

Please check the examination details below before entering your candidate information

Candidate surname	Other names
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**Pearson Edexcel
International GCSE**

Centre Number

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Candidate Number

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Wednesday 15 January 2020

Morning (Time: 2 hours 30 minutes)

Paper Reference **4MB1/02**

Mathematics B

Paper 2



You must have: Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question **carefully** before you start to answer it.
- Check your answers if you have time at the end.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

P59766A

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Pearson

Question 1 continued

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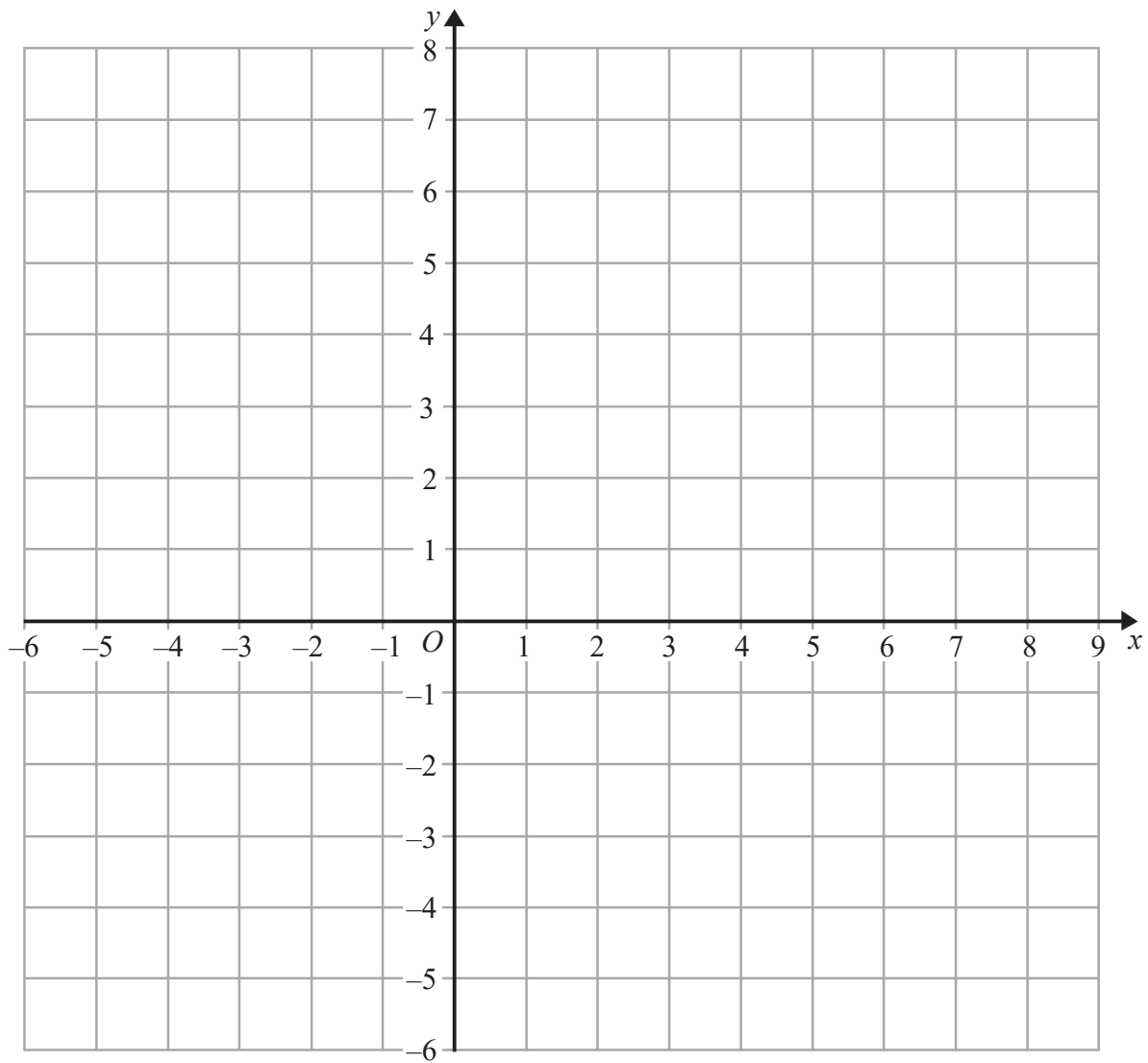
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Ruled area for writing the answer to Question 1.

(Total for Question 1 is 5 marks)



Question 2 continued



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Turn over for a spare grid if you need to redraw your parallelograms.



P 5 9 7 6 6 A 0 5 3 6

Question 2 continued

Handwriting practice area with 20 horizontal dotted lines.

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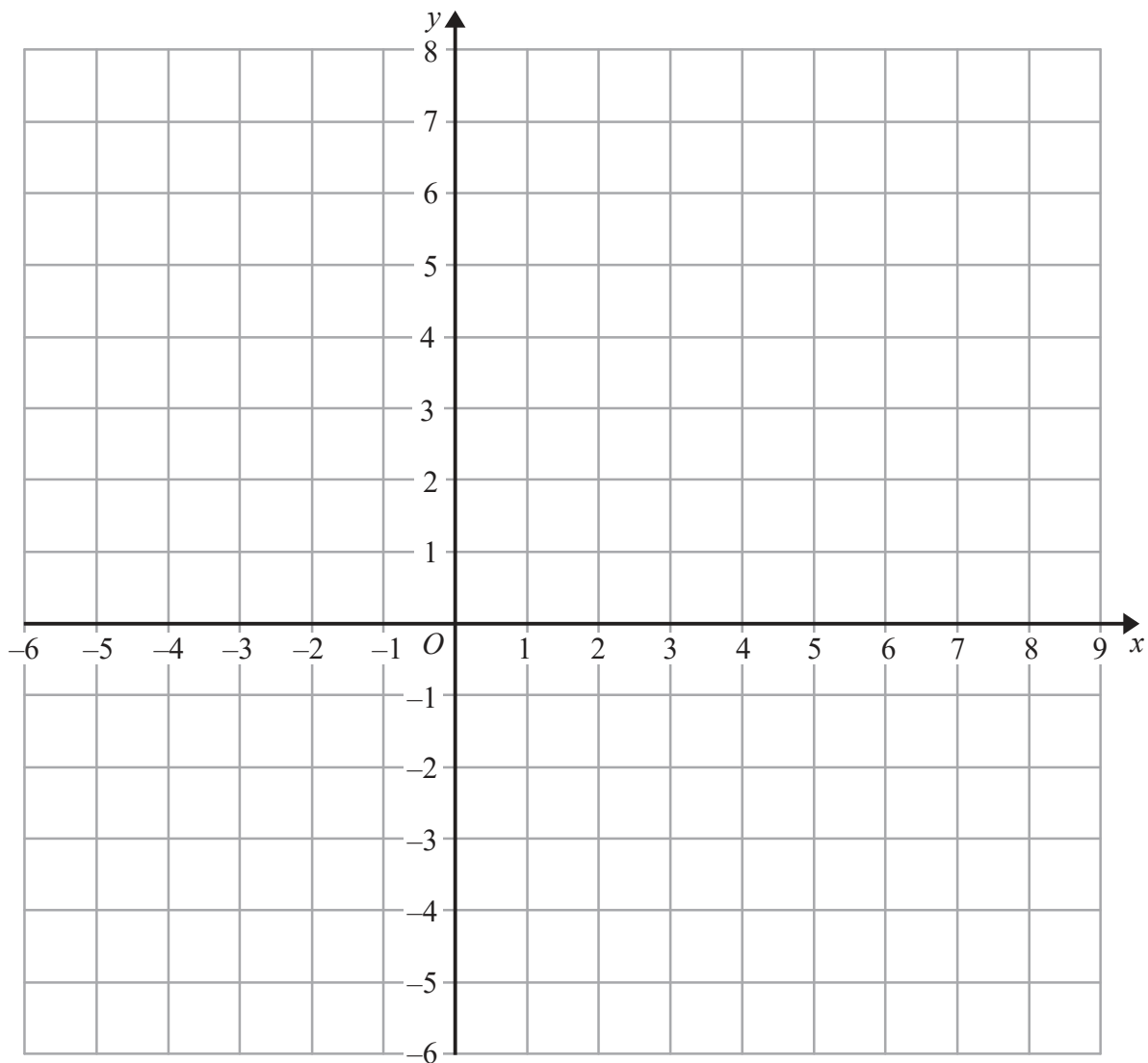
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Question 2 continued

Only use this grid if you need to redraw your parallelograms.



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(Total for Question 2 is 7 marks)



P 5 9 7 6 6 A 0 7 3 6

Question 3 continued

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Area with horizontal dotted lines for writing.

(Total for Question 3 is 7 marks)



Question 4 continued

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Ruled writing area with horizontal dotted lines.

(Total for Question 4 is 6 marks)



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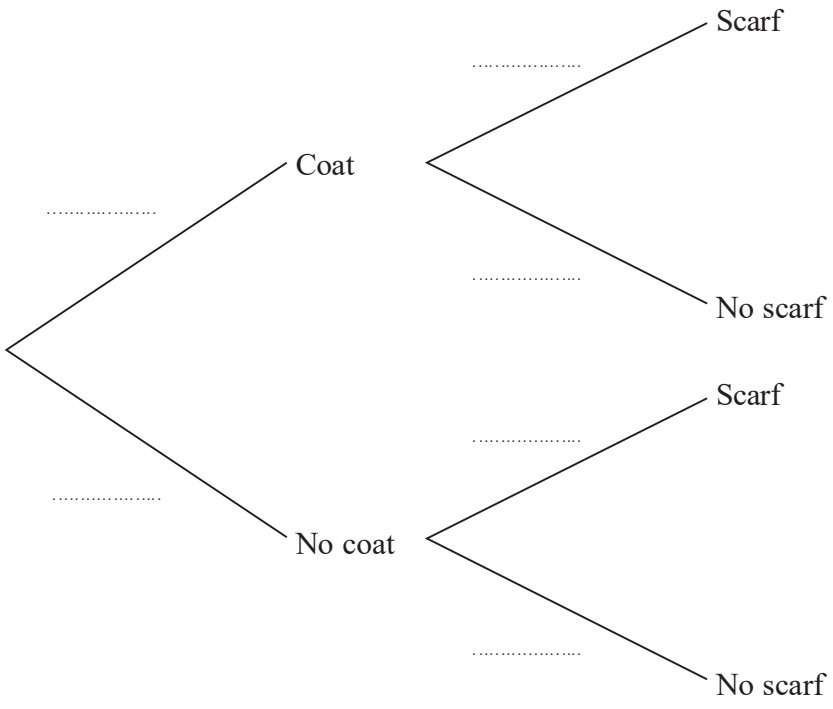
5 When Joe goes to school in winter, the probability that he wears a coat is $\frac{5}{8}$

If he wears a coat, the probability that he wears a scarf is $\frac{1}{4}$

If he does not wear a coat, the probability that he wears a scarf is $\frac{1}{6}$

(a) Complete the probability tree diagram.

(3)



On a day Joe goes to school in winter, calculate the probability that

(b) he is not wearing a coat and is not wearing a scarf,

(2)

(c) he is wearing a coat or he is wearing a scarf but he is not wearing both a coat and a scarf.

(2)

On a day Joe goes to school in winter, if he is wearing a coat and a scarf then the

probability that he is also wearing a hat is $\frac{3}{5}$

(d) Calculate the probability, that on a day Joe goes to school in winter, he is not wearing all three of a coat, a scarf and a hat.

(3)

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Question 5 continued

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(Total for Question 5 is 10 marks)



P 5 9 7 6 6 A 0 1 3 3 6

6 f and g are two functions such that

$$f: x \mapsto x^2 + x - 6 \quad \text{where } x \geq -\frac{1}{2}$$

$$g: x \mapsto \frac{2x - 24}{3 - 2x}$$

(a) State the value of x that must be excluded from any domain of g (1)

(b) Find the value of a and the value of b such that

$$f(x) = (x + a)^2 + b \quad (2)$$

(c) Hence write down the range of f (1)

(d) Find the value of c for which $g^{-1}(0) = c$ (2)

Given that $f(x) = g(x)$

(e) show that $2x^3 - x^2 - 13x - 6 = 0$

Show clear algebraic working. (3)

(f) Use the factor theorem to show that $(2x + 1)$ is a factor of $2x^3 - x^2 - 13x - 6$ (2)

The curve with equation $y = f(x)$ intersects the curve with equation $y = g(x)$ at the point A with coordinates (p, q) , where $p > -\frac{1}{2}$

(g) Find the coordinates of A . (4)

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Question 6 continued

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Question 6 continued

Handwriting practice area with 20 horizontal dotted lines.

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Question 6 continued

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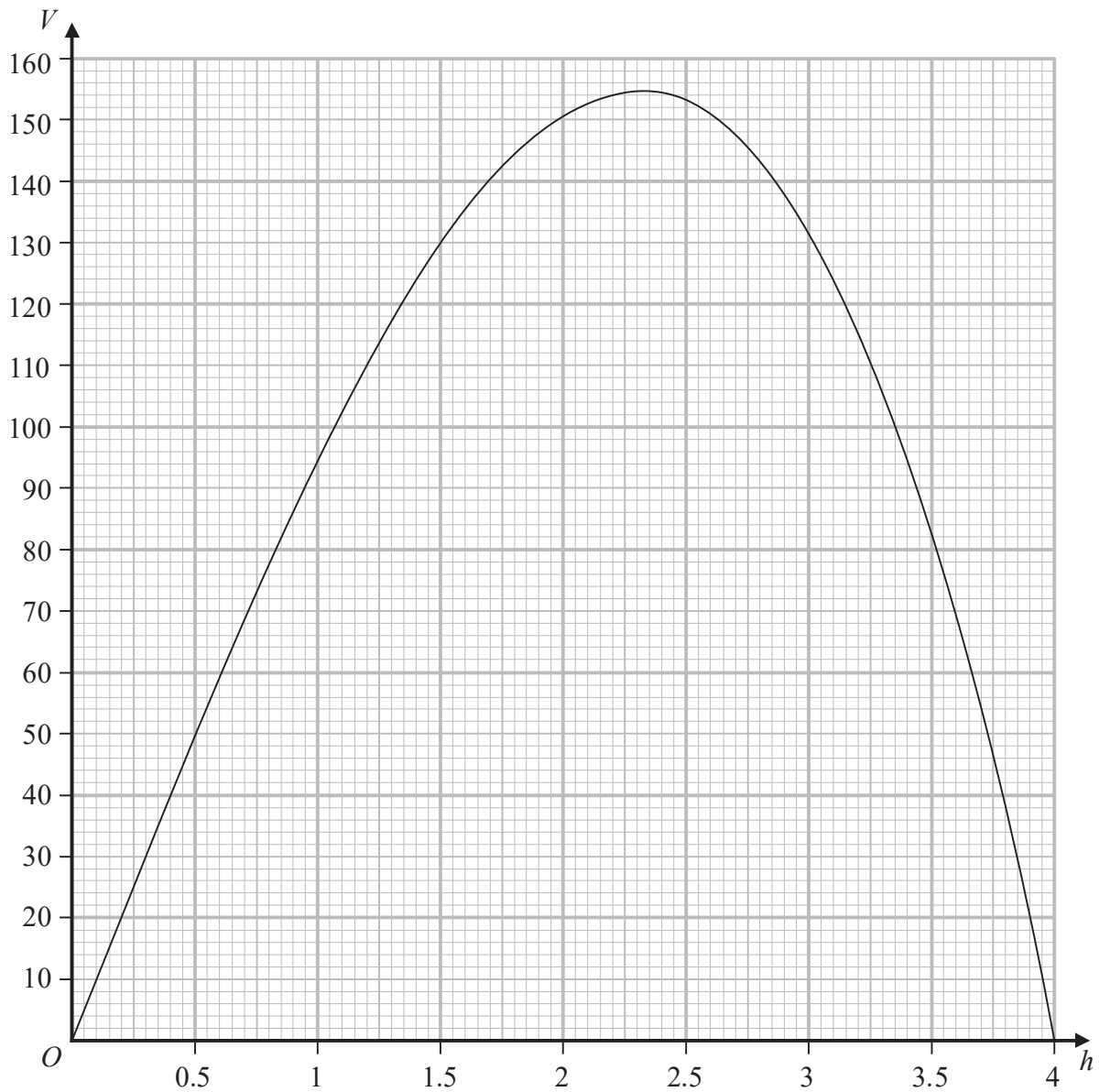
(Total for Question 6 is 15 marks)



P 5 9 7 6 6 A 0 1 7 3 6

Question 7 continued

Part of the curve with equation $V = 32\pi h - 2\pi h^3$ is drawn on the grid.



- (c) Find an estimate, to one decimal place, of each of the two values of h for which the volume of the cylinder is 100 cm^3

(2)

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Question 7 continued

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Question 7 continued

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(Total for Question 7 is 9 marks)



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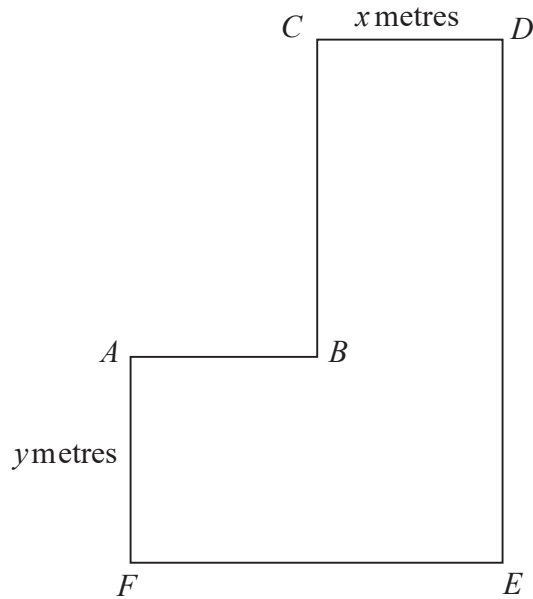


Diagram **NOT**
accurately drawn

Figure 3

Figure 3 shows the plan of a floor $ABCDEF$ in which all the corners are right angles and
 $CD = x$ metres $AF = y$ metres

The length of DE is twice the length of CD .

The length of FE is twice the length of AF .

The perimeter of the floor plan is 68 metres.

(a) Find and simplify an equation in terms of x and y for this information.

(2)

The area of the floor plan is 248 m^2

(b) Show that $2y^2 + 2x^2 - xy = 248$

(3)

(c) Find the possible lengths of AB .

Show clear algebraic working.

(5)

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Question 8 continued

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Question 8 continued

Handwriting practice area with 20 horizontal dotted lines.

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Question 8 continued

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(Total for Question 8 is 10 marks)



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Question 9 continued

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(Total for Question 9 is 5 marks)



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Question 10 continued

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Question 10 continued

Handwriting practice area with 20 horizontal dotted lines.

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Question 10 continued

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Area with horizontal dotted lines for writing.

(Total for Question 10 is 8 marks)



P 5 9 7 6 6 A 0 3 1 3 6

11 Find the range of values of x for which both

$$2x + 3(4 - 3x) < 8x \text{ and } 6x - 5 \leq (2x - 3)^2$$

Show clear algebraic working.

(7)

Area with horizontal dotted lines for writing the solution.

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Question 11 continued

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Area with horizontal dotted lines for writing.

(Total for Question 11 is 7 marks)



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12 A company produces bird food made with sunflower seeds, corn and millet.

The weights of sunflower seeds, corn and millet in each bag of the bird food are in the ratios

$$\text{sunflower seeds} : \text{corn} : \text{millet} = 8 : 3 : 1$$

The total weight of the bird food in each bag is 30 kg.

(a) Calculate the weight, in kg, of corn in each bag of the bird food. (2)

Tom buys bags of the bird food from the company and sells them in his shop.

He sells each bag for \$15.04

He makes a profit of 17.5% on each bag he sells.

(b) Calculate, in \$, how much Tom pays the company for each bag of the bird food he buys. (2)

The bags are filled with the bird food at a rate of 530 grams per second.

(c) Calculate the number of bags of the bird food that are filled completely in 6 hours. (4)

Sunflower seeds cost £150.75 for 30 kg from farmer *A*.

Sunflower seeds cost \$162.35 for 25 kg from farmer *B*.

Using an exchange rate of £1 = \$1.315

(d) find which of the two farmers, *A* or *B*, sells sunflower seeds at the cheaper cost per kilogram.
You must give a reason for your answer. (3)

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Question 12 continued

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Question 12 continued

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(Total for Question 12 is 11 marks)

TOTAL FOR PAPER IS 100 MARKS

