Pearson Edexcel Functional Skills

Centre Number

Candidate Number

Sample assessment material for first teaching September 2019

Time: 1 hour 30 minutes

Paper Reference **SAML2/01**

Mathematics

Level 2
Section B (Calculator)

You must have:
Pen, calculator, HB pencil, eraser, ruler graduated in cm and mm, protractor, pair of compasses.

Total Marks

My signature confirms that I will not discuss the content of the test with anyone.

Signature: _____

Instructions

- Use a **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Sign the declaration.
- Answer **all** questions.
- Write your final answers in the boxes provided.
- Answer the questions in the spaces provided – *there may be more space than you need*.
- You **must** show clearly how you get your answers in the spaces provided. Marks will be awarded for your working out.
- Check your working and your answers at each stage.
- Diagrams are **not** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button take the value of π to be 3.14
- **Calculators may be used.**

Information

- The total mark for this section is 48
- The total mark for this paper is 64
- The marks for each question are shown in brackets.
  – *use this as a guide to how much time to spend on each question.*
- This sign ☑ shows where marks will be awarded for showing your checks.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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Worked Solutions

Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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SECTION B

Answer ALL questions. Write your answers in the spaces provided.

1   Data set A has a median value of 3.1

Here is data set B.

$$14 \quad -9 \quad 28 \quad -38 \quad -13 \quad -2$$

(a) Write a statement to compare the median values of the two sets of data.

(2)

$-\cancel{38}, -\cancel{13}, -9, -2, \cancel{14}, \cancel{28}$

> Writing the numbers in order from smallest to largest then crossing out from both ends until there are two numbers in the middle

$$\frac{-9 + -2}{2} = -5.5$$

> The median is the mean of the two numbers in the middle. This is found by adding them together and dividing by 2 as there are 2 numbers

The median for set B is less

> The median of set B is -5.5, which is less than 3.1, the median of set A

(b) Show a check of your answer for the median of data set B.

(1)

$-5.5 \times 2 = -11$

$-2 + -9 = -11$

> Doing a reverse calculation on the mean to show that the total is the same as both of the middle numbers added together

(Total for Question 1 is 3 marks)

2 Dan throws two fair dice.

The numbers on dice A are   1   −2   3   −4   5   −6

The numbers on dice B are   −1   2   −3   4   −5   6

The table shows some total scores from throwing the two dice.

Dice A

	+	1	−2	3	−4	5	−6
	−1	0	−3	2	−5	4	−7
	2	3	0	5	−2	7	−4
Dice B −3	−3	−2	−5	0	−7	2	−9
	4	5	2	7	0	9	−2
	−5	−4	−7	−2	−9	0	−11
	6	7	4	9	2	11	0

(a) Complete the table.

(1)

Dan throws the two dice once.

(b) What is the probability that the total score is −11?

(1)

There are 36 possible scores as there are 6 rows of 6 and 6 x 6 = 36. 1 out of the 36 possible scores is -11

$\frac{1}{36}$

Dan throws the two dice again.

(c) What is the probability that the new total score is 0?

(1)

There are 36 possible scores as there are 6 rows of 6 and 6 x 6 = 36. 6 out of the 36 possible scores is 0

$\frac{6}{36}$

(Total for Question 2 is 3 marks)

3 Last year Zack had two jobs.

Zack worked

- in an office for 12 months and earned £2600 per month

- at a gym for 39 weekends and earned £80 per weekend.

What fraction of his total income last year came from his work at the gym?
Write the fraction in its simplest form.

(4)

2600×12 ← This works out that he earned £31200 in the office last year

80×39 ← This works out that he earned £3120 in the gym last year

$\dfrac{3120}{3120 + 31200}$ ← Expressing the amount he earned in the gym as a fraction of the total amount earned last year

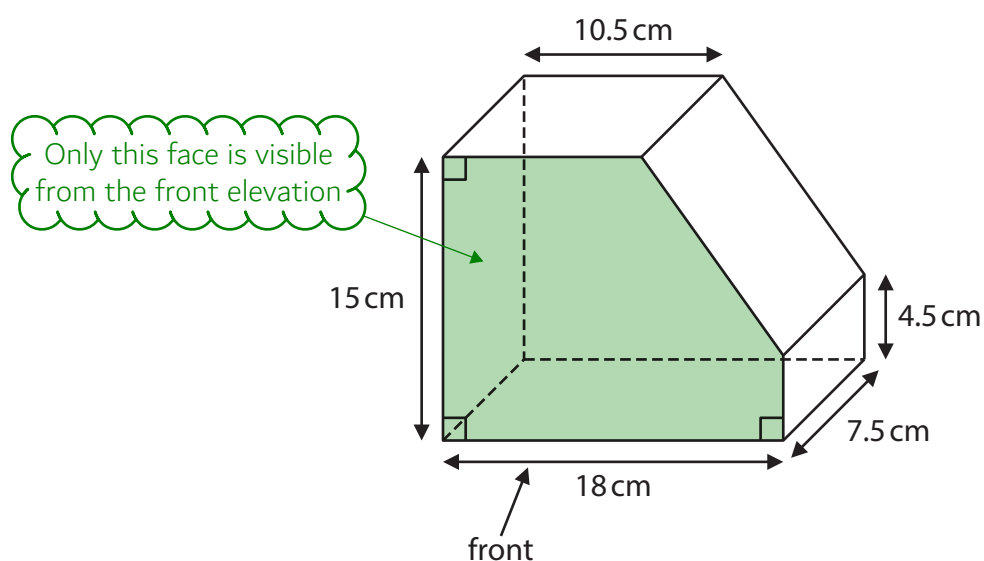The calculator simplifies the fraction for us

$\dfrac{1}{11}$

(Total for Question 3 is 4 marks)

4 Here is a prism.
The cross section of the prism is a pentagon.

Only this face is visible from the front elevation

10.5 cm

15 cm

4.5 cm

7.5 cm

18 cm

front

Draw the front elevation of the prism on the grid.
Use the scale 1:3
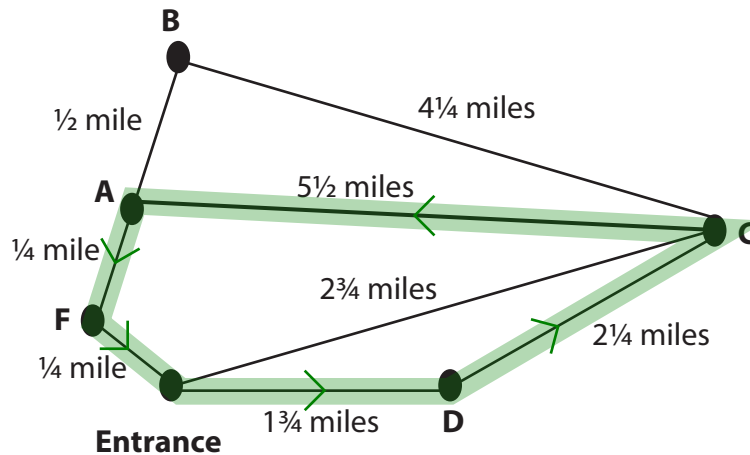
(3)

Leave this slanted side until last

Key

◄----► 1cm on the page
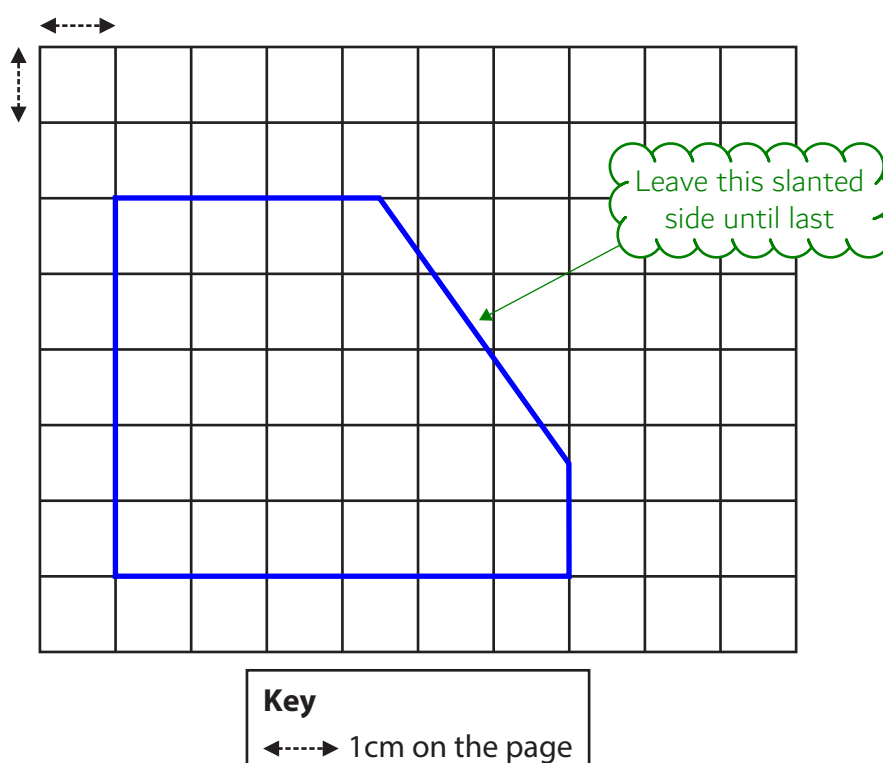
The scale means that the real prism is 3 times larger than the scale drawing. So dividing all of the sides by 3 works out the lengths needed

(Total for Question 4 is 3 marks)

5 Olga has this sketch of the paths in a park.

B

½ mile   4¼ miles

A   5½ miles   **C**

¼ mile

F   2¾ miles   2¼ miles

¼ mile

Entrance   1¾ miles   **D**

She wants a cycle route that

- starts and ends at the entrance

- goes through point C at least once

- has a total length between 15 **kilometres** and 20 **kilometres**.

1 km = 0.6 miles.

Plan a suitable route.
Work out the total distance of the route.

(5)

$$\frac{2\frac{3}{4}+5\frac{1}{2}+\frac{1}{4}+\frac{1}{4}}{0.6} = 14.5\ldots$$

First trying the route Entrance, C, A, F, Entrance. Adding the distances of each part works out the total distance in miles. Every 0.6 miles is 1km so dividing by 0.6 converts the total distance in miles into kilometres. This is less than 15 kilometres so this route doesn't work

$$\frac{1\frac{3}{4}+2\frac{1}{4}+5\frac{1}{2}+\frac{1}{4}+\frac{1}{4}}{0.6}$$

Trying the route Entrance, D, C, A, F, Entrance. Adding the distances of each part works out the total distance in miles. Every 0.6 miles is 1km so dividing by 0.6 converts the total distance in miles into kilometres. This is within the desired range of distances

Route	EDCAFE

Total distance	16.6 km

(Total for Question 5 is 5 marks)

6 Here is a cube of side length 2.5 cm.
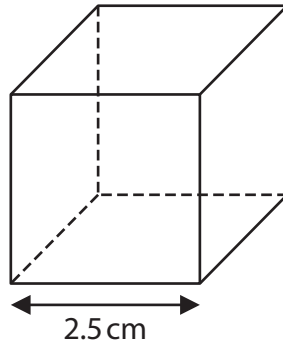
2.5 cm

Work out the surface area of this cube.

(3)

$2.5^2 \times 6$

Each face on the cube is a square. Area of a square = length². The length is 2.5cm. There are 6 identical square faces so multiplying the area of one of the squares by 6 works out the surface area

37.5   cm²

(Total for Question 6 is 3 marks)

3HDUVRQ (GH[FHO)XQFWLRQDO 6NLOOV 4XDOL4FDW
6DPSOH DVVHVVPHQW PDWHULDOV 6$0V − VVXH -XQH k3

7 Megan is the manager of a computer shop.
She organises a sale with 18% off all tablets.

Megan changes the price of one tablet from £389 to £330.98

(a) Has Megan changed the price correctly?

(3)

$$389 \times \frac{100-18}{100} = 318.98$$

Percentage is out of 100 so 100 - 18 works out the percentage the prices are reduced to. Dividing this by 100 converts the percentage into a fraction. Multiplying the £389 by this fraction reduces the price by 18%

£318.98 is not £330.98 so Megan has not changed the price correctly

No

(b) Use estimation to show a check of your answer.

(1)

$$400 \times \frac{100-20}{100} = 320$$

Rounding the amounts to 1 significant figure and repeating the calculation

(Total for Question 7 is 4 marks)

8 A team of workers deliver identical fridges.

The team will use the average time to fully load an old lorry to predict the time to fully load a new lorry.

The table shows the times it took to fully load the old lorry with 24 fridges.

Time (mins)	52	60	55	59	54	63	56

The diagram shows the space available for fridges in the new lorry.
The space is in the shape of a cuboid.

2400 mm

13600 mm
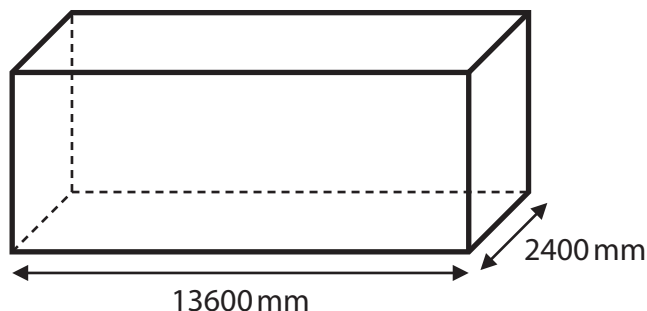
Each fridge needs a rectangular floor space 1000 mm by 800 mm.

The team do not stack fridges.

They think it will take less than 90 minutes to fully load the new lorry.

Are they correct?

(6)

$$\frac{52 + 60 + 55 + 59 + 54 + 63 + 56}{7}$$

Working out the mean time for loading 24 fridges. Adding together all of the times then dividing by 7, which is the number of times, works this out

$$\frac{13600}{1000} , \frac{2400}{800}$$

13×3

Assuming that the 1000mm lengths the fridges need are placed along the 13600mm and the 800mm lengths the fridges need are placed along the 2400mm. Dividing the lengths of the space in the new lorry by the lengths the fridges need works out how many fridges could go along each edge. 13.6 needs to be rounded down to 13 as there needs to be a whole number of fridges and 14 would be too many. Multiplying the number of fridges which can go along each edge of the space in the new lorry works out the total amount of fridges which will fit

$$\frac{13600}{800} \quad , \quad \frac{2400}{1000}$$

$$17 \times 2$$

Assuming that the 800mm lengths the fridges need are placed along the 13600mm and the 1000mm lengths the fridges need are placed along the 2400mm. Dividing the lengths of the space in the new lorry by the lengths the fridges need works out how many fridges could go along each edge. 2.4 needs to be rounded down to 2 as there needs to be a whole number of fridges and 3 would be too many. Multiplying the number of fridges which can go along each edge of the space in the new lorry works out the total amount of fridges which will fit

$$\frac{39}{24} \times 57 = 92.6\ldots$$

39 is more than 34 so the maximum amount of fridges which can be fit in the space is 39. Dividing this by the 24 fridges which could be fit in the old lorry works out how many lots of 24 it is. Each lot of 24 fridges should take the average amount of time needed to load 24 fridges, which was 57 minutes. So multiplying by 57 works out how many minutes it should take to load 39 fridges

92.6 minutes is more than 90 minutes so they are not correct

No

(Total for Question 8 is 6 marks)

9 Louis makes a cake.
The cake is in the shape of a cylinder with diameter 14 inches.
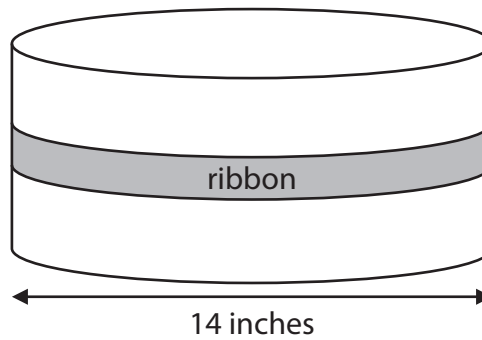
14 inches

Louis needs to put a ribbon around this cake.
The ribbon will go around the cake once with a 6 inch overlap.

Louis has a piece of ribbon 48 inches in length.

Is this piece of ribbon long enough for this cake?

(3)

$\pi \times 14 + 6 = 49.9...$

Circumference is the distance around the edge of a circle, which is the distance needed around the cake. Circumference = π x diameter. The diameter is 14 inches. Adding the 6 inch overlap works out the amount of ribbon needed

48 inches is less than the 49.9... inches needed

No

(Total for Question 9 is 3 marks)

10 The scatter diagram shows some information about 12 athletes who have run a race.
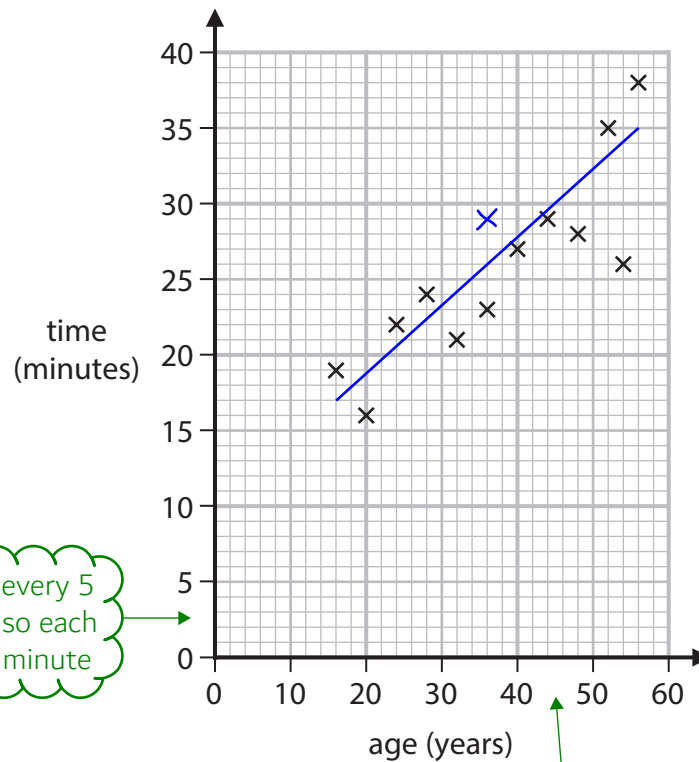
This scale goes up 5 every 5 small boxes. 5/5 = 1 so each small box is worth 1 minute

This scale goes up 10 every 5 small boxes. 10/5 = 2 so each small box is worth 2 years

Here is the information for another athlete

- age 36, time 29 minutes.

(a) Plot this information on the scatter diagram.
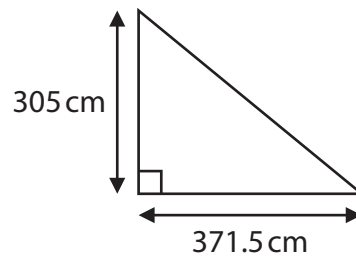
(1)

(b) Draw the line of best fit on the scatter diagram.

(1)

(c) Describe the relationship shown in this scatter diagram.

(1)

Positive correlation

(Total for Question 10 is 3 marks)

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11 George will cover part of a floor with tiles.
The part of the floor is in the shape of a triangle as shown.

305 cm

371.5 cm

George buys tiles in packs.
Each pack covers $1\,m^2$ and costs £39.95

The tiles can be cut and joined.
George gets $\frac{1}{3}$ off the cost of the packs of tiles.

Work out the lowest cost of the tiles for George.

(5)

$\frac{1}{2} \times \frac{371.5}{100} \times \frac{305}{100}$

The area of the triangle in square metres, which it needs to be in as the area each pack covers is given in square metres. Area of triangle = 1/2 x base x height. The base is 371.5cm and the height is 305cm. Dividing both the base and height by 100 converts them into metres as there are 100 centimetres in a metre

$6 \times 39.95 \times \left(1 - \frac{1}{3}\right)$

The 5.6... packs is rounded up to 6 as 5 wouldn't be enough and there needs to be a whole number of packs. Multiplying this by the price of each pack works out the normal cost of the packs needed. 1 - 1/3 works out the fraction of the original price the price is after it has been reduced by 1/3. Multiplying the normal cost by this reduces it by 1/3 and works out the lowest cost of the tiles

£ | 159.80

(Total for Question 11 is 5 marks)

12 Gabi wants to buy a flat.
The cost of the flat is £175 000

The bank uses this formula to work out the mortgage Gabi can get.

$$M = 4.625A$$

M = mortgage (£)
A = annual income (£)

Gabi has an annual income of £34 000
She will have to pay a deposit for the flat.
The deposit is the difference between the cost of the flat and the mortgage.

(a) Work out the deposit Gabi will have to pay.

(3)

175000 − 4.625 × 34000

Using the formula, the mortgage she can get is 4.625 x 34000. Subtracting this from the 175000 works out the difference and therefore the deposit she will have to pay

£ 17750

Gabi invests £4000 for 3 years.
The investment earns 2% compound interest per annum.

(b) Work out the value of the investment at the end of 3 years.

(3)

$$4000 \times \left(\frac{100+2}{100}\right)^3$$

The full amount is 100%. Adding 2% to this increases it by 2%. Dividing this by 100 converts it into a fraction which when the £4000 is multiplied by it increases it by 2%. Raising the fraction to the power of 3 as it needs to be increased by 2% 3 times

£   4244.83

(Total for Question 12 is 6 marks)

TOTAL FOR SECTION B = 48 MARKS
TOTAL FOR PAPER = 64 MARKS