Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out $16 - 6 \times 2$

(1)

(b) Write 0.7 as a percentage.

(1)

(c) Write $\frac{3}{5}$ as a decimal.

(1)

(d) Find 15% of 120

(2)

(Total for Question 1 is 5 marks)

2 (a) Solve $4x = 20$

(1)

(b) Solve $y - 9 = 17$

(1)

(Total for Question 2 is 2 marks)

NEW

NEW

3 Dan buys 24 packets of nuts.
Each packet of nuts weighs 225 g.

(a) Work out the total weight of all the packets of nuts that Dan buys.

(2)

Susan is going to have a party.
There will be 50 people at the party.

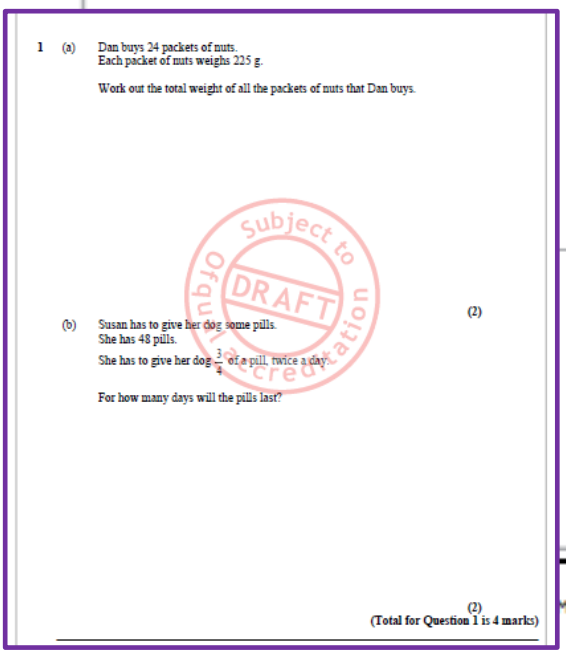
Susan wants to buy enough sausages so that each person at the party can have 2 sausages.

There are 8 sausages in each pack.
Susan buys 12 packs of sausages.

(b) Has she bought enough sausages?

(3)

(Total for Question 3 is 5 marks)



1 (a) Dan buys 24 packets of nuts.
Each packet of nuts weighs 225 g.

Work out the total weight of all the packets of nuts that Dan buys.

(2)

(b) Susan has to give her dog some pills.
She has 48 pills.
She has to give her dog $\frac{3}{4}$ of a pill, twice a day.

For how many days will the pills last?

(2)
(Total for Question 1 is 4 marks)

Appears to be based on Q1 in Draft SAMs

4 (a) Write down the 20th odd number.

(1)

The sum of two consecutive odd numbers is 48

(b) Find the smaller of these two odd numbers.

(2)

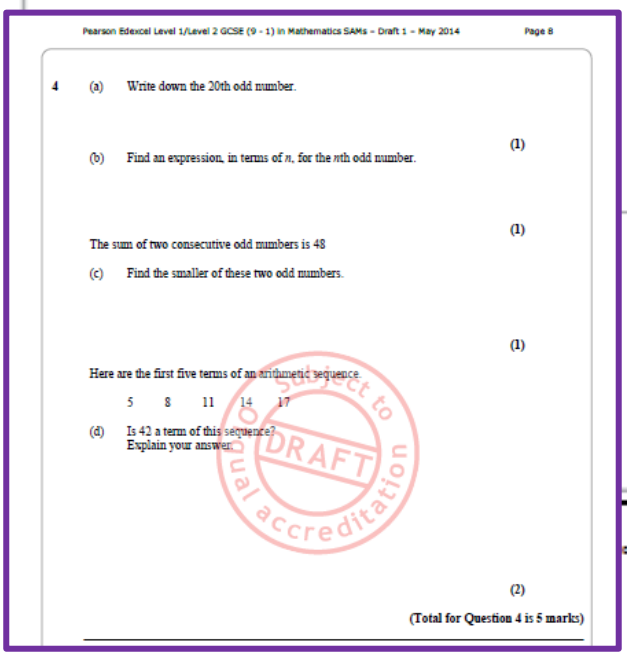
Here are the first five terms of an arithmetic sequence.

5 8 11 14 17

(c) Is 42 a term of this sequence?
Show how you get your answer.

(2)

(Total for Question 4 is 5 marks)



4 (a) Write down the 20th odd number.

(1)

(b) Find an expression, in terms of n, for the nth odd number.

(1)

The sum of two consecutive odd numbers is 48

(c) Find the smaller of these two odd numbers.

(1)

Here are the first five terms of an arithmetic sequence.

5 8 11 14 17

(d) Is 42 a term of this sequence?
Explain your answer.

(2)

(Total for Question 4 is 5 marks)

Appears to be based on Q4in Draft SAMs

5 Ajay owns a cafe.
The pictogram shows information about the number of each type of fruit he has in the cafe.

Apples	
Oranges	
Bananas	

Key

represents 4 pieces of fruit

It takes 7 oranges to make 500 ml of orange juice.

Ajay has to make $1\frac{1}{2}$ litres of orange juice.

Has Ajay enough oranges?
You must show all your working.

NEW

(Total for Question 5 is 3 marks)

6 Shazia buys 10 boxes of drinks.

The cost of each box of drinks is £5
Each box holds 12 cans of drink.

Shazia sells $\frac{2}{3}$ of the total number of cans for 60p each.

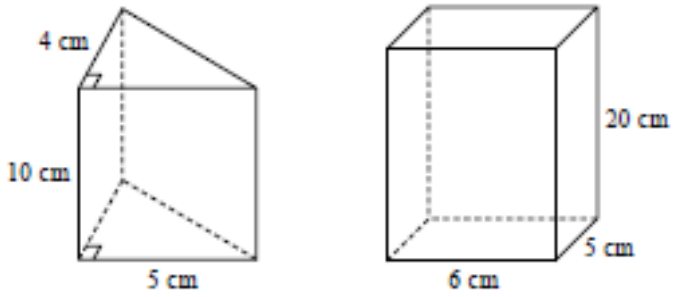
She then sells all the remaining cans for 30p each.

Work out the total profit that Shazia makes.

(Total for Question 6 is 5 marks)

Same as Q5 on Draft SAMs

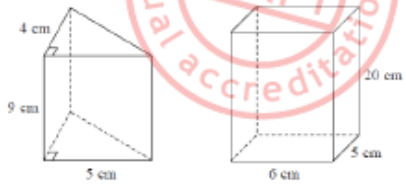
7 The diagram shows a right-angled triangular prism **A** and a cuboid **B**.



A **B**

Show that the volume of **B** is 6 times the volume of **A**.

7 The diagram shows a right-angled triangular prism and a cuboid.



Find the ratio of the volume of the triangular prism to the volume of the cuboid.
Give your answer in its simplest form.

(Total for Question 7 is 3 marks)

Question 7 is 3 marks)

Appears to be based on Q7 in the Draft SAMs

8 Carpet tiles are going to be used to cover a floor.

The floor is a 1200 mm by 1000 mm rectangle.
Each carpet tile is a 40 cm by 30 cm rectangle.

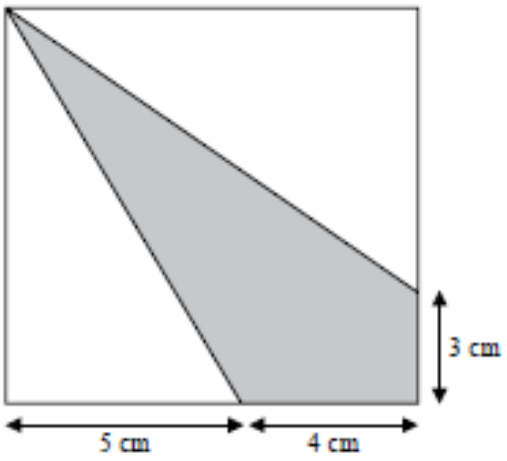
Exactly 10 carpet tiles can be used to cover the floor completely.

Show in a labelled sketch how this can be done.

NEW

(Total for Question 8 is 3 marks)

9 The diagram shows a shaded quadrilateral inside a square.



Work out the area of the shaded quadrilateral.

Same as Q9 on Draft SAMs

(Total for Question 9 is 4 marks)

10 There are 3 red beads and 1 blue bead in a jar.
A bead is taken at random from the jar.

(a) What is the probability that the bead is blue?

(1)

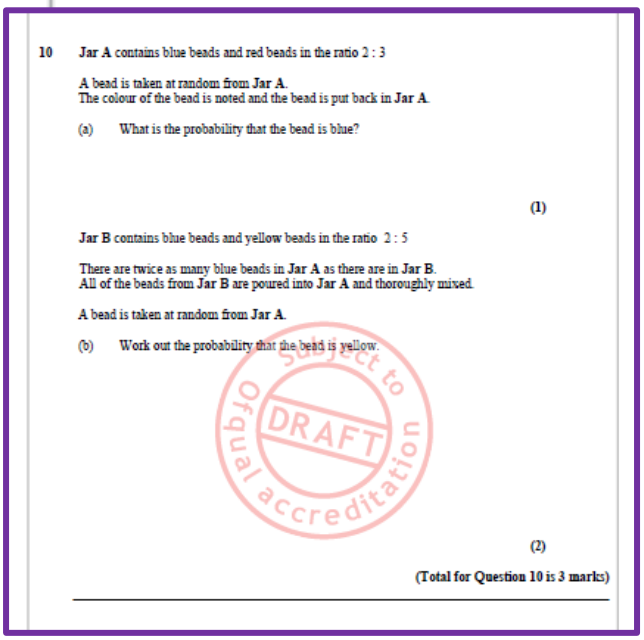
There are 4 yellow counters and 3 green counters in a bag.

Sharon puts some more green counters into the bag.
The ratio of the number of yellow counters to the number of green counters is now 2 : 5

(b) How many green counters did Sharon put into the bag?

(2)

(Total for Question 10 is 3 marks)



10 **Jar A** contains blue beads and red beads in the ratio 2 : 3

A bead is taken at random from **Jar A**.
The colour of the bead is noted and the bead is put back in **Jar A**.

(a) What is the probability that the bead is blue?

(1)

Jar B contains blue beads and yellow beads in the ratio 2 : 5

There are twice as many blue beads in **Jar A** as there are in **Jar B**.
All of the beads from **Jar B** are poured into **Jar A** and thoroughly mixed.

A bead is taken at random from **Jar A**.

(b) Work out the probability that the bead is yellow.

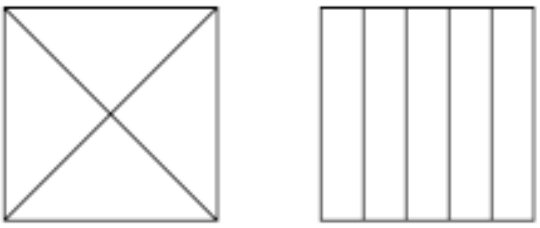
(2)

(Total for Question 10 is 3 marks)

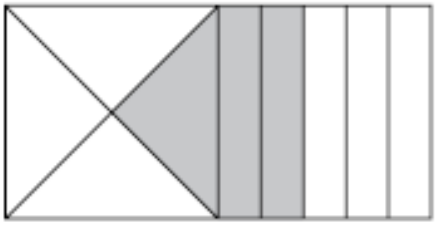
Appears to be based on Q10 on Draft SAMs

11 Here are two identical squares.

The first square is divided into four equal parts.
The second square is divided into five equal parts.



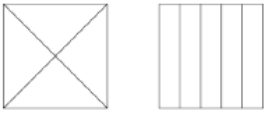
The two squares are joined together as shown to make a rectangle.



What fraction of the rectangle is shaded?

11 Here are two identical squares.

The first square is divided into four equal parts.
The second square is divided into five equal parts.



The two squares are joined together as shown to make a rectangle.

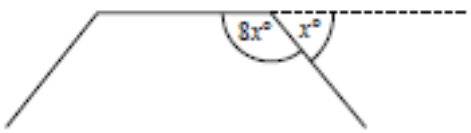
What fraction of the rectangle is shaded?

(Total for Question 11 is 4 marks)

(Total for Question 11 is 3 marks)

Appears to the same as Q11 on Draft SAMs NOTE THE MARKS DIFFERENCE

12 The diagram shows three sides of a regular polygon.



The size of each exterior angle of the regular polygon is $x°$.
The size of each interior angle of the regular polygon is $8x°$.

Work out the number of sides the regular polygon has.

NEW

(Total for Question 12 is 3 marks)

13 Liam, Sarah and Emily shared some money in the ratio 2 : 3 : 7
Emily got £80 more than Liam.

How much money did Sarah get?

Same as Q13 on Draft SAMs

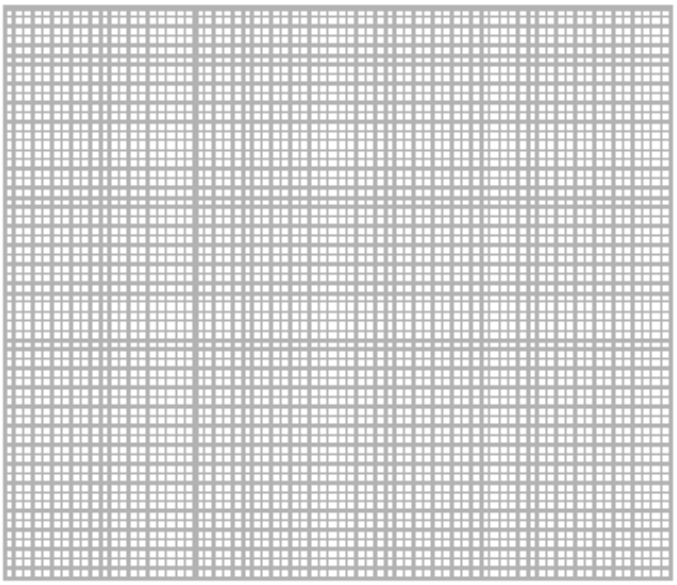
(Total for Question 13 is 3 marks)

14 The table shows the life expectancy (in years) for males born in the UK from 2000 to 2012.

Year of birth	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Life expectancy (years)	75.4	75.7	75.8	76.1	76.6	76.9	77.2	77.4	77.6	78.1	78.4	78.8	79.0

(Data from statistics.gov.uk)

(a) Use this information to predict the life expectancy of a male born in 2030.



(4)

(b) Make two comments explaining why your prediction in part (a) may not be reliable.

Based on Q14 in Draft SAMs

(ii) is different

(ii) Evaluate the reliability of your result.

(Total for Question 14 is 6 marks)

(Total for Question 14 is 6 marks)

15 Given that $A = 2^4 \times 3^3 \times 5$ and $B = 2^3 \times 3 \times 5^2$

write down, as a product of powers of its prime factors,

(i) the highest common factor (HCF) of A and B

(ii) the lowest common multiple (LCM) of A and B.

Same as Q15 on Draft SAMs

(Total for Question 15 is 2 marks)

16 A rectangular piece of card $ABCP$ is placed on a horizontal straight line.

The card is first rotated 90° clockwise about C.
The card is then rotated 90° clockwise about B.
The card is then rotated 90° clockwise about A.

Draw the locus of the vertex P.

Same as Q16 on Draft SAMs

(Total for Question 16 is 3 marks)

PREVIOUS

17 (a) Solve the simultaneous equations $3x + 5y = 4$

$2x - y = 7$

(3)

(b) Find the integer value of x that satisfies both the inequalities

$x + 5 > 8$ and $2x - 3 < 7$

(3)

(Total for Question 17 is 6 marks)

(2)

(Total for Question 17 is 5 marks)

17

Same as Q17 on Draft SAMs

Marks for (b) are different

18 Modelling the planet Mercury as a sphere, it has a radius of 2440 km.

(a) (i) Work out an estimate in square kilometres for the surface area of Mercury.

(ii) Without carrying out a further calculation, give evidence to show whether your method gives you an underestimate or an overestimate for the surface area of Mercury.

(3)

In July 2013, the spacecraft Messenger was near Mercury at a distance of 9.75×10^7 km from Earth.

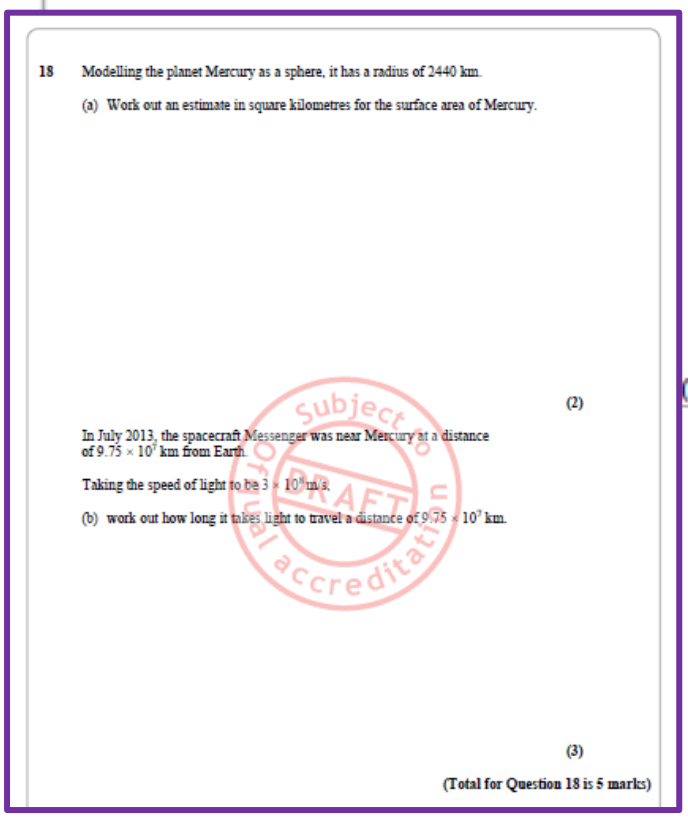
Taking the speed of light to be 3×10^8 m/s,

(b) work out how long it takes light to travel a distance of 9.75×10^7 km.

(3)

(Total for Question 18 is 6 marks)

Same as Q18 on Draft SAMs



18 Modelling the planet Mercury as a sphere, it has a radius of 2440 km.

(a) Work out an estimate in square kilometres for the surface area of Mercury.

(2)

In July 2013, the spacecraft Messenger was near Mercury at a distance of 9.75×10^7 km from Earth.

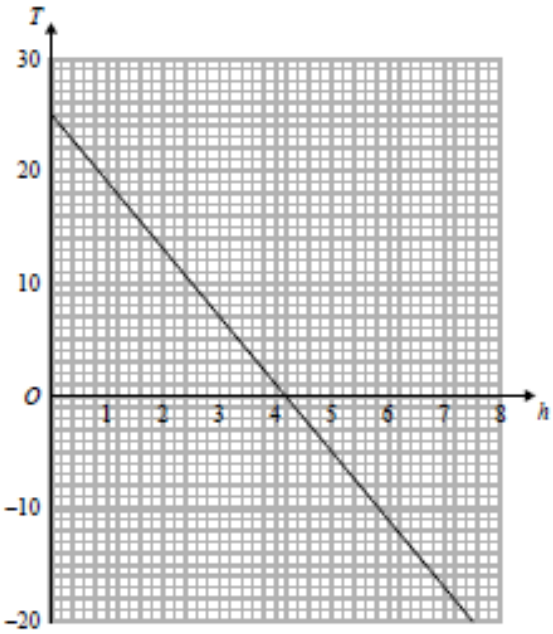
Taking the speed of light to be 3×10^8 m/s,

(b) work out how long it takes light to travel a distance of 9.75×10^7 km.

(3)

(Total for Question 18 is 5 marks)

19 The graph gives information about how the temperature, T °C, of the atmosphere decreases as the height above ground level, h km, increases.



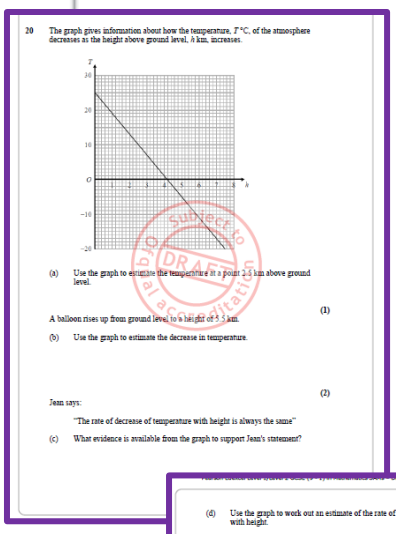
Based on Q20 on Draft SAMs

(a) Use the graph to estimate the temperature at a point 2.5 km above ground level.

(1)

A balloon rises up from ground level to a height of 5.5 km.

(b) Use the graph to estimate the decrease in temperature.


20 The graph gives information about how the temperature, T °C, of the atmosphere decreases as the height above ground level, h km, increases.

(a) Use the graph to estimate the temperature at a point 2.5 km above ground level.

(1)

A balloon rises up from ground level to a height of 5.5 km.

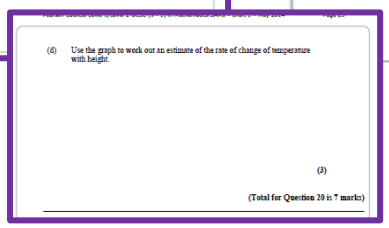
(b) Use the graph to estimate the decrease in temperature.

(2)

Jean says:

"The rate of decrease of temperature with height is always the same"

(c) What evidence is available from the graph to support Jean's statement?


(d) Use the graph to work out an estimate of the rate of change of temperature with height.

(3)

(Total for Question 20 is 7 marks)

Jean says:

"The temperature falls 6 °C for every kilometre the balloon rises."

(c) What evidence is available from the graph to support this?

(4)

(Total for Question 19 is 7 marks)

20 Michael carried out a survey of the time, in minutes, it takes the 20 people in his office to get to work. This table gives some information about his results.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	6
$20 < t \leqslant 30$	1
$30 < t \leqslant 40$	4
$40 < t \leqslant 50$	1

Michael used this information to work out the mean of the times taken.
He got an answer of 68 minutes.

(a) Explain why it is impossible for the mean time to be 68 minutes.

(1)

The 20 people in the survey had:
a mean age of 45 years
a median age of 41 years

Michael decides to include his age so that he works out the mean age and median age of 21 people.
Michael is 42 years old.

Here are two statements about the ages of the 21 people.

Statement 1: The mean age of the 21 people is less than 45 years.

Statement 2: The median age of the 21 people is more than 41 years.

NEW

(b) (i) Is statement 1 correct?
You must give a reason to support your answer.

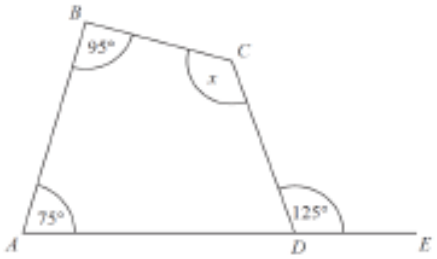
(ii) Is statement 2 correct?
You must give a reason to support your answer.

(2)

(Total for Question 20 is 3 marks)

THE FOLLOWING QUESTIONS HAVE BEEN REMOVED:

6 *ABCD* is a quadrilateral.



ADE is a straight line.

Work out the size of the angle marked *x*.

(Total for Question 6 is 2 marks)

---

12 Jason cycles the $4\frac{1}{2}$ miles from Sudbury to Alpheton in 20 minutes.

(a) Work out Jason's average speed.
Give your answer in miles per hour.

(2)

Jason cycles from Alpheton to Bury St Edmunds at an average speed of 12 miles per hour for $1\frac{1}{2}$ hours.

(b) How far does he cycle from Alpheton to Bury St Edmunds?

(2)

(Total for Question 12 is 4 marks)

---

19 The median of five consecutive integers is n.

Show that the difference between the mean and the median of the squares of the five integers is always 2

(Total for Question 19 is 3 marks)

---

21 30 children attend a youth club.
20 of the children are boys and 10 of the children are girls.
The mean amount of pocket money received each week by the boys is £7
The mean amount of pocket money received each week by the girls is £10

Work out the mean amount of pocket money received each week by all the children attending the youth club.

(Total for Question 21 is 2 marks)