Answer **all** the questions

1 **(a)** Solve.

(i) $2x - 18$

(a)(i) $x =$ ..... **[1]**

(ii) $x \div 2 = 5$

(ii) $x =$ ..... **[1]**

(iii) $\frac{x}{3} = 15$

(iii) $x =$ ..... **[1]**

(b) **(i)** Find the value of t in the following expression when $g = 4.2$ and $h = 7$.

$t = 12g - 5h$

(b)(i) $t =$ ..... **[2]**

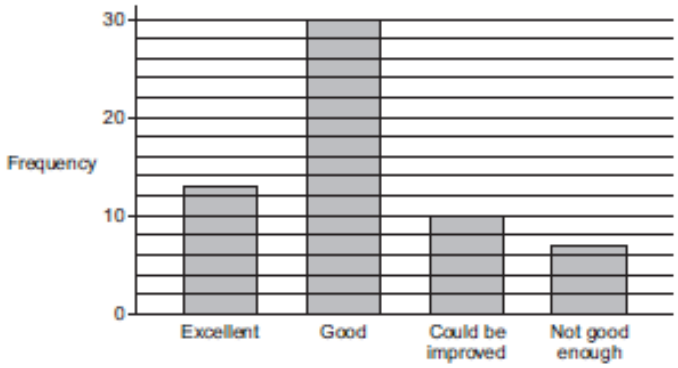
(ii) Rearrange to make r the subject.

$q = p - 4r$

(ii) ..... **[2]**

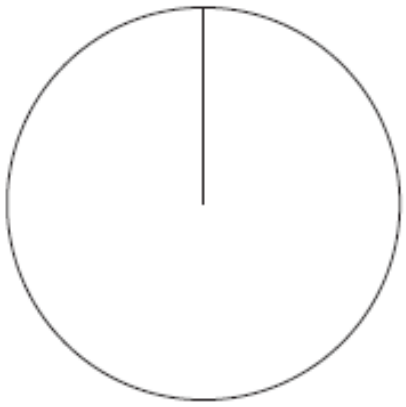
Same as Q1 on draft SAMs

2 Cambury Council asked 60 customers what they thought of the services offered at the local leisure centre.
The results are shown in this bar chart.



The council wants to present the data in a pie chart.

Draw and label a pie chart to represent the data.



[5]

Same as Q2 on draft SAMs

3 In 2008 some 20p coins were made with no date on.

Ordinary 20p 20p with no date

(a) A 20p with no date on is a collector's item.
One 20p with no date sold for £7100.

How many ordinary 20p coins would you need to pay for this 20p with no date?

(a) ..... [2]

(b) Each 20p coin weighs 5 g.

Could an average person lift £7100 worth of ordinary 20p coins?
Show any estimates and calculations you use to decide. [4]

(c) Explain whether your answer to (b) would change if the person lifting the coins was a champion weightlifter.

..... [1]

Q3 on draft SAMs

NOTE part c is NEW

4 Antonio works Monday, Tuesday and Wednesday.

He starts work at 3.30 pm and finishes at 10.30 pm.
He has a 30 minute break each weekday, for which he is not paid.
Antonio is paid £10 per hour on weekdays.

One week, he also works for 4 hours on Sunday.
He is paid 50% more on Sundays.

How much does Antonio earn altogether this week?

£ ..... **[6]**

Same as Q4 on draft SAMs

5 Darren says

I can run 100 m in 15 seconds, so I should be able to run 800 m in 120 seconds.

Do you think that he would take more or less than 120 seconds to run 800 m?
Explain your answer, with reference to any assumptions Darren has made.

.....

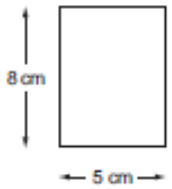
.....

.....

..... **[3]**

NEW

6 Jo makes a silver pendant.
She starts with a rectangular piece of silver.

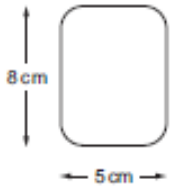


Not to scale

(a) Work out the area of this rectangle.

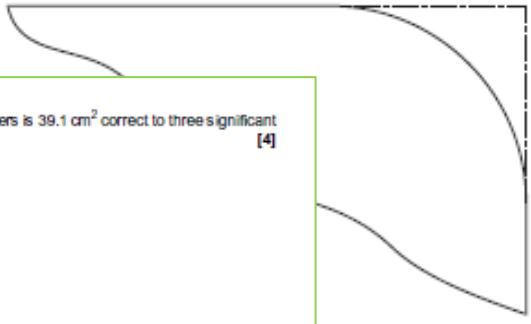
(a) ..... cm^2 **[1]**

(b) Jo cuts each corner of the rectangle in the shape of a quarter-circle, radius 1 cm.



Not to scale

This is an enlarged drawing of one corner of the pendant.



Show that the area of the pendant with rounded corners is 39.1 cm^2 correct to three significant figures. **[4]**

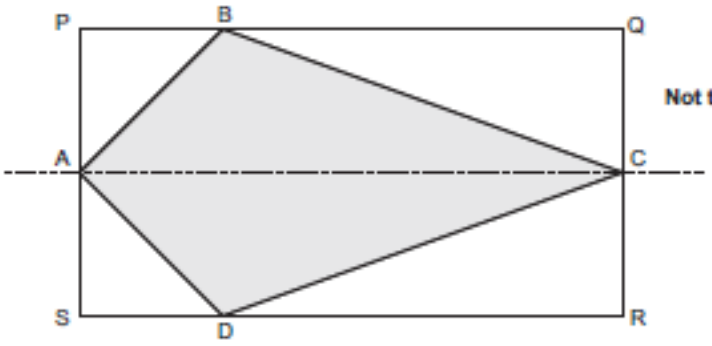
Same as Q6 on draft SAMs

(c) The silver pendant is 2 mm thick.

Find the volume of silver in the pendant with rounded corners.
Give your answer in cm^3.

(c) ..... cm^3 **[3]**

7 PQRS is a rectangle.
A, B, C and D are points on SP, PQ, QR and RS respectively.
A, B, C and D can be connected to form a quadrilateral.
The dashed line is the line of symmetry for the diagram.



Not to scale

(a) Angle ABC = 125°.

Write down the size of angle ADC.

(a) angle ADC = ... ° **[1]**

(b) AP is the same length as PB.

Work out the size of angle BCD.
Show your reasoning clearly.

Based on Q7 on draft SAMs

Part a removed

(b) angle BCD = ... ° **[4]**

(a) Write down the mathematical name of quadrilateral ABCD.

(a) ..... **[1]**

8 **(a)** The nth term of a sequence is given by $3n + 5$.

Explain why 21 is not a term in this sequence.

.....

..... **[2]**

(b) Here are the first three terms in a sequence.

1 2 4

Find two different rules for continuing this sequence and the next two terms in each case.

Rule 1 .....

Next two terms ....

Rule 2 .....

Next two terms .... **[4]**

NEW

Based on Q8 on draft SAMs

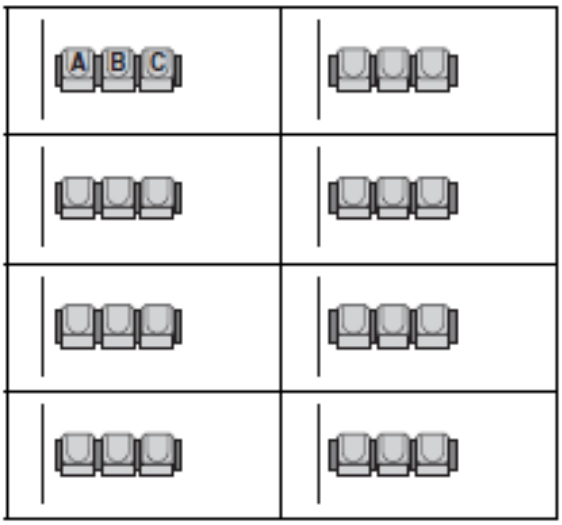
Part b changed

9 Three friends, Ann (A), Bob (B) and Carol (C), go on holiday together.

(a) They book a row of three seats on the plane.
When they arrive at the plane they go to their seats in a random order.

(i) List all the different ways they could sit together on the three seats.

The first one has been done. You may not need to fill in all the pictures.



[2]

(ii) What is the probability that Ann and Carol sit next to each other?

(a)(ii) ..... **[1]**

(iii) What is the probability that Bob has a window seat and sits next to Ann?

(b) Ann, Bob and Carol have a budget of £500 to rent a holiday apartment.
The apartment normally costs £50 per night, but they can get a 20% discount if they book early.

Calculate how many extra nights they can stay in the apartment if they book early.

(b) ..... nights **[4]**

(b) The apartment they stay in costs a total of £600 for the week.
They get a 30% discount.
They share the cost of the apartment equally between them.

How much will they **each** have to pay for the apartment?

DRAFT

(b) £ ..... **[3]**

10 Calculate.

(a) $\sqrt{6561}$

(a) ..... [1]

(b) $\sqrt[4]{625}$

(b) ..... [1]

(c) 8^{-2}

(c) ..... [1]

Same as Q9 on draft SAMs

11 Erna is doing some calculations without a calculator.
These two are wrong.

For each one, without working it out, explain how Erna could have known the answer is wrong.

(a) $0.38 \times 0.26 - 0.827$

.....

..... [1]

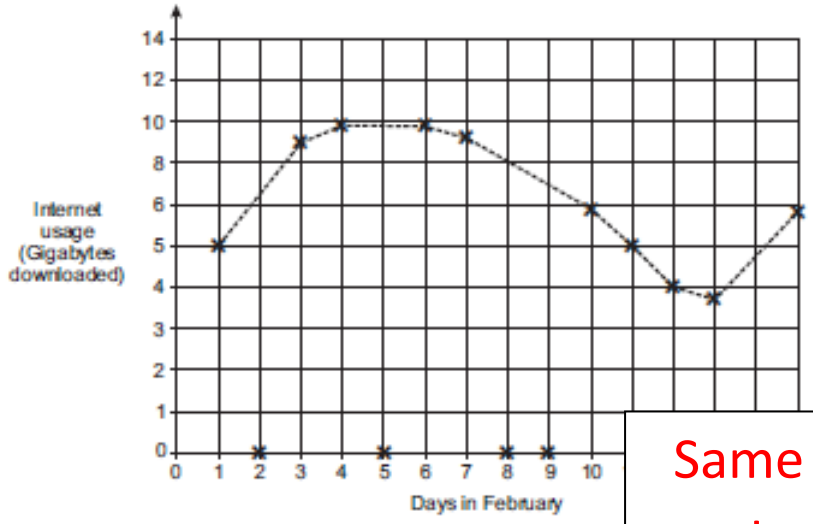
(b) $\frac{3}{4} + \frac{2}{3} - \frac{5}{7}$

.....

..... [1]

Same as Q10 on draft SAMs

12 Shinya's internet service provider gives him a graph of his internet usage in the first part of February.



State two reasons why this graph is misleading.

1 .....

2 .....

[2]

Same as Q15 on draft SAMs

13 **(a)** Mia cycled 23 km, correct to the nearest km.

What is the least distance Mia could have cycled?

(a) ..... km **[1]**

(b) A number x, rounded to one decimal place, is 4.7.
So the error interval for x is given by $4.65 \leqslant x < 4.75$.

(i) A number y, rounded to **two** decimal places, is 4.13.

Write down the error interval for y.

(b)(i) ..... **[2]**

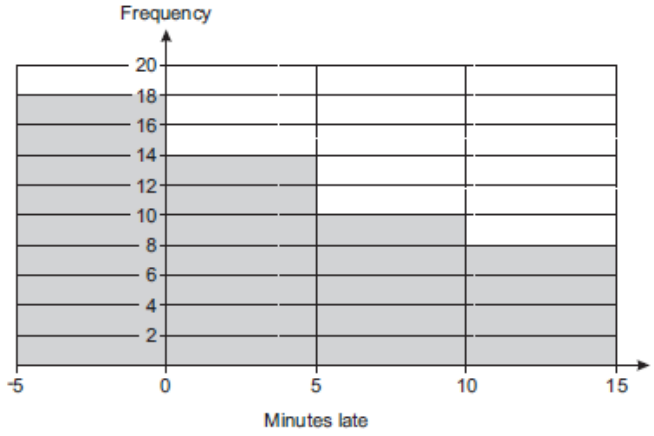
(ii) A number z, rounded to two significant figures, is 4700.

Write down the error interval for z.

(ii) ..... **[2]**

Same as Q14 on draft SAMs

14 **(a)** This frequency diagram summarises the number of minutes late or early Astrid's train journey to work was over the last 50 days.



Use information from this diagram to estimate the probability that her train will be late tomorrow.

(a) ..... **[2]**

(b) Explain whether your answer to **(a)** gives a reliable probability.

.....

..... **[1]**

Based on Q11 on draft SAMs

Part b is NEW

15 Leo is using these numbers to make a new number.

11	1	3	6

He can only use +, −, ×, ÷ and brackets to combine the numbers.

- He cannot use any number more than once.
- He cannot use powers.
- He cannot put numbers together, e.g. he can't use 136.

What is the biggest number he can make?
Show how he can make this number.

Same as Q16 on draft SAMs

.....

.....

.....

..... **[4]**

16 18 kg of copper is mixed with 10.5 kg of zinc to make an alloy.

The density of copper is 9 g/cm^3.
The density of zinc is 7 g/cm^3.

(a) Work out the volume of copper used in the alloy.

(a) ..... cm^3 **[2]**

(b) What is the density of the alloy?

(b) ..... g/cm^3 **[4]**

Same as Q17 on draft SAMs

17 (a) (i) Solve.

$5x + 1 > x - 18$

(a)(i) ..... [3]

(ii) Write down the largest integer that satisfies $5x - 1 < 10$.

(ii) ..... [1]

(b) Solve.

$3x^2 = 75$

(b) $x =$ ..... [2]

(c) Solve.

$4x + 3y = 5$

$2x + y = 3$

Same as Q18 on draft SAMs

(c) $x =$ .....

$y =$ .....

[3]

18 Here are the interest rates for two accounts A and B.

Account A	Account B
Interest: 3.5% per year compound interest. No withdrawals until the end of three years.	Interest: 4% for the first year, 3.5% for the second year and 3% for the third year. Withdrawals allowed at any time.

Derrick has £10 000 he wants to invest.

(a) Calculate which account would give him most money if he invests his money for 3 years.
Give the difference in the interest to the nearest penny.

Same as Q19 on draft SAMs

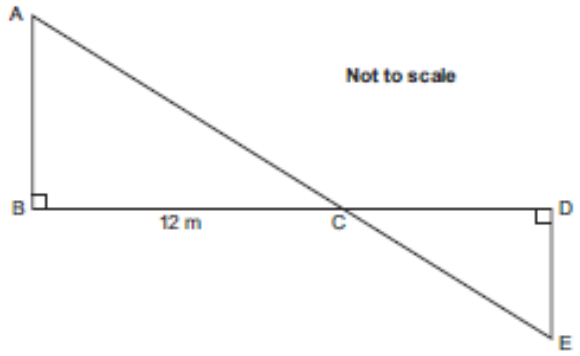
(a) Account ..... by ..... p [

(b) Explain why he might **not** want to use Account A.

.....

..... [

19 In the diagram below, AE and BD are straight lines.
The length BC is 12 m.
The ratio BC : CD = 3 : 1.



(a) Show that triangles ABC and EDC are similar.

.....

.....

.....

.....

.....

..... **[3]**

(b) The length DE is 3.5 m.

Find the length AB.

Same as Q20 on draft SAMs

(b) ..... m **[2]**

THE FOLLOWING HAVE BEEN REMOVED:

5 **(a)** Here are the first four numbers of a sequence.

12 19 26 33

Write down the next number in the sequence.

(a) ..... **[1]**

(b) The nth term of another sequence is $2n + 5$.

Write down the first three terms of this sequence.

(b) ..... , ... , ... **[2]**

13 A straight line has gradient -2 and passes through the point $(3, 4)$.

Find the equation of the line.

..... **[3]**