total for Question 17 is 3 marks)

18 The diagram shows two solids, **A** and **B**, made from two different metals.



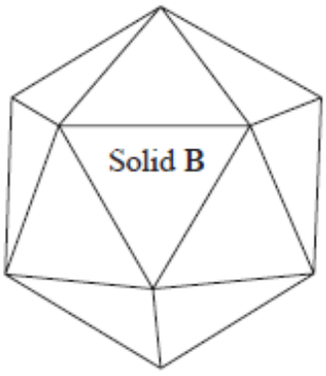


Diagram **NOT** accurately drawn

Volume
$= \pi \times r^2 \times h$
$= \pi \times 3^2 \times 7$
$= 197.920...$
cm^3

Solid **A** is in the shape of a cylinder with radius 3 cm and height 7 cm
Solid **A** has a mass of 2000 g

197.9203372

Solid **B** has a mass of 3375 g
Solid **B** has a volume of 450 cm^3

All of the metal from Solid **A** and Solid **B** is melted down to make a uniform Solid **C**

Given that there is no change to mass or volume during this process,
work out the density of Solid **C**

Give your answer correct to one decimal place.

	A	B		C
Volume	$197.92 cm^3$	$450 cm^3$	=	647.92
mass	2000g	3375g	=	5375

so C has a volume of $647.920... cm^3$
mass of 5375 g

Density $= \frac{5375}{647.92..} = 8.29577...$

8.3 ..... g / cm^3

(Total for Question 18 is 3 marks)

19 The diagram shows a solid triangular prism.

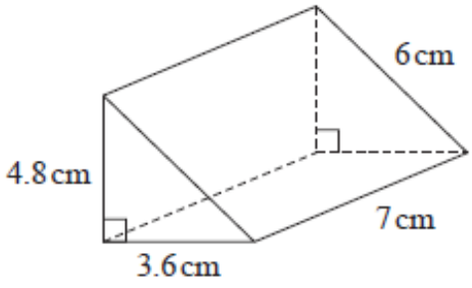


Diagram **NOT** accurately drawn

Work out the **total** surface area of the triangular prism.
Give your answer correct to 3 significant figures.

△ x 2 $\frac{1}{2}$ 3·6 x 4·8 = 8·64

slope 6 x 7 = 42

Base 3·6 x 7 = 25·2

Back 4·8 x 7 = 33·6

Total
8·64
8·64
42·
25·2
33·6
118·08
3 s.f.

118 ..... cm^2

(Total for Question 19 is 3 marks)

20 *C* grams of chocolate is shared in the ratios 2 : 5 : 8
The difference between the largest share and the smallest share is 390 grams.

Work out the value of *C*

2 : 5 : 8

Difference = 6

390 ÷ 6 = 65

2 × 65 = 130

5 × 65 = 325

8 × 65 = 520

check
520 − 130
= 390 ✓

C = 130 + 325 + 520

C = 975

(Total for Question 20 is 3 marks)

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21 60 students sat a Mathematics exam.

The mean mark for the 32 students in Class A was 55
The mean mark for the 28 students in Class B was 52

Find the mean mark for all 60 students.

	A	B	ALL STUDENTS
Number	32	28	60
Mean	55	52	
Total marks	32 × 55 = 1760	28 × 52 = 1456	1760 + 1456 = 3216

Mean for all students = 3216 ÷ 60 = 53·6

53·6

(Total for Question 21 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS