

- 1.1** Jozef invests £1700 for 2 years at 4% per annum **compound** interest.  
Work out the value of his investment at the end of 2 years.

£ .....

**(Total for Question 11 is 3 marks)**

*November 2012 – Unit 1 (Modular) – Higher – Calculator – Q11*

- 1.2** Danny bought a car for £10 000  
The value of the car depreciated by 20% in the first year.  
Then the value of the car depreciated by 10% in the second year.  
Work out the value of Danny's car at the end of two years.

**(Total for Question 11 is 3 marks)**

*June 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q11*

- 1.3** Neil invested £500 on 1st January 2000 at a fixed compound interest rate of  $R\%$  each year.  
The value  $V$ , in pounds, of this investment after  $n$  years is given by the formula

$$V = 500 \times (1.025)^n$$

- (a) Write down the value of  $R$ .

**(1)**

- (b) Use your calculator to find the value of Neil's investment at the end of 12 years.

£ .....

**(2)**

*November 2012 – Unit 3 (Modular) – Higher – Calculator – Q16*

- 1.4** Charlie invests £1200 at 3.5% per annum compound interest.  
Work out the value of Charlie's investment after 3 years.

£ ..... **(3)**

*June 2011 – Unit 1 (Modular) – Higher – Calculator – Q7*

- 1.5** Aminata invested £2500 for  $n$  years in a savings account.  
She was paid 3% per annum compound interest.  
At the end of  $n$  years, Aminata has £2813.77 in the savings account.

Work out the value of  $n$ .

**(Total for Question 13 is 2 marks)**

*March 2011 – Unit 1 (Modular) – Higher – Calculator – Q13*

- 1.6** Jodi bought a car for £12 000  
She bought the car 3 years ago.  
The car depreciated at a rate of 10% each year.

- (a) How much is the car worth now?

**(3)**

Mia also bought a car for £12 000  
Her car also depreciated at 10% a year.

- (a) After how many years will her car be worth £6000?

..... years

**(3)**

*Practice Paper Set B – Unit 1 (Modular) – Higher – Calculator – Q9*

**\*1.7** Jim buys 6 trays of Cola for £9.99 a tray.

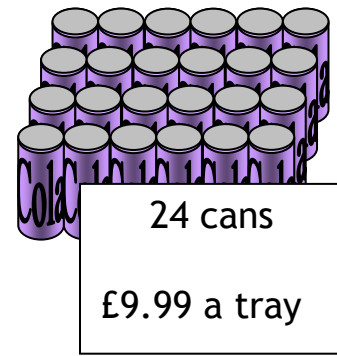
Each tray holds 24 cans of Cola.

Jim goes to the school fete to sell his Cola.

He sells 75 cans at 80p each.

He gives 10 cans to his friends.

He sells the rest at 50p each.



What is Jim's percentage profit or loss?

Give your answer to 1 decimal place.

**(Total for Question 9 is 5 marks)**

*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q9*

**\*1.8** Here are two schemes for investing £2500 for 2 years.

**Scheme A**

gives 4% **simple** interest each year.

**Scheme B**

gives 3.9% **compound** interest each year.

Which scheme gives the most total interest over 2 years?

You must show all your working.

**(Total for Question 13 is 4 marks)**

*March 2013 – Unit 3 (Modular) – Higher – Calculator – Q13*

**1.9** Martin bought a computer for £1200

At the end of each year the value of the computer is depreciated by 20%.

After how many years will the value of the computer be £491.52?

You must show your working.

**(Total for Question 11 is 3 marks)**

*March 2013 – Unit 1 (Modular) – Higher – Calculator – Q11*

**1.10** Becky buys a new car for £20 000.

The value of this car will depreciate

by 15% at the end of the first year

then by 10% at the end of every year after the first year.

After how many years will the car have a value of less than £15 000?

You must show all your working.

**(Total for Question 10 is 4 marks)**

*June 2013 – Unit 1 (Modular) – Higher – Calculator – Q10*

**\*1.11** Ella wants to invest £6000 in a savings account for 2 years.  
She finds information about savings accounts at two different banks.

<p><b>Northway Bank</b></p> <p>Compound interest</p> <p>of</p> <p>3.8% per annum</p>	<p><b>Portland Bank</b></p> <p>Compound interest</p> <p>of</p> <p>5% per annum in year 1</p> <p>3.2% per annum in year 2</p>
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Ella wants to choose the bank that pays the greater total amount of interest for the 2 years.

Which bank should she choose?

You must show all your working.

**(Total for Question 15 is 4 marks)**

*June 2013 – Unit 3 (Modular) – Higher – Calculator – Q2*

- 2.1** Mr and Mrs Adams sold their house for £168 000.  
They made a profit of 12% on the price they paid for the house.  
Calculate how much they paid for the house.

£ .....

**(Total for Question 13 is 3 marks)**

*November 2012 – Unit 3 (Modular) – Higher – Calculator – Q13*

- 2.2** A holiday costs £840 plus 20% VAT.

(a) Calculate the total cost of the holiday.

**(3)**

In a sale, normal prices are reduced by 45%.  
The sale price of another holiday is £462

(b) Work out the normal price of this holiday.

**(3)**

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q16*

- 2.3** Sally buys a car for £4900  
She saves 30% on the original price of the car.

What was the original price of the car?

£ .....

**(Total for Question 14 is 3 marks)**

*Practice Paper Set A – Unit 3 (Modular) – Higher – Calculator – Q14*

- 2.4** (a) Ben bought a car for £12 000.  
Each year the car depreciated by 10%.

Work out its value two years after he bought it.

**(3)**

- (b) Susie also bought a car two years ago.  
It too depreciated by 10% each year.  
The car is now worth £8100

Work out the original cost of Susie's car.

**(3)**

*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q12*

- 3.1 (a) Write 125 000 in standard form. (1)  
 (b) Write  $8 \times 10^{-4}$  as an ordinary number. (1)

*November 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q10*

- 3.2 (a) Write 60 800 000 in standard form. (1)  
 (b) Write  $1.7 \times 10^{-4}$  as an ordinary number. (1)

*November 2011 – Unit 2 (Modular) – Higher – Non-Calculator – Q11*

- 3.3 (a) Write 55 000 in standard form. (1)  
 (b) Work out  $(3.6 \times 10^9) \times (5 \times 10^{-4})$   
 Write your answer as an ordinary number. (2)

*November 2012 – Unit 3 (Modular) – Higher – Calculator – Q17*

- 3.4 Work out  $(2.5 \times 10^9) \div (5 \times 10^3)$ .  
 Give your answer in standard form. **(Total for Question 13 is 2 marks)**

*November 2010 – Unit 2 (Modular) – Higher – Non-calculator – Q13*

- 3.5 An object is travelling at a speed of 2650 metres per second.  
 How many seconds will the object take to travel a distance of  $3.45 \times 10^{10}$  metres?  
 Give your answer in standard form, correct to 2 significant figures. **(Total for Question 12 is 3 marks)**

*June 2012 – Unit 3 (Modular) – Higher – Calculator – Q12*

- 3.6 Work out  $5.6 \times 10^8 \times 3 \times 10^{-5}$   
 Give your answer in standard form. **(Total for Question 14 is 2 marks)**

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q14*

- 3.7 Light travels at 186 000 miles per second.  
 A light year is the distance light can travel in a year of  $365 \frac{1}{4}$  days.  
 How many miles are there in one light year?  
 Give your answer in standard form.  
 ..... miles **(Total for Question 10 is 3 marks)**

*Practice Paper Set A – Unit 3 (Modular) – Higher – Calculator – Q10*

- 3.8 A spaceship travelled for  $6 \times 10^2$  hours at a speed of  $8 \times 10^4$  km/h.  
 (a) Calculate the distance travelled by the spaceship.  
 Give your answer in standard form. ..... km(3)  
 One month an aircraft travelled  $2.4 \times 10^5$  km.  
 The next month the aircraft travelled  $3.7 \times 10^4$  km.  
 (b) Calculate the total distance travelled by the aircraft in the two months.  
 Give your answer as an ordinary number. ..... km  
(2)

*Practice Paper Set C – Unit 3 (Modular) – Higher – Calculator – Q10*

- 3.9** Write these numbers in order of size.  
Start with the smallest number.

$$4.2 \times 10^5 \quad 13 \times 10^4 \quad 30 \times 10^{-6} \quad -2.5 \times 10^{-4} \quad 0.0052 \times 10^6$$

**(Total for Question 12 is 3 marks)**

*March 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

**3.10** Work out  $\frac{4 \times 10^9 + 3.2 \times 10^7}{1.6 \times 10^{-6}}$

Give your answer in standard form.

**(Total for Question 16 is 2 marks)**

*June 2013 – Unit 3 (Modular) – Higher – Calculator – Q16*

**4.1** (a) Simplify  $m^0$  (1)

(b) Simplify  $(2x^6y^{-1})^3$  (2)

*November 2010 – Unit 2 (Modular) – Higher – Non-calculator – Q12*

**4.2** (a) Expand  $3(x + 2)$  (2)

(b) Factorise completely  $12x^3y - 18xy^2$  (2)

(c) Expand and simplify  $(2x - 3)(x + 4)$  (2)

(d) Simplify  $5x^4y^3 \times 2x^3y^2$  (2)

*March 2011 – Unit 2 (Modular) – Higher – Non-calculator – Q11*

**4.3** (a) Expand and simplify  $(x + 5)(x - 8)$  (2)

(b) Factorise  $x^2 - 16$  (1)

*June 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

**4.4** (a) Factorise fully  $20w^2y + 24wy^3$  (2)

(b) Factorise  $m^2 + 3m - 40$  (2)

*November 2010 – Unit 2 (Modular) – Higher – Non-calculator – Q10*

**4.5** (a) Factorise  $x^2 + 5x + 4$  (2)

(b) Expand and simplify  $(3x - 1)(2x + 5)$  (2)

(c) Write as a single fraction  $\frac{1}{2x} + \frac{1}{5x} - \frac{1}{3x}$  *[Grade A]* (2)

*November 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q14*

**4.6** Simplify fully  $(x + 5)^2 - (x - 5)^2$

**(Total for Question 12 is 2 marks)**

*June 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

4.7 (a) Factorise fully  $6ab + 10ac$  (2)

(b) Expand and simplify  $(x - 5)(x + 7)$  (2)

(c) Simplify  $\frac{2m^2t^6}{m^4t^2}$   
 Give your answer in its simplest form. (2)

(d) Factorise  $y^2 - 16$  (1)

(e) Simplify  $(h^2)^{-3}$  (1)

*November 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

5.1 (a) Make  $t$  the subject of the formula

$$2(a + t) = 5t + 7$$

$$t = \dots\dots\dots$$
 (3)

(b) Solve the simultaneous equations

$$3x - 4y = 8$$

$$9x + 5y = -1.5$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$
 (3)

*June 2012 – Unit 3 (Modular) – Higher – Calculator – Q16*

5.2 Solve the simultaneous equations.

$$3x + 2y = 8$$

$$6x - 5y = 34$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**.(Total for Question 15 is 3 marks)**

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q15*

5.3 Bob and Sally buy some fruit.

Bob buys 5 oranges and 2 bananas for £2.00  
 Sally buys 2 oranges and 3 bananas for £1.35

Work out the cost of

- (i) one orange
- (ii) one banana

**(Total for Question 14 is 5 marks)**

*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q14*

5.4 Solve  $5x + 2y = 8$   
 $2x - 4y = 8$

**(Total for Question 16 is 3 marks)**

*Practice Paper Set C – Unit 3 (Modular) – Higher – Calculator – Q16*

5.5 Solve the simultaneous equations

$$\begin{aligned}3x - 2y &= 7 \\7x + 2y &= 13\end{aligned}$$

**(Total for Question 14 is 3 marks)**

*March 2013 – Unit 3 (Modular) – Higher – Calculator – Q14*

5.6 Solve the simultaneous equations

$$\begin{aligned}3x + 10y &= 7 \\x - 4y &= 6\end{aligned}$$

**(Total for Question 13 is 3 marks)**

*June 2013 – Unit 3 (Modular) – Higher – Calculator – Q13*

5.7 Solve the simultaneous equations

$$4x - 5y = 33$$

$$3x + y = 1$$

**(Total for Question 14 is 3 marks)**

*November 2013 – Unit 3 (Modular) – Higher – Calculator – Q14*

6.1 (a) Solve  $7(x - 4) = 35$

(2)

$$-3 \leq n < 4$$

$n$  is an integer.

(b) Write down the possible values of  $n$ .

(2)

(c) Solve the inequality  $5x + 3 > 3x - 11$

(2)

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q4*

7.1 Make  $m$  the subject of the formula  $6m^2 = k$

$$m = \dots\dots\dots$$

**(Total for Question 15 is 2 marks)**

*November 2012 – Unit 3 (Modular) – Higher – Calculator – Q15*

7.2 (a) Make  $t$  the subject of the formula

$$2(a + t) = 5t + 7$$

$$t = \dots\dots\dots$$

(3)

*June 2012 – Unit 3 (Modular) – Higher – Calculator – Q16a*

7.3 Make  $t$  the subject of the formula  $3t + b = a^2$

$$t = \dots\dots\dots$$

**(Total for Question 7 is 2 marks)**

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q7*

7.4

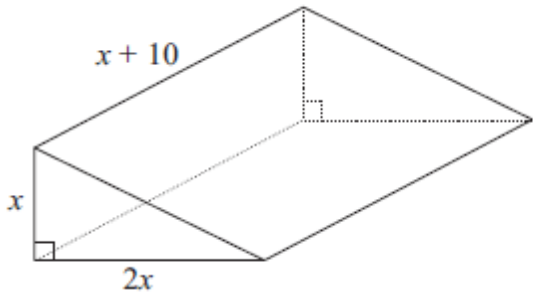


Diagram NOT  
accurately drawn

The diagram shows a solid triangular prism.  
All the measurements are in centimetres.  
The volume of the prism is  $V \text{ cm}^3$ .  
Find a formula for  $V$  in terms of  $x$ .  
Give your answer in simplified form.

**(Total for Question 11 is 3 marks)**

*November 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q11*

7.5 (a) Solve  $4(y - 7) = 13$ .

$y = \dots\dots\dots$   
(2)

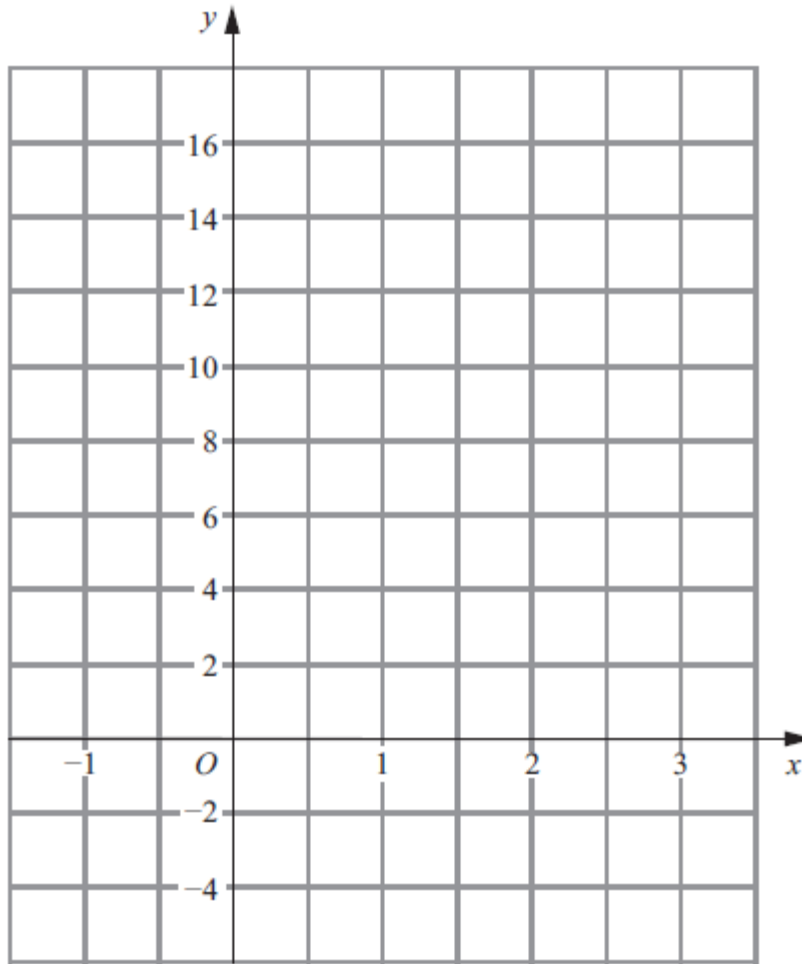
(b) Make  $t$  the subject of the formula  $P = 4t - 3$ .

(2)

*November 2013 – Unit 3 (Modular) – Higher – Calculator – Q10*



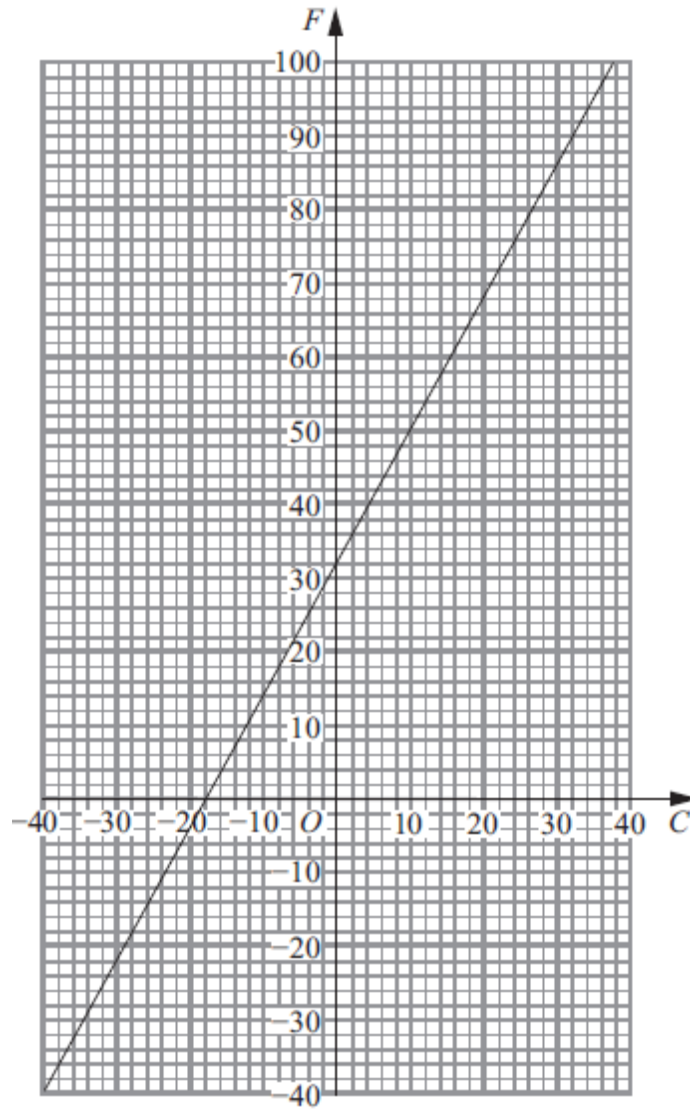
8.1 (a) On the grid, draw the graph of  $y = 4x + 2$  from  $x = -1$  to  $x = 3$



- (b) (i) Write down the equation of a straight line that is parallel to  $y = 4x + 2$   
(ii) Write down the gradient of a straight line that is perpendicular to  $y = 4x + 2$ (2)

*June 2011 – Unit 2 (Modular)– Higher –Non- Calculator – Q5*

8.2 This graph can be used to convert between degrees Celsius ( $C$ ) and degrees Fahrenheit ( $F$ ).



Find the values of  $m$  and  $k$  such that

$$F = mC + k$$

$m = \dots\dots\dots$

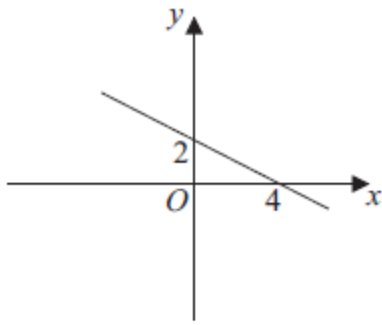
$k = \dots\dots\dots$

(3)

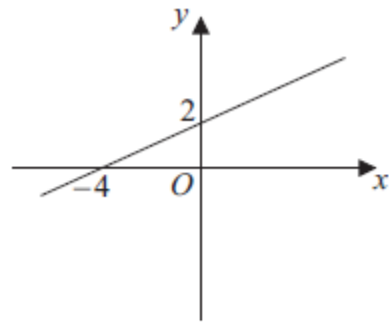
June 2011 – Unit 1 (Modular) – Higher – Calculator – Q9

8.3 Here are the graphs of 6 straight lines.

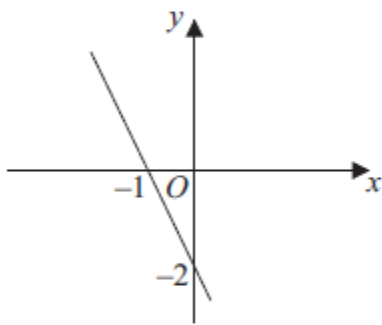
Graph A



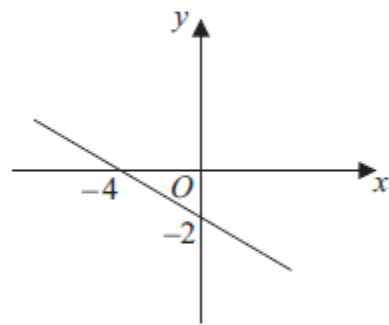
Graph B



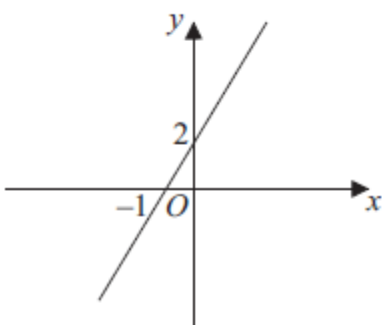
Graph C



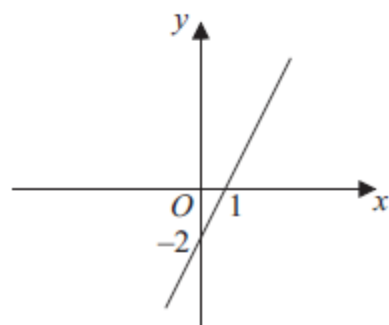
Graph D



Graph E



Graph F



Match each of the graphs A, B, C, D, E and F to the equations in the table.

<b>Equation</b>	$y = \frac{1}{2}x + 2$	$y = 2x -$	$y = -\frac{1}{2}x + 2$	$y = -2x - 2$	$y = 2x + 2$	$y = -\frac{1}{2}x - 2$
<b>Graph</b>						

(Total for Question 12 is 3 marks)

November 2012 – Unit 1 (Modular) – Higher – Calculator – Q12

8.4 Here are the equations of 5 straight lines.

**P**  $y = 2x + 5$

**Q**  $y = -2x + 5$

**R**  $y = x + 5$

**S**  $y = -\frac{1}{2}x + 6$

**T**  $y = \frac{1}{2}x + 1$

- (a) Write down the letter of the line that is parallel to  $y = x - 5$  (1)  
 (b) Write down the letter of the line that is perpendicular to  $y = 2x - 1$  (1)  
 (c) Find the coordinates of the point where the line  $y = 2x + 5$  cuts the  
 (i) y axis,  
 (ii) x axis.

(2)

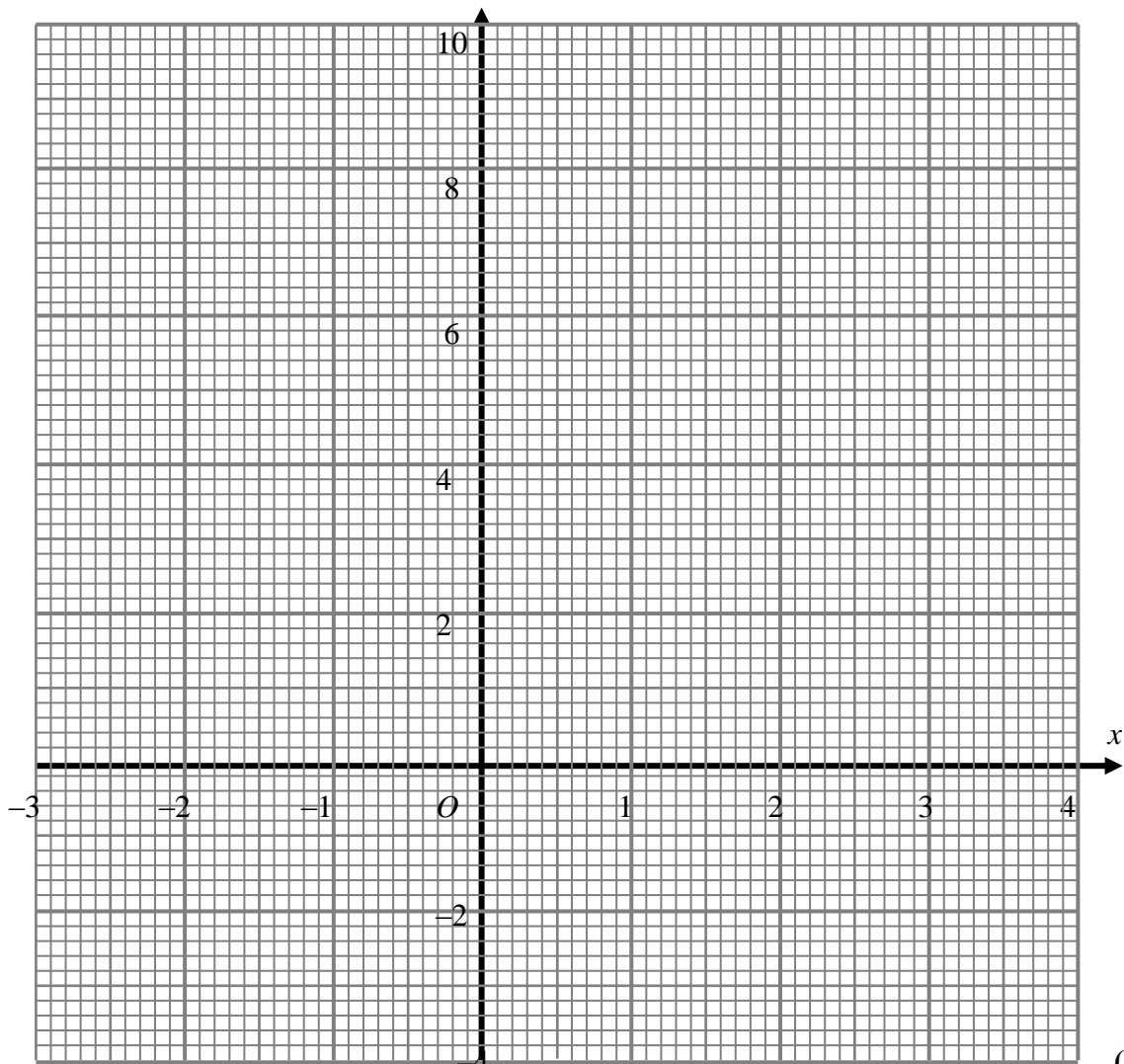
*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q13*

- 9.1 (a) Complete the table of values for  $y = x^2 - 3x - 1$

x	-2	-1	0	1	2	3	4
y		3	-1	-3		-1	

(2)

- (b) On the grid draw the graph of  $y = x^2 - 3x - 1$  for values of x from -2 to 4



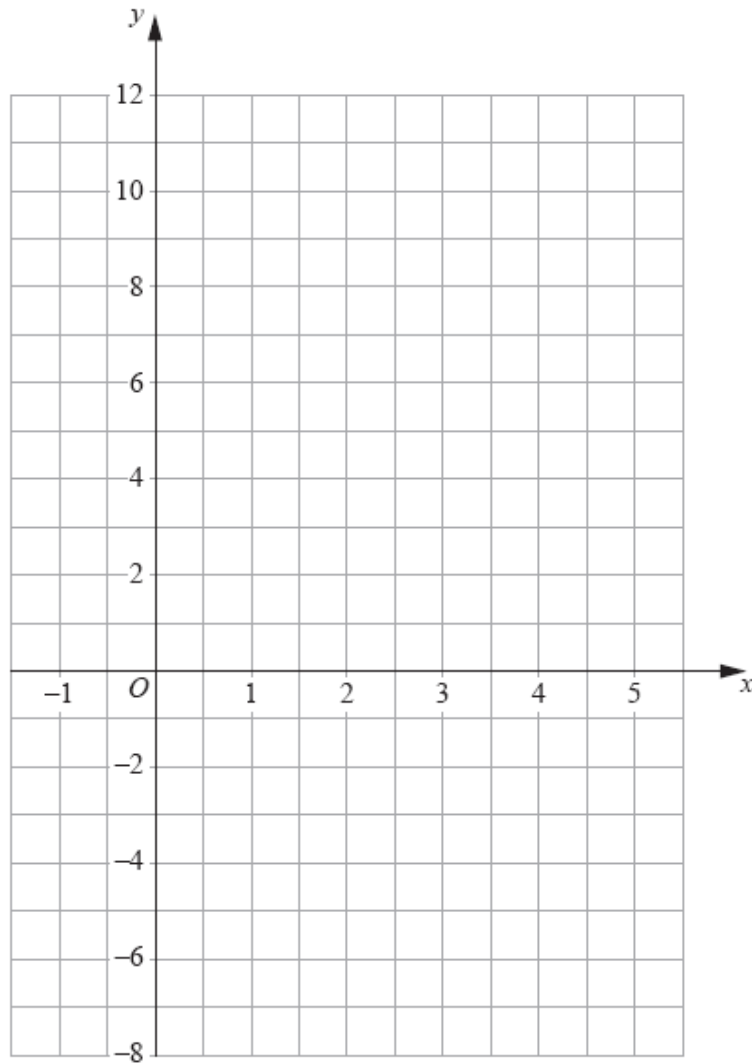
(2)

- (c) Solve the equation  $x^2 - 3x = 4$

(2)

*Practice Paper Set A – Unit 3 (Modular) – Higher – Calculator – Q11*

9.2 On the grid, draw the graph of  $y = x^2 - 2x - 5$  for  $-1 \leq x \leq 5$



**(Total for Question 12 is 4 marks)**

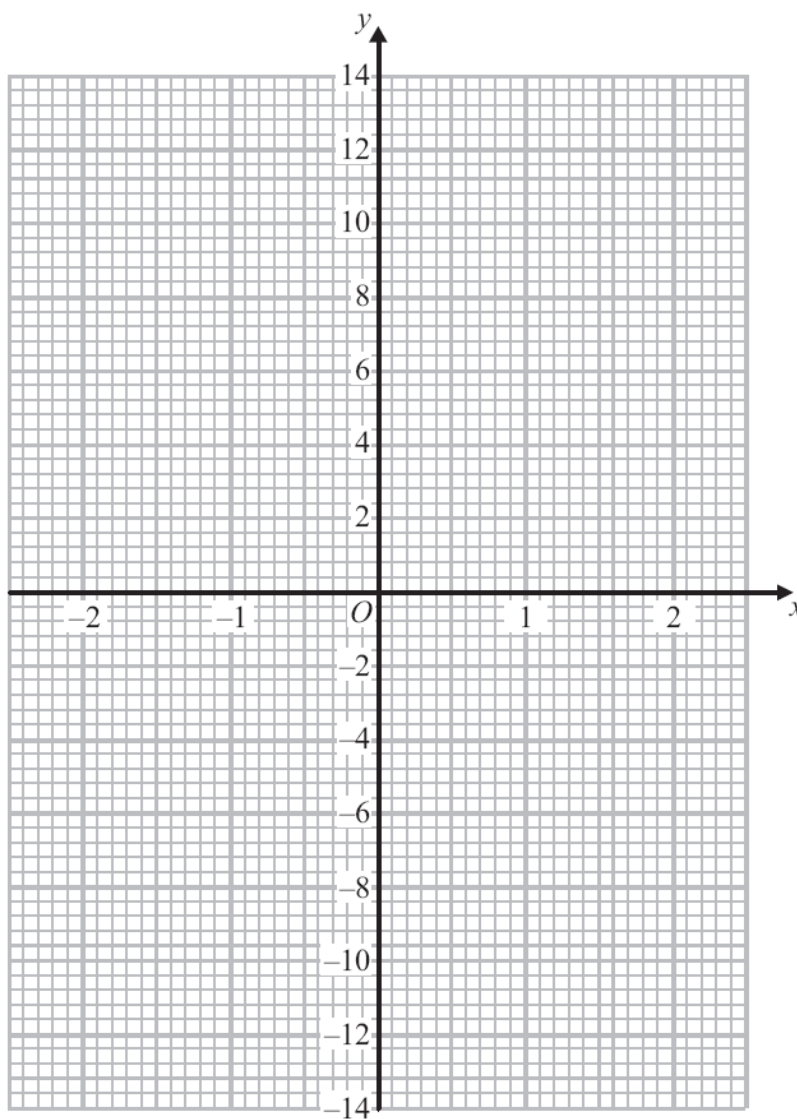
*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q12*

9.3 (a) Complete this table of values for  $y = x^3 + 2x - 1$

$x$	-2	-1	0	1	2
$y$		-4			11

(2)

(b) On the grid, draw the graph of  $y = x^3 + 2x - 1$



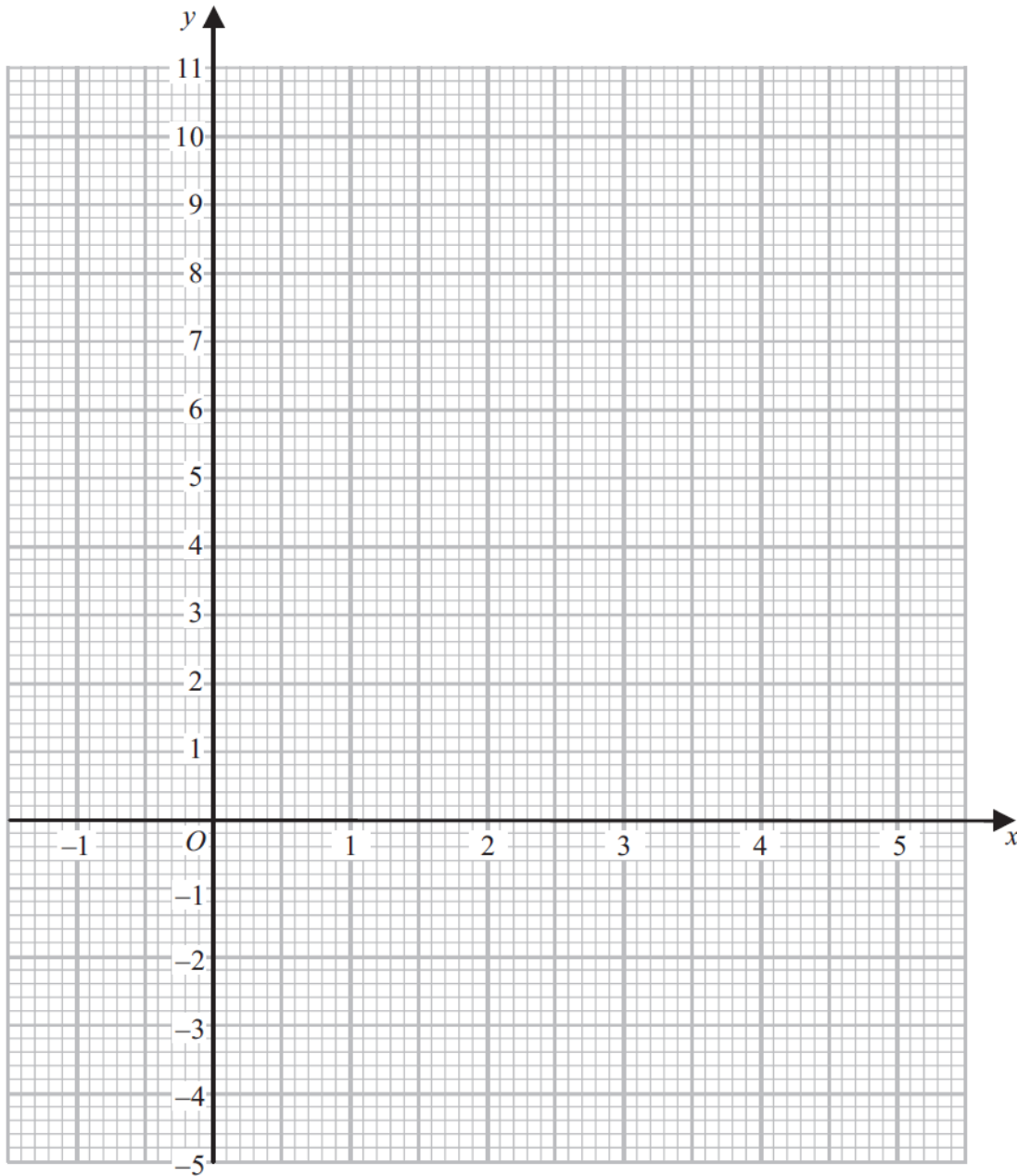
(2)

9.4 (a) Complete the table of values for  $y = x^2 - 5x + 3$ .

$x$	-1	0	1	2	3	4	5
$y$		3	-1		-3		3

(2)

(b) On the grid below, draw the graph of  $y = x^2 - 5x + 3$  for values of  $x$  from  $x = -1$  to  $x = 5$ .



(2)

(c) Find estimates of the solutions of the equation  $x^2 - 5x + 3 = 0$ .

$x = \dots\dots\dots$

or  $x = \dots\dots\dots$

(2)

**10.1** The diagram shows a cuboid drawn on a 3-D coordinate grid.

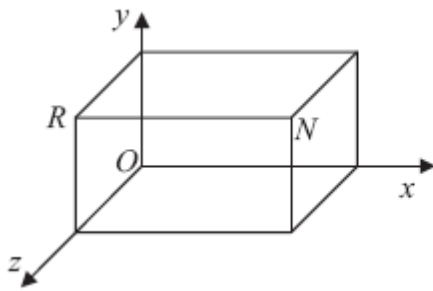


Diagram **NOT** accurately drawn

The vertex  $N$  of the cuboid has coordinates  $(6, 2, 4)$ .

(a) What are the coordinates of the vertex  $R$ ?

( ..... , ..... , ..... )  
(1)

(b) What are the coordinates of the midpoint of the line segment  $RN$ ?

( ..... , ..... , ..... )  
(2)

*June 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q13*

**10.2**

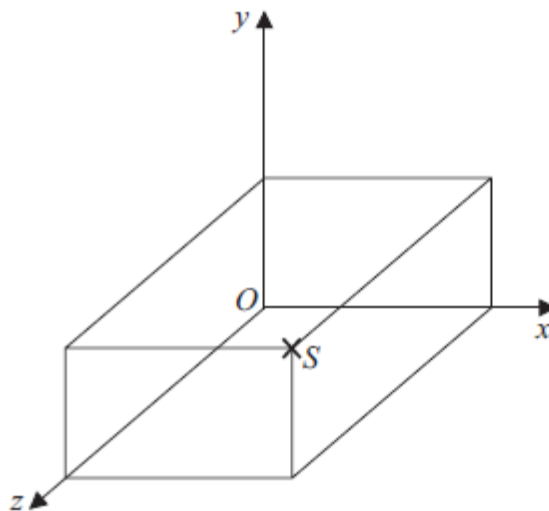


Diagram **NOT** accurately drawn

The diagram shows a cuboid drawn on a 3-D grid.

Three of the vertices of the cuboid are  $P(3, 2, 0)$

$Q(3, 0, 0)$

$R(3, 0, 4)$

(a) Label the vertex  $Q$  with a cross ( $\times$ ).

(1)

The vertex  $S$  is shown on the diagram.

(b) Write down the coordinates of the vertex  $S$ .

(..... , ..... , ..... )  
(1)

*November 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

**10.3**  $AB$  is a line segment.

$A$  is the point  $(2, 5, 6)$ .

The midpoint of the line  $AB$  has coordinates  $(-1, -4, 2)$ .

Find the coordinates of point  $B$ .

(..... , ..... , ..... )  
(Total for Question 10 is 2 marks)

*March 2011 – Unit 2 (Modular) – Higher – Non-calculator – Q10*



**10.4** The diagram shows a cuboid on a 3-D grid.

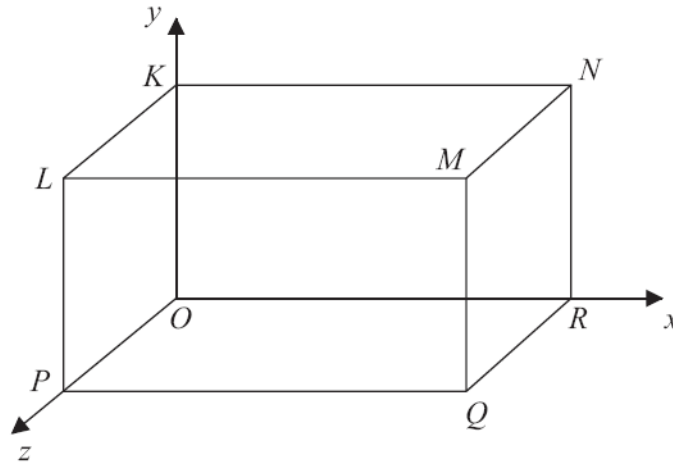


Diagram **NOT** accurately drawn

The coordinates of the vertex  $M$  are  $(5, 3, 2)$ .  
 Work out the coordinates of the midpoint of  $LN$ .

(..... , ..... , .....)

**(Total for Question 14 is 2 marks)**

*June 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q14*

**11.1**

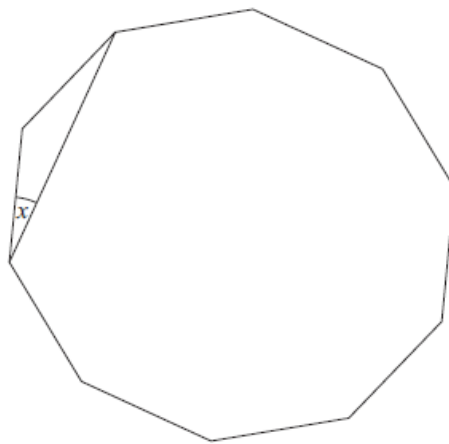


Diagram **NOT** accurately drawn

The diagram shows a regular decagon.  
 Work out the size of angle  $x$ .

(4)

*June 2011 – Unit 2 (Modular) – Higher – Non-Calculator – Q11*

11.2

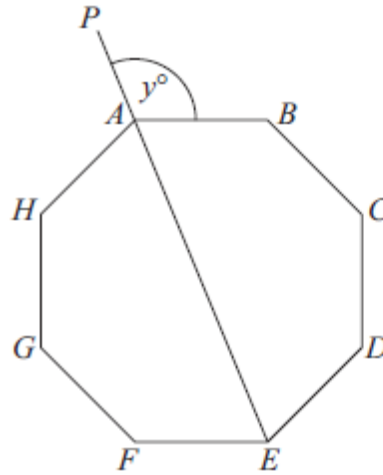


Diagram **NOT**  
accurately drawn

$ABCDEFGH$  is a regular octagon.  
 $PAE$  is a straight line.  
Angle  $PAB = y^\circ$   
Work out the value of  $y$ .

(Total for Question 9 is 4 marks)

November 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q9

11.3

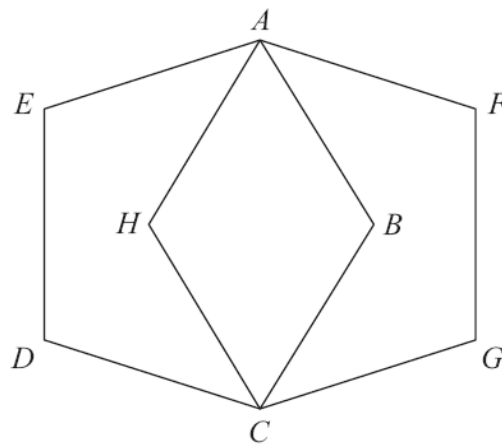


Diagram **NOT**  
accurately drawn

$ABCDE$  and  $AFGCH$  are regular pentagons.  
The two pentagons are the same size.  
Work out the size of angle  $EAH$ .  
You must show how you got your answer.

(Total for Question 10 is 4 marks)

June 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q10

11.4

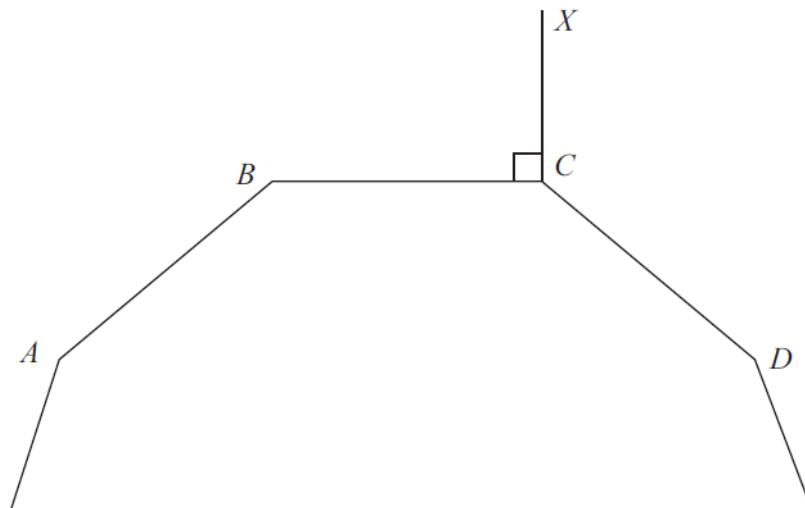


Diagram NOT accurately drawn

$A, B, C$  and  $D$  are four vertices of a regular 10-sided polygon.

Angle  $BCX = 90^\circ$ .

Work out the size of angle  $DCX$ .

(Total for Question 10 is 3 marks)

November 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q10

\*12.1

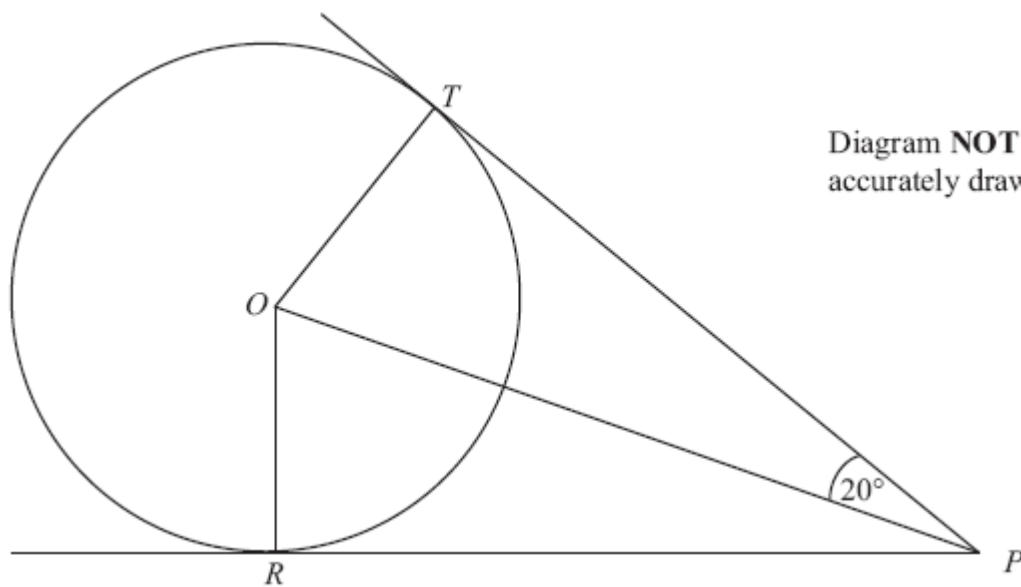


Diagram NOT accurately drawn

$T$  and  $R$  are two points on a circle centre  $O$ .

$PT$  and  $PR$  are the tangents to the circle from  $P$ .

Angle  $TPO = 20^\circ$ .

Work out the size of angle  $TOR$ .

You must give reasons for each stage of your working.

(Total for Question 15 is 4 marks)

June 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q15

12.2

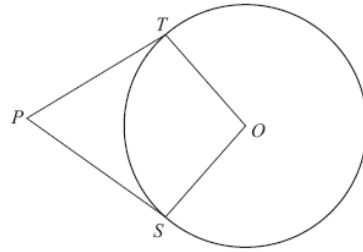


Diagram NOT  
accurately drawn

$S$  and  $T$  are points on the circumference of a circle, centre  $O$ .  
 $PT$  and  $PS$  are tangents.  
Angle  $TPO = 24^\circ$ .  
Work out the size of angle  $SOT$ .

(3)

March 2012 – Unit 2 (Modular)– Higher – Non-Calculator – Q12

\*12.3

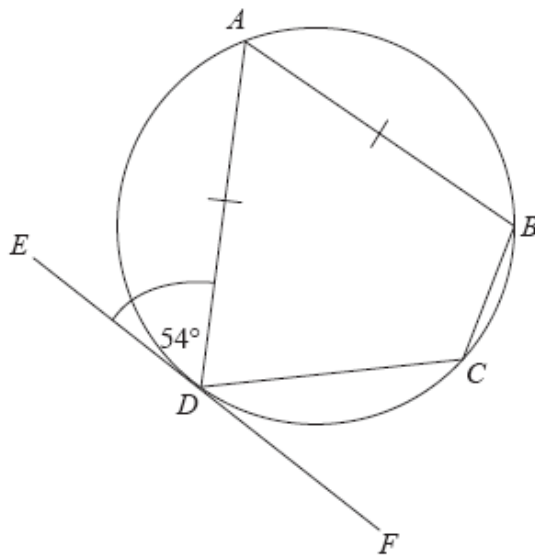


Diagram NOT  
accurately drawn

$A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle.  
 $EDF$  is a tangent to the circle.  
 $AB = AD$ .  
Angle  $ADE = 54^\circ$ .

Work out the size of angle  $BCD$ .  
You must give a reason for each stage in your working.

(Total for Question 20 is 5 marks)

Mock paper – Unit 3 (Modular) – Higher – Calculator – Q20

**\*12.4**

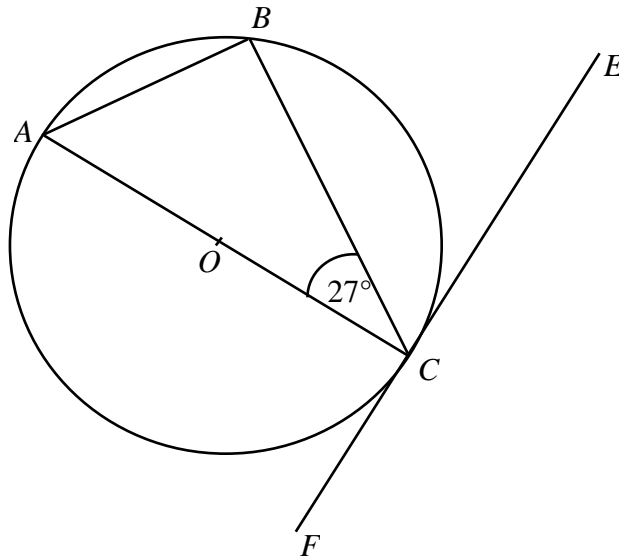


Diagram **NOT** accurately drawn

In the diagram ABC are points on the circle centre  $O$ .

Angle  $ACB = 27^\circ$

FE is a tangent to the circle at point C.

- (i) Calculate the size of angle  $BAC$ .  
Give reasons for your answer.
- (ii) Calculate the size of angle  $BCE$ .  
Give reasons for your answer.

**(Total for Question 15 is 4 marks)**

*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q15*

**\*12.5**

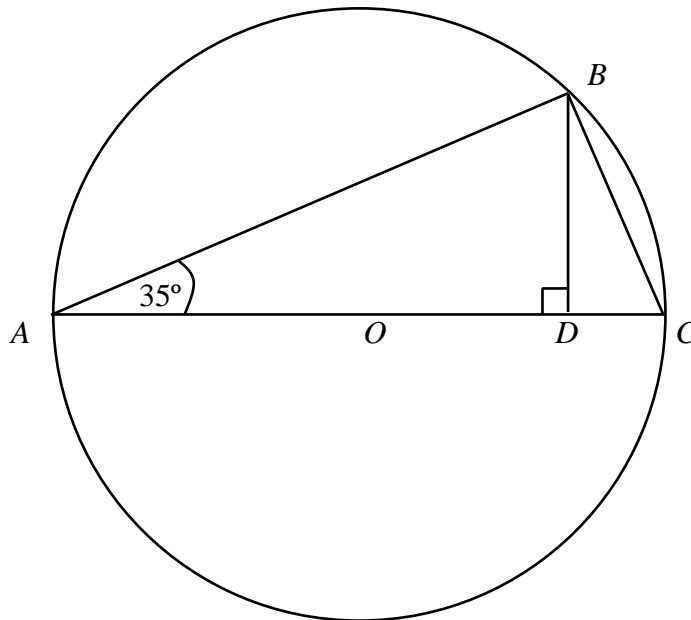


Diagram **NOT** accurately drawn

The diagram shows a circle, centre  $O$ .

$AC$  is a diameter

Angle  $BAC = 35^\circ$

$D$  is the point on  $AC$  such that angle  $BDA$  is a right angle

- (a) Work out the size of angle  $BCA$ . Give reasons for your answer.
- (b) Calculate the size of angle  $BOA$ . Give reasons for your answer.

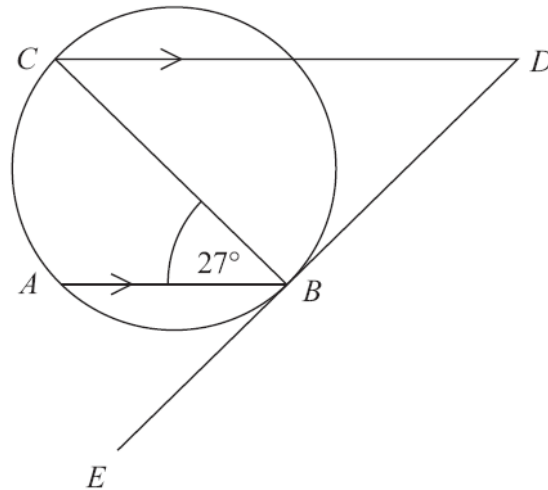
**(2)**

**(2)**

*Practice Paper Set C – Unit 3 (Modular) – Higher – Calculator – Q14*

\*12.6

Diagram NOT  
accurately drawn



$A$ ,  $B$  and  $C$  are three points on a circle.  
 $DBE$  is a tangent to the circle.  
 $AB$  is parallel to  $CD$ .  
 $BC$  is a diameter.  
Angle  $ABC = 27^\circ$ .

Find the size of angle  $CDB$ .  
Give reasons for your answer.

**(Total for Question 14 is 4 marks)**

*March 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q14*

13.1

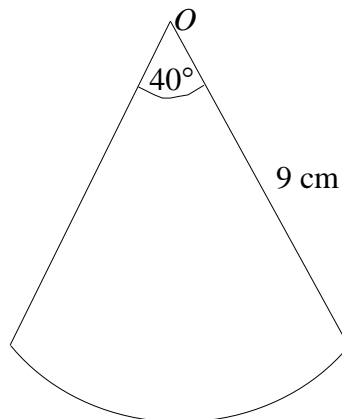


Diagram NOT  
accurately drawn

The diagram shows a sector of a circle centre  $O$ .  
The radius of the circle is 9 cm.  
The angle at the centre of the circle is  $40^\circ$ .

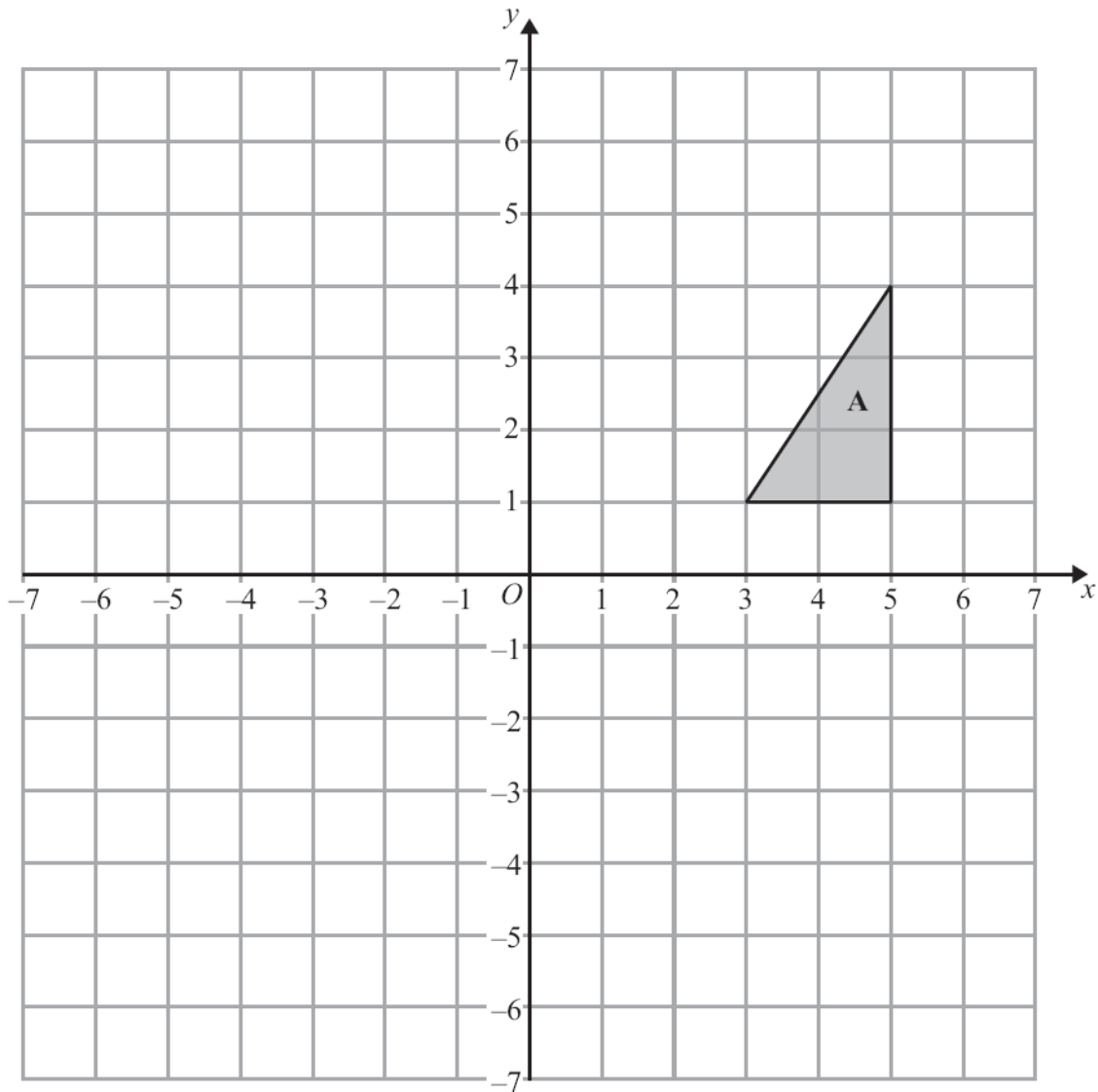
Find the perimeter of the sector.  
Give your answer correct to 2 decimal places.

..... cm

**(Total for Question 16 is 4 marks)**

*Practice Paper Set B – Unit 3 (Modular) – Higher – Calculator – Q16*

14.1



Triangle **A** is reflected in the  $x$ -axis to give triangle **B**.

Triangle **B** is then reflected in the line  $x = 1$  to give triangle **C**.

Describe fully the single transformation that maps triangle **A** onto triangle **C**.

**(Total for Question 14 is 3 marks)**

*June 2013 – Unit 3 (Modular) – Higher – Calculator – Q14*

15.1

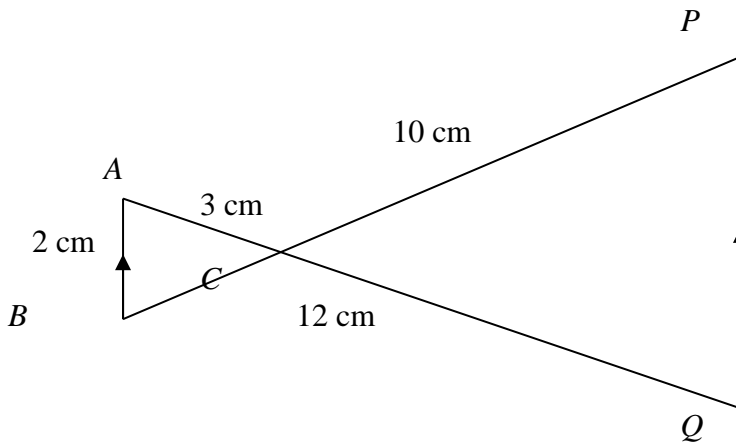


Diagram NOT accurately drawn

$ACQ$  and  $BCP$  are straight lines.  
 $AB$  is parallel to  $PQ$ .  
 $AB = 2$  cm.  
 $AC = 3$  cm.  
 $CQ = 12$  cm.  
 $CP = 10$  cm.

- (a) Work out the length of  $PQ$ . ..... cm (2)
- (b) Work out the length of  $BP$ . ..... cm (3)

*Practice Paper Set A – Unit 3 (Modular) – Higher – Calculator – Q12*

15.2  $ABC$  is a triangle.

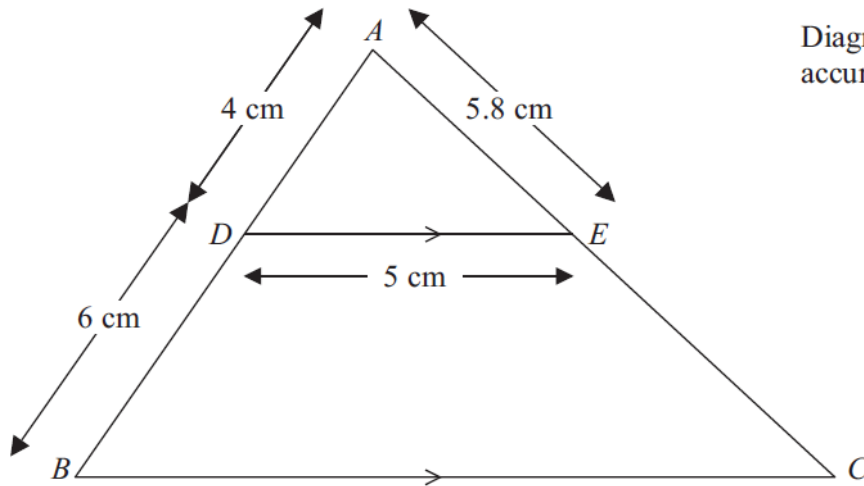


Diagram NOT accurately drawn

$D$  is a point on  $AB$  and  $E$  is a point on  $AC$ .  
 $DE$  is parallel to  $BC$ .  
 $AD = 4$  cm,  $DB = 6$  cm,  $DE = 5$  cm,  $AE = 5.8$  cm.

Calculate the perimeter of the trapezium  $DBCE$ .  
 ..... cm

**(Total for Question 13 is 4 marks)**

*November 2013 – Unit 3 (Modular) – Higher – Calculator – Q13*



16.1 The diagram shows a right-angled triangle.

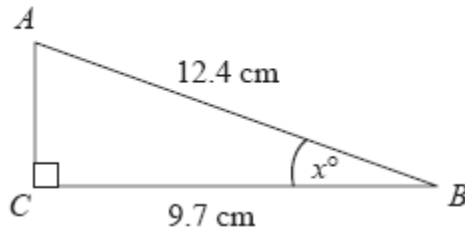


Diagram NOT accurately drawn

Angle  $ACB = 90^\circ$ .  
 $AB = 12.4$  cm.  
 $CB = 9.7$  cm.

Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

(Total for Question 13 is 3 marks)

Mock paper – Unit 3 (Modular) – Higher – Calculator – Q13

16.2

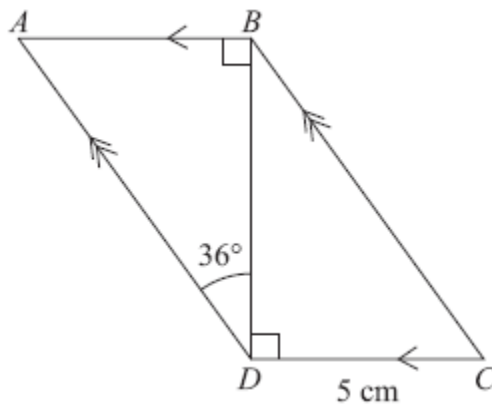


Diagram NOT accurately drawn

$ABCD$  is a parallelogram.  
 $DC = 5$  cm  
Angle  $ADB = 36^\circ$   
Calculate the length of  $AD$ .  
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 14 is 4 marks)

November 2012 – Unit 3 (Modular) – Higher – Calculator – Q14

16.3  $LMN$  is an equilateral triangle.

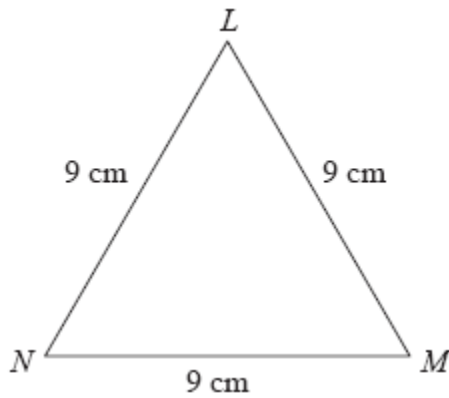


Diagram NOT accurately drawn

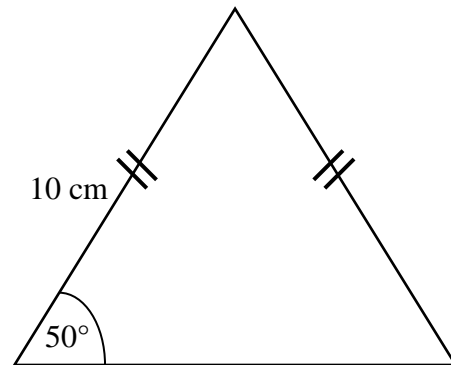
Work out the height of triangle  $LMN$ .  
Give your answer correct to 3 significant figures.

..... cm

**(Total for Question 17 is 3 marks)**

*Mock paper – Unit 3 (Modular) – Higher – Calculator – Q17*

16.4 Here is an isosceles triangle.



Find the area of the triangle.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$

**(Total for Question 13 is 6 marks)**

*Practice Paper Set A – Unit 3 (Modular) – Higher – Calculator – Q13*

16.5  $G H J$  is a right-angled triangle.

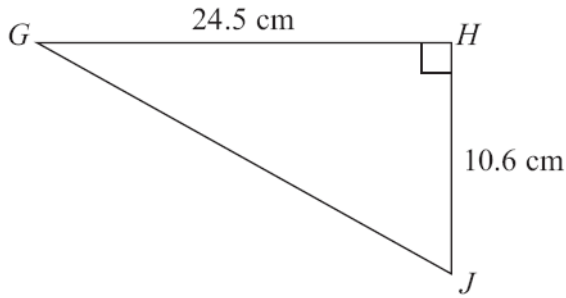


Diagram NOT accurately drawn

- (a) Calculate the length of  $GJ$ .  
Give your answer correct to one decimal place.

..... cm  
(1)

$LMN$  is a different right-angled triangle.

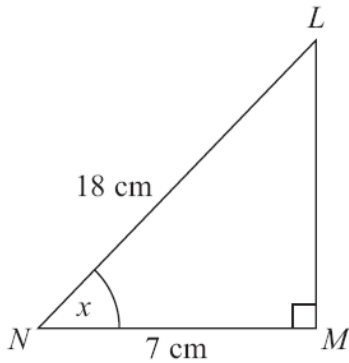


Diagram NOT accurately drawn

- (b) Calculate the size of the angle marked  $x$ .  
Give your answer correct to one decimal place.

.....° (3)

June 2013 – Unit 3 (Modular) – Higher – Calculator – Q10

16.6

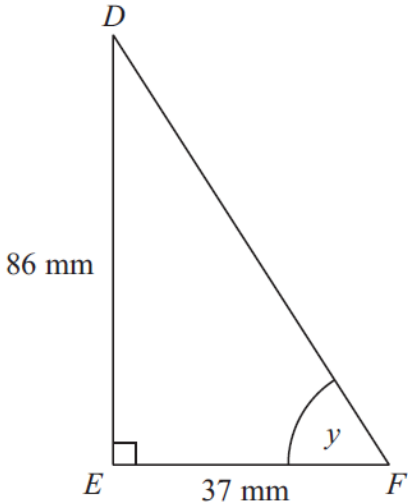


Diagram NOT accurately drawn

- $DEF$  is a right-angled triangle.  
 $DE = 86$  mm.  
 $EF = 37$  mm.  
Calculate the size of the angle marked  $y$ .  
Give your answer correct to 1 decimal place.

(Total for Question 11 is 3 marks)

November 2013 – Unit 3 (Modular) – Higher – Calculator – Q11

17.1 Judy drives at an average speed of 80 km per hour for 2 hours 45 minutes.  
Work out the number of **miles** Judy drives.

.....miles

**(Total for Question 16 is 3 marks)**

*June 2012 – Unit 2 (Modular) – Higher – Non-Calculator – Q16*

17.2 Matt decides to make a bell.

He mixes copper and tin to make the metal for the bell.  
No metal is gained or lost in the process.

He has 270 kg of copper and  $0.01 \text{ m}^3$  of tin.

The density of copper is  $9000 \text{ kg per m}^3$ .  
The density of tin is  $7300 \text{ kg per m}^3$ .



Work out the density of the metal in the bell.

**(Total for Question 12 is 6 marks)**

*Practice Paper Set C – Unit 2 (Modular) – Higher – Non-Calculator – Q12*

17.3 A water trough is in the shape of a prism.

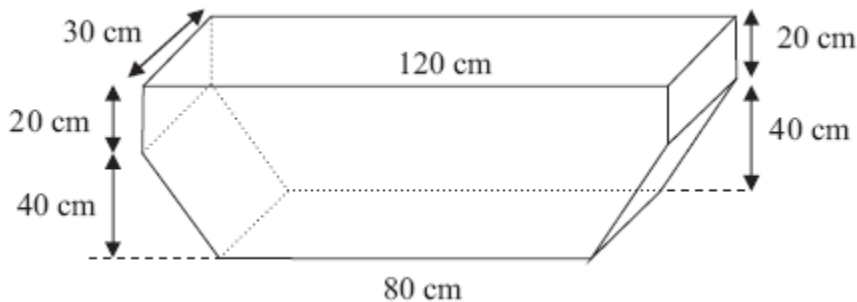


Diagram NOT accurately drawn

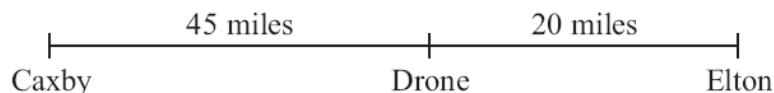
Hamish fills the trough completely.  
Water leaks from the bottom of the trough at a constant rate.  
2 hours later, the level of the water has fallen by 20 cm.  
Water continues to leak from the trough at the same rate.

How many more minutes will it take for the trough to empty completely?

**(Total for Question 11 is 6 marks)**

*November 2010 – Unit 2 (Modular) – Higher – Non-calculator – Q11*

17.4 The distance from Caxby to Drone is 45 miles.  
The distance from Drone to Elton is 20 miles.



Colin drives from Caxby to Drone.  
Then he drives from Drone to Elton.  
Colin drives from Caxby to Drone at an average speed of 30 mph.  
He drives from Drone to Elton at an average speed of 40 mph.

Work out Colin's average speed for the whole journey from Caxby to Elton.

..... mph

**(Total for Question 11 is 3 marks)**

*June 2013 – Unit 2 (Modular) – Higher – Non-Calculator – Q11*

**18.1** Nathan is doing a survey about DVDs.  
 He writes a questionnaire.  
 Nathan decides to hand out his questionnaire to the women who are inside a DVD store.  
 His sample is biased.

(a) Give **two** possible reasons why. (2)

This is one of the questions on Nathan's questionnaire.

How many DVDs do you have?

0 to 5

5 to 10

11 to 15

16 to 20

(b) Write down **two** things wrong with this question.

*November 2012 – Unit 1 (Modular) – Higher – Calculator – Q9*

**18.2** The table below shows the population of each of three villages.

Village	Population
Ashley	243
Brigby	370
Irton	127

Mr Akhtar carries out a survey of the people living in these three villages.  
 He uses a sample stratified by village population.  
 There are 50 people from Brigby in his sample.  
 Work out the number of people from Irton in his sample.

**(Total for Question 13 is 2 marks)**

*November 2010 – Unit 1 (Modular) – Higher – Calculator – Q13*

**18.3** Raul is the manager of a restaurant.  
 He wants to find out how often local people eat in a restaurant.  
 Raul is going to carry out a survey using a questionnaire.

- (a) Design a suitable question for Raul to use on his questionnaire. (2)
- (b) The two-way table shows information about the ages of the customers in Raul's restaurant one evening.

	Age (years)				Total
	0–16	17–30	31–60	over 60	
Male	8	10	17	20	55
Female	7	9	22	34	72
Total	15	19	39	54	127

Raul carries out his survey using only these customers.  
 He uses a sample of 50 of these customers stratified by gender and by age.  
 Calculate the number of males aged 17–30 in his sample.

(2)

Raul's survey is biased.  
 (c) Give **two** possible reasons why.

(2)

*March 2012 – Unit 1 (Modular) – Higher – Calculator – Q11*

**18.4** A factory makes 600 laptops.  
 Mrs Green is responsible for checking these laptops.  
 She is going to take a random sample of 80 of the laptops.  
 (a) Describe a method she could use to select the sample. (1)

Mrs Green finds that 3 of the 80 laptops are faulty.  
 b) Work out an estimate for how many of the 600 laptops are faulty. (2)

*November 2010 – Unit 1 (Modular) – Higher – Calculator – Q11*

**18.5** There are  $N$  beads in a jar.  
 40 of these beads are black.  
 Julie takes at random a sample of 50 beads from the jar.  
 5 of the beads in her sample are black.  
 Work out an estimate for the value of  $N$ . (2)

*June 2012 – Unit 1 (Modular) – Higher – Calculator – Q11*

**18.6** The table gives information about the number of students at a school.

Year 9	Year 10	Year 11	Total
244	315	181	740

Priya is going to survey 60 of the students in the school.  
 She is going to use a sample stratified by year group.

(a) Work out the number of year 9, year 10 and year 11 students Priya should have in her sample.  
 You must show all your working.

Year 9 .....  
 Year 10 .....  
 Year 11 .....(3)

Priya is going to use a random sample to select the students.

(b) (i) Explain what is meant by a random sample.  
 (ii) Describe how Priya could take a random sample. (2)

*November 2012 – Unit 1 (Modular) – Higher – Calculator – Q13*

**\*18.7** A farmer wants to estimate the number of rabbits on his farm.  
 On Monday he catches 120 rabbits.  
 He puts a tag on each rabbit.  
 He then lets the rabbits run away.  
 On Tuesday the farmer catches 70 rabbits.  
 15 of these rabbits have a tag on them.  
 Work out an estimate for the total number of rabbits on the farm.  
 You must write down any assumptions you have made.

**(Total for Question 14 is 4 marks)**

*November 2011 – Unit 1 (Modular) – Higher – Calculator – Q14*

**18.8** Simon is designing a questionnaire for people who visit his sports club. He wants to find out how often people visit his sports club.

(a) Design a suitable question he could use.

(2)

Simon asks 10 of his friends who visit his sports club to do his questionnaire. This may **not** be a suitable sample.

(b) Give one reason why.

(1)

There are 365 runners in Simon's sports club.

The table gives information about these runners.

Age (in years)	Number of male runners	Number of female runners
10 – 19	35	36
20 – 29	52	48
30 – 39	45	32
40 – 49	37	29
50 – 69	20	31

Simon surveys the runners in his sports club.

He uses a sample of 50 runners stratified by gender and by age.

(c) Work out the number of male runners with an age 30 – 39 years he should have in his sample.

(2)

*June 2012 – Unit 1 (Modular) – Higher – Calculator – Q10*

**19.1** The table shows information about the lengths, in seconds, of 40 TV adverts.

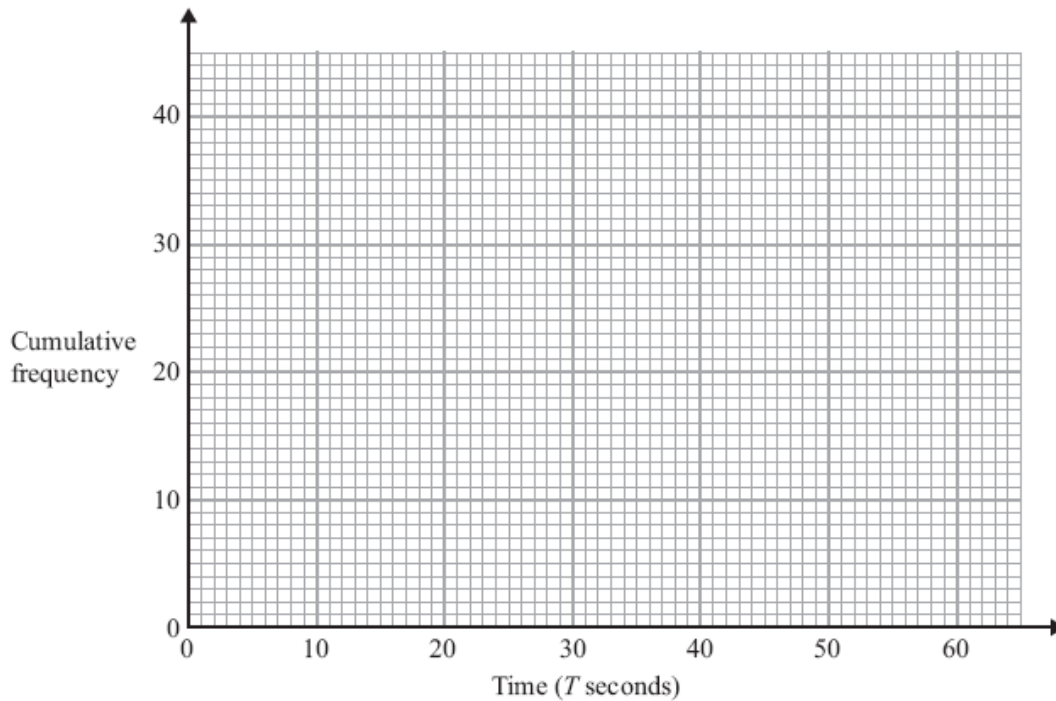
Time ( $T$ seconds)	Frequency
$10 < T \leq 20$	4
$20 < T \leq 30$	7
$30 < T \leq 40$	13
$40 < T \leq 50$	12
$50 < T \leq 60$	4

(a) Complete the cumulative frequency table for this information.

Time ( $T$ seconds)	Cumulative frequency
$10 < T \leq 20$	4
$10 < T \leq 30$	
$10 < T \leq 40$	
$10 < T \leq 50$	
$10 < T \leq 60$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the median length of these TV adverts.

..... seconds  
(1)



19.2 The table shows some information about the weights, in grams, of 60 eggs.

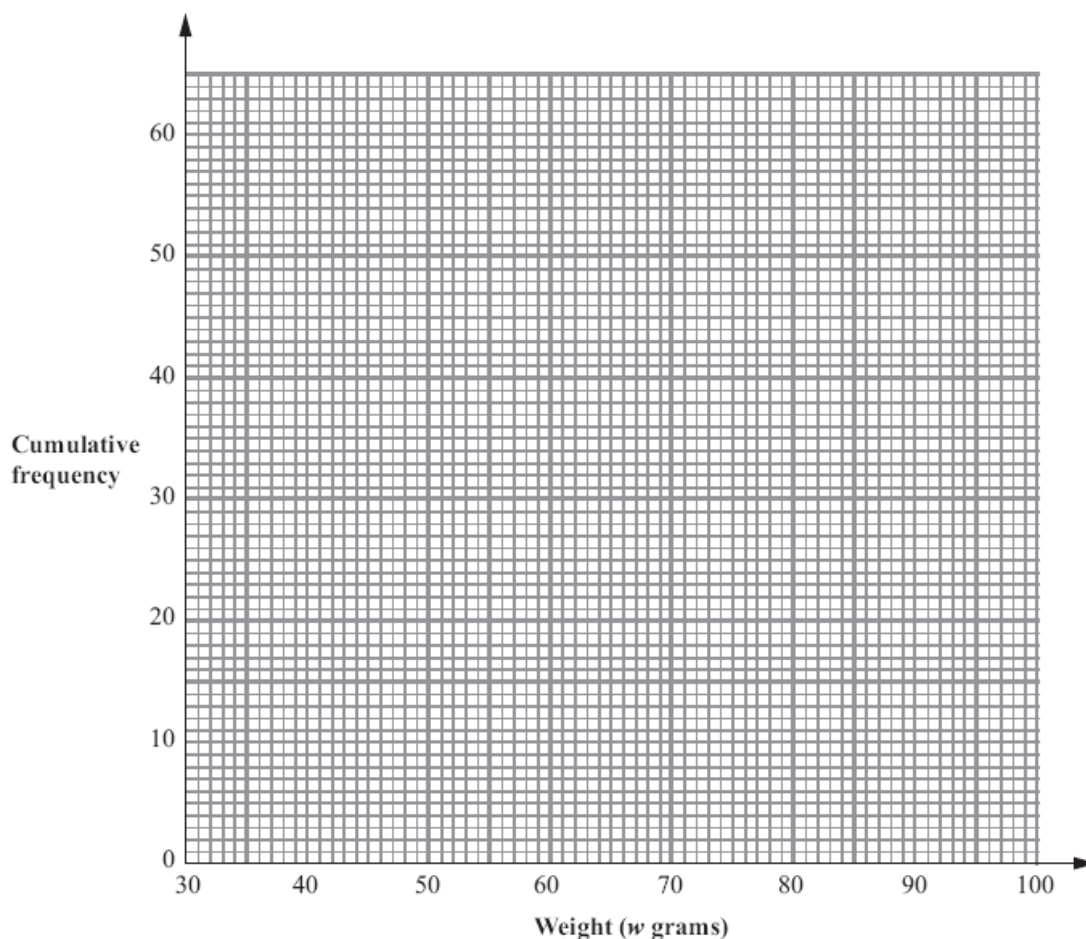
Weight( $w$ grams)	Frequency		
$0 < w \leq 30$	0		
$30 < w \leq 50$	14		
$50 < w \leq 60$	16		
$60 < w \leq 70$	21		
$70 < w \leq 100$	9		

(a) Calculate an estimate for the mean weight of an egg. (4)

(b) Complete the cumulative frequency table.

Weight( $w$ grams)	Cumulative frequency
$0 < w \leq 30$	0
$0 < w \leq 50$	
$0 < w \leq 60$	
$0 < w \leq 70$	
$0 < w \leq 100$	

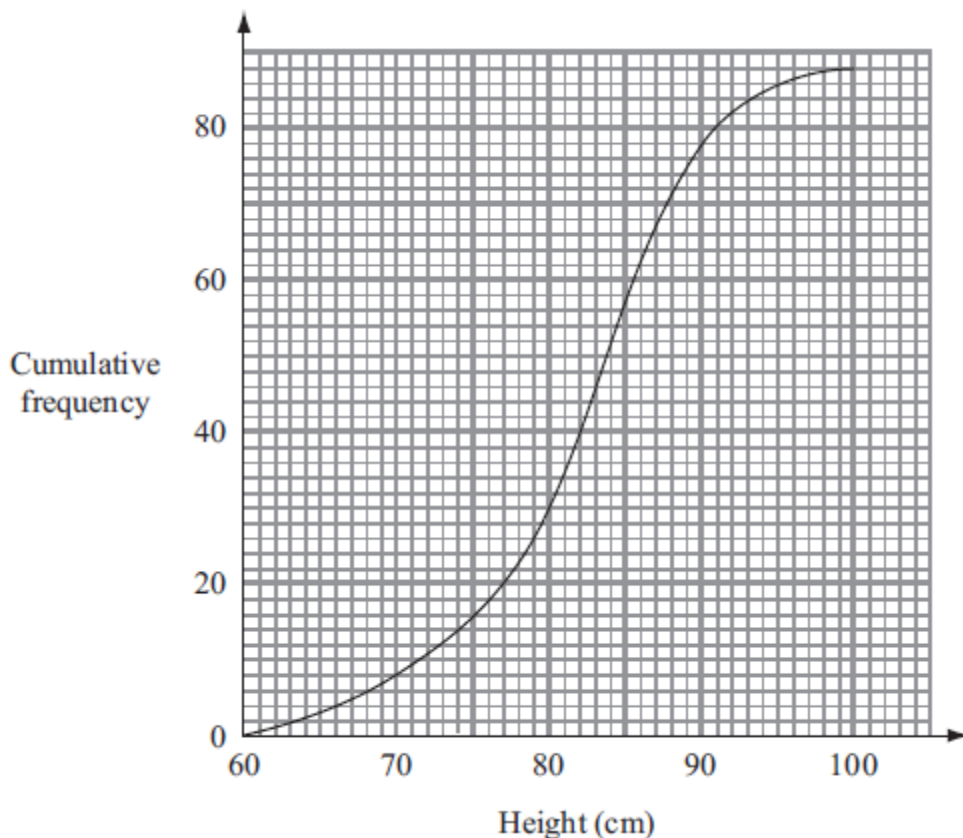
(1)



(c) On the grid, draw a cumulative frequency graph for your table (2)

(d) Use your graph to find an estimate for the number of eggs with a weight greater than 63 grams. (2)

19.3 The cumulative frequency graph shows information about the heights of some hollyhockplants.



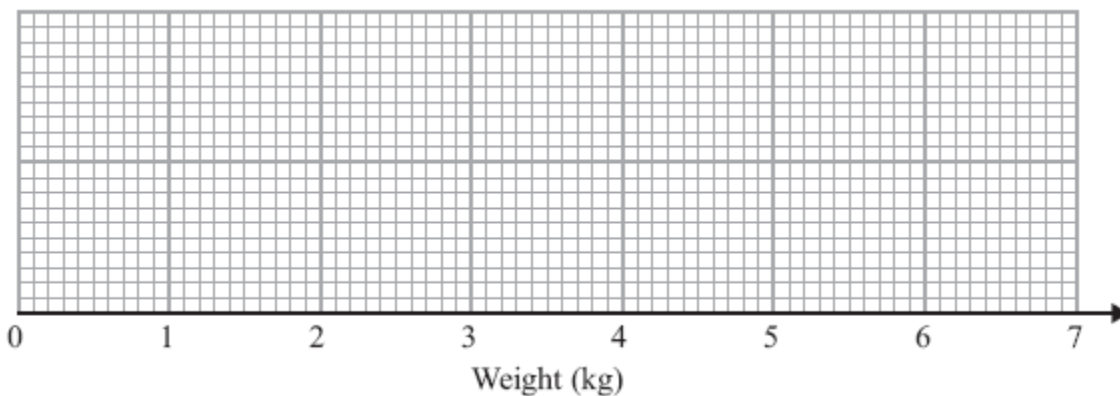
- (a) Find an estimate for the median height. .... cm (1)
- (b) Work out an estimate for the interquartile range..... cm (2)
- (c) Find an estimate for the number of hollyhock plants taller than 90 cm. (2)

*March 2012 – Unit 1 (Modular)–Higher – Calculator – Q8*

19.4 The table gives some information about the weights of 60 babies.

Lowest	2.0 kg
Highest	6.5 kg
Lower quartile	2.8 kg
Upper quartile	4.2 kg
Median	3.0 kg

- (a) Draw a box plot to show this information. (2)

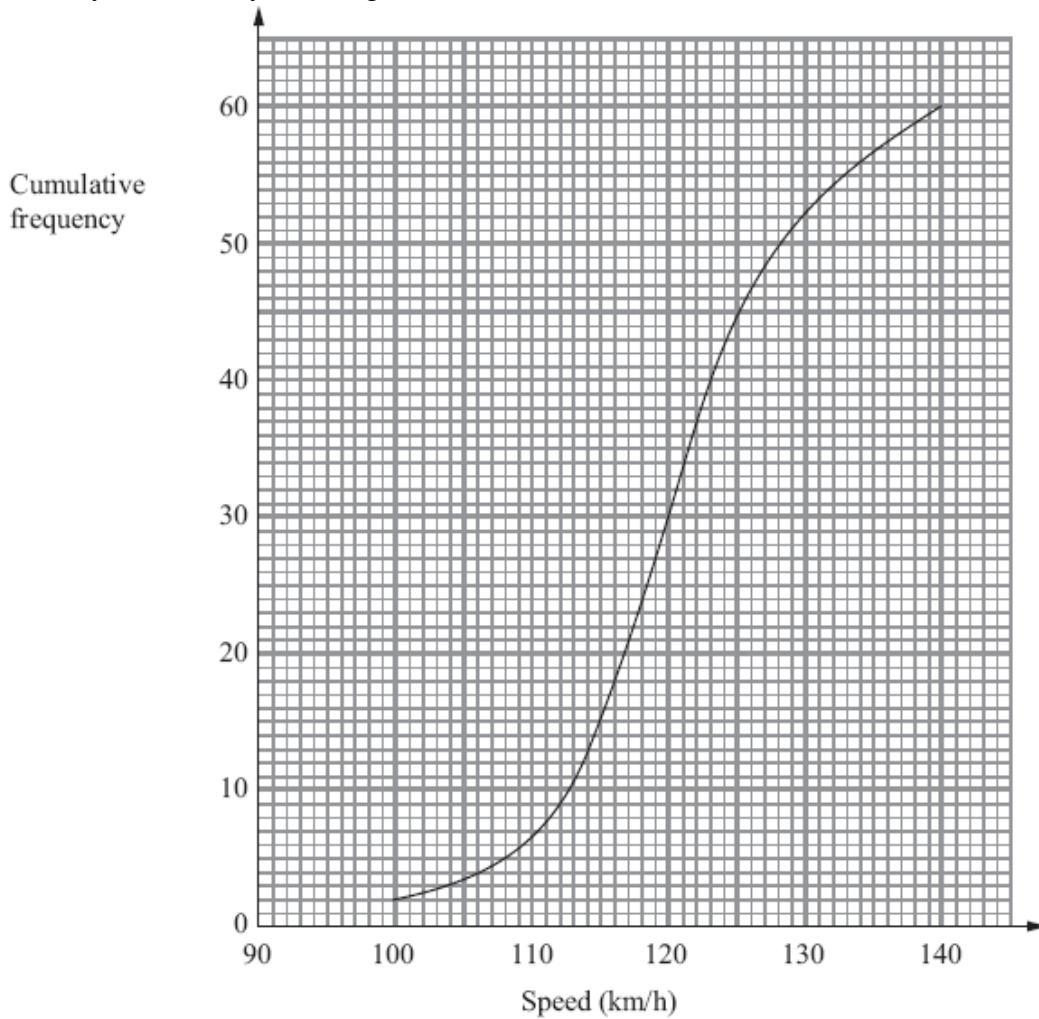


There are 60 babies.

- (b) Work out an estimate for the number of these babies with a weight greater than 2.8 kg. (2)

*June 2012 – Unit 1 (Modular) – Higher – Calculator – Q9*

19.5 The cumulative frequency graph shows information about the speeds of 60 cars on a motorway one Sunday morning.



(a) Use the graph to find an estimate for the median speed. .... km/h(1)

The speed limit on this motorway is 130 km/h.

The traffic police say that more than 20% of cars travelling on the motorway break the speed limit.

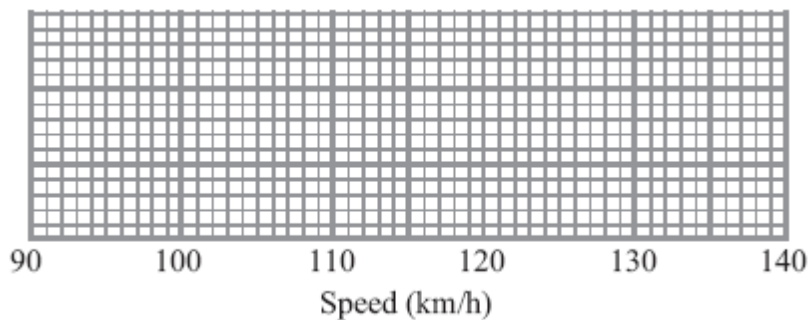
(b) Comment on what the traffic police say. (3)

For these 60 cars

the minimum speed was 97 km/h

and the maximum speed was 138 km/h.

(c) Use the cumulative frequency graph and the information above to draw a box plot showing information about the speeds of the cars.

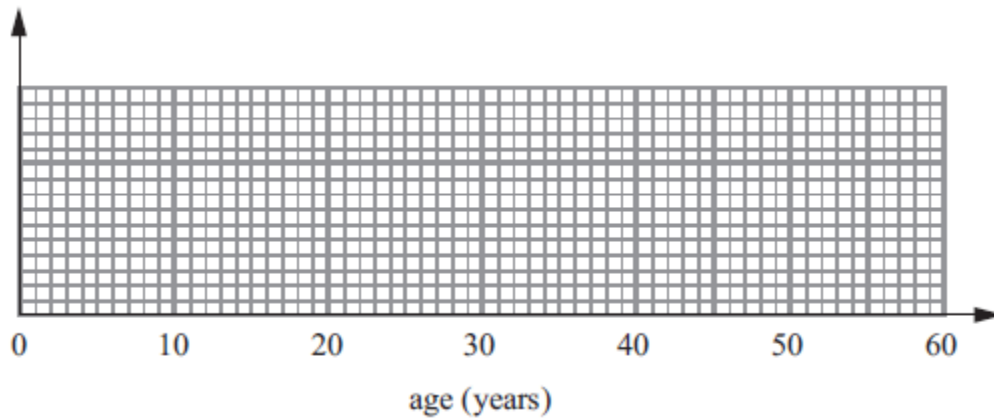


(3)

19.6 Here are the ages, in years, of 15 women at West Ribble Tennis Club.

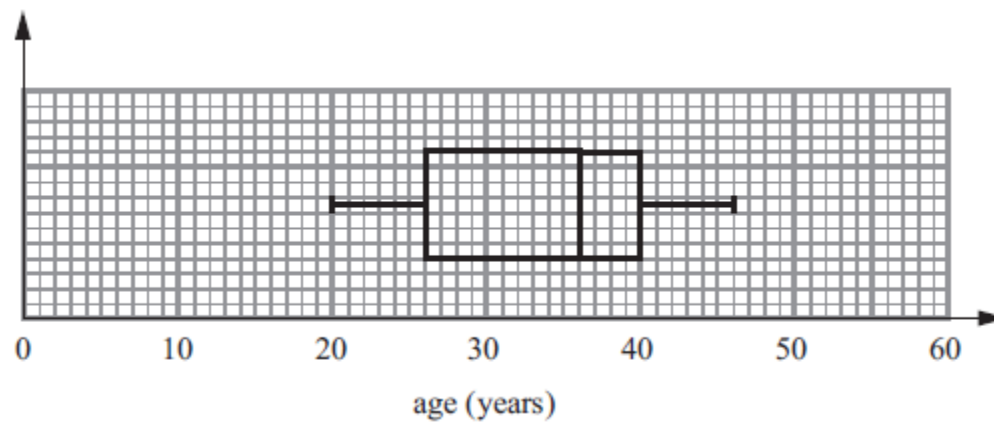
16, 18, 18, 20, 25, 25, 27, 28, 30, 35, 38, 42, 45, 46, 50

(a) On the grid, draw a box plot for this information.



(3)

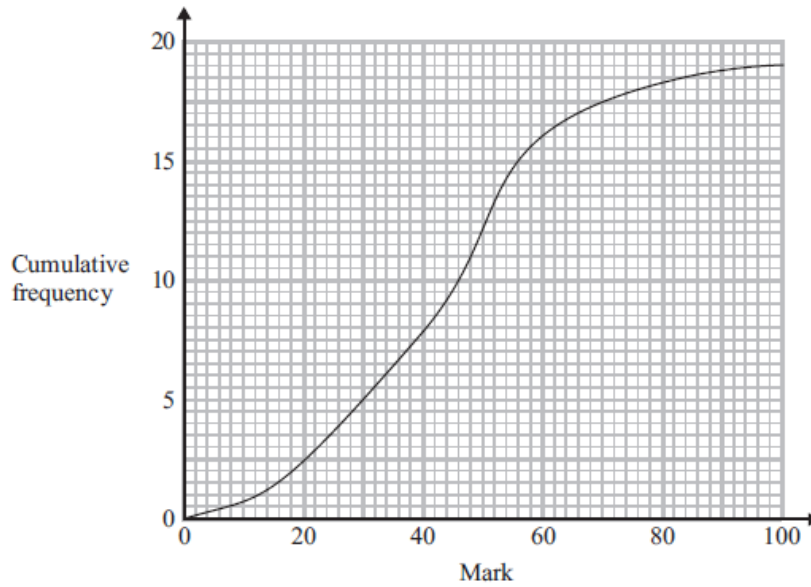
The box plot below shows the distribution of the ages of the men at West Ribble Tennis Club.



\* (b) Use the box plots to compare the distributions of the ages of these women and the distributions of the ages of these men.

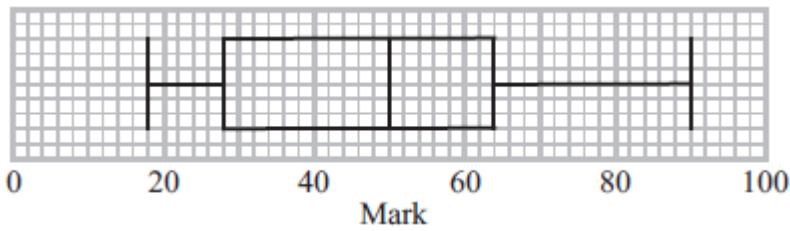
(2)

19.7 Mrs Angus's class did a maths test.  
The cumulative frequency graph shows information about their marks.



- (a) Use the cumulative frequency graph to find  
 (i) the median,  
 (ii) the interquartile range. (3)

Mr Wilson's class did the same maths test.  
The box plot shows information about their marks.



- \*(b) Compare the interquartile range of the marks of Mr Wilson's class with the interquartile range of the marks of Mrs Angus's class. (2)

- \*19.8** There are two trays of plants in a greenhouse.  
The first tray of plants was given fertiliser.  
The second tray of plants was not given fertiliser.

On Monday the heights of the plants were measured in centimetres.  
The boxes show some information about the heights of the plants.

Heights of the plants given fertiliser							
22	29	30	35	37	40	44	47
48	48	54	56	59	66	72	

Information about the heights of plants not given fertiliser			
Smallest	18	Lower quartile	26
Largest	64	Upper quartile	47
Median	44		

Compare the distribution of the heights of the plants given fertiliser to the distribution of the heights of the plants not given fertiliser.

**(Total for Question 9 is 4 marks)**

*March 2013 – Unit 1 (Modular) – Higher – Calculator – Q9*

**19.9** Jodie picks all the apples from her 56 apple trees.  
 For each tree she records the total weight of its apples.

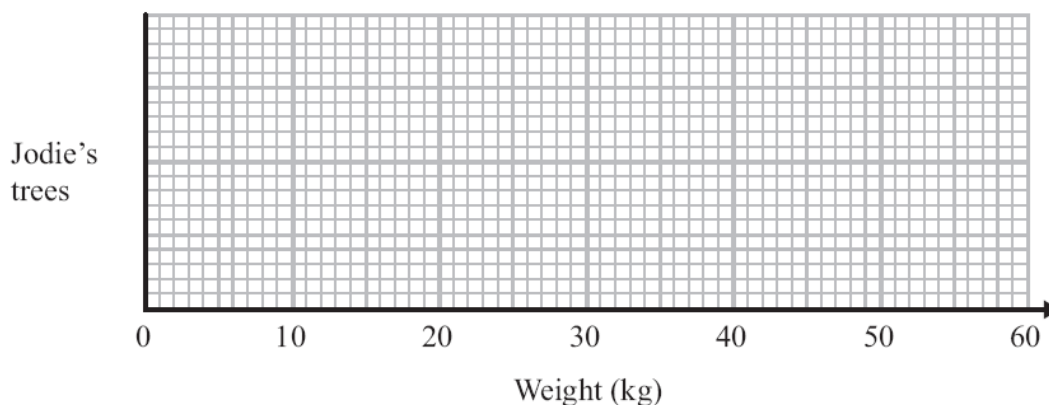
The table shows some information about these total weights in kg.

least weight	25
greatest weight	55
median	40
lower quartile	35
upper quartile	45

(a) Work out how many of Jodie's apple trees have a total weight of apples of less than 45 kg.

(2)

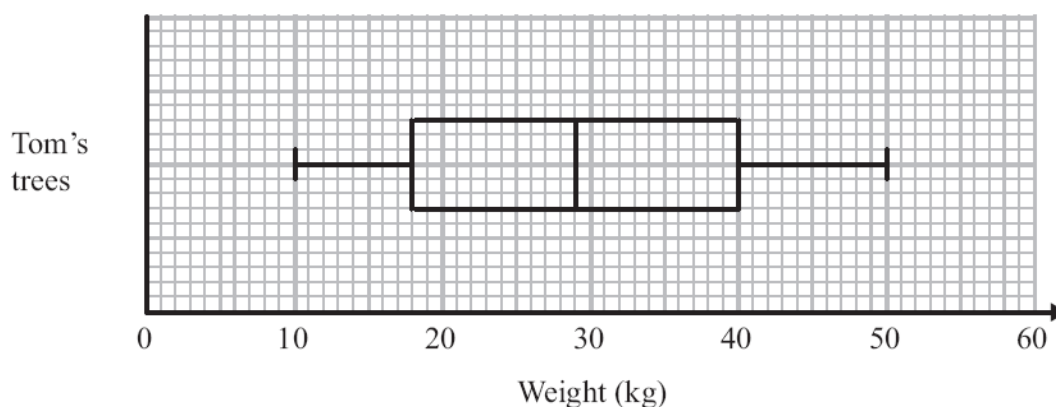
(b) On the grid, draw a box plot for the information in the table.



(2)

Tom has 59 apple trees.

The box plot shows the distribution of the total weights of the apples Tom picks from each of his apple trees.



\*(c) Compare the distribution of the weights of apples Jodie picks with the distribution of the weights of apples Tom picks.

(2)

**20.1** Mary plays a game of throwing a ball at a target.

The table shows information about the probability of each possible score.

<b>Score</b>	0	1	2	3	4	5
<b>Probability</b>	0.09	$x$	0.18	0.16	0.21	0.30

Mary is 3 times as likely to score 2 points than to score 1 point.

(a) Work out the value of  $x$ .

(3)

Mary plays the game twice.

(b) Work out the probability of Mary scoring a total of 8

(3)

*March 2011 – Unit 1 (Modular) – Higher – Calculator – Q9*

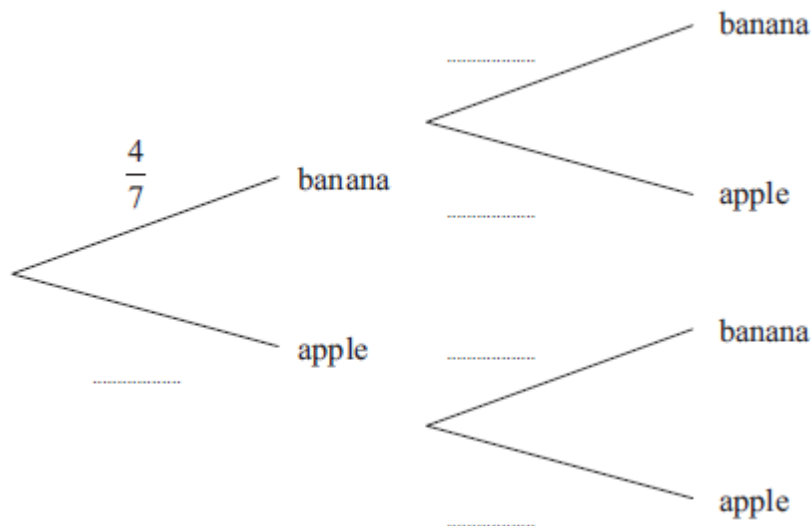
**20.2** There are 4 banana smoothies and 3 apple smoothies in a box.

Jenny takes at random 1 smoothie from the box.

She writes down its flavour, and puts it back in the box.

Jenny then takes at random a second smoothie from the box.

(a) Complete the probability tree diagram.



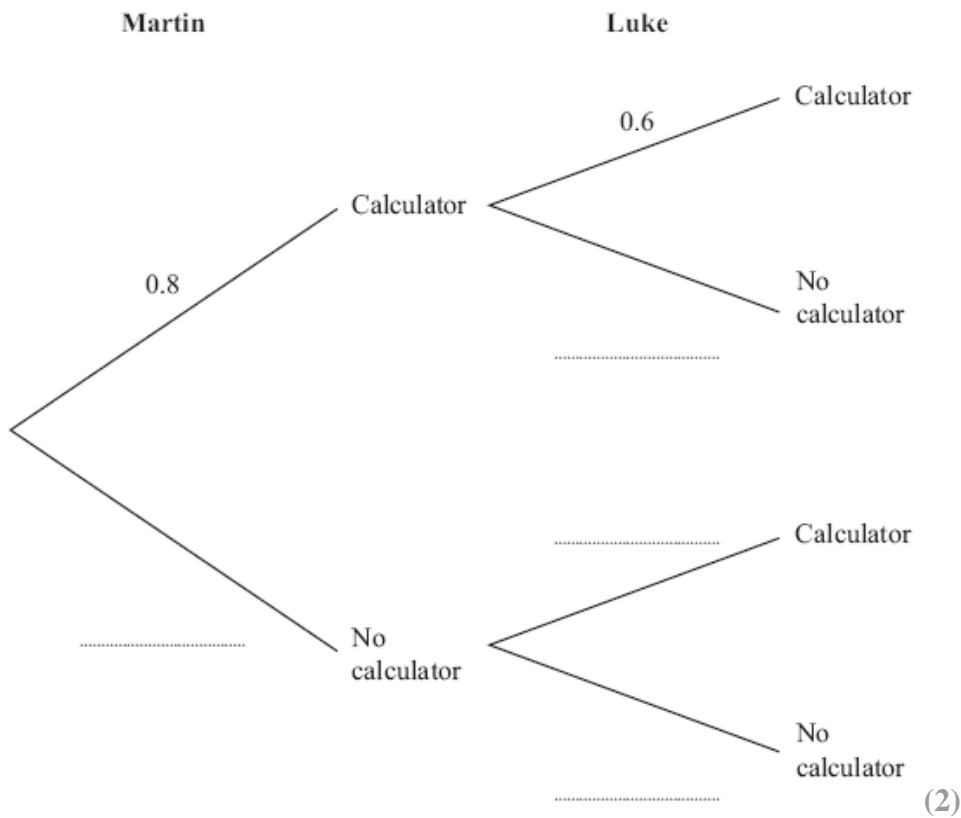
(2)

(b) Work out the probability that both smoothies are apple flavour.(2)

*November 2011 – Unit 1 (Modular)–Higher – Calculator – Q13*



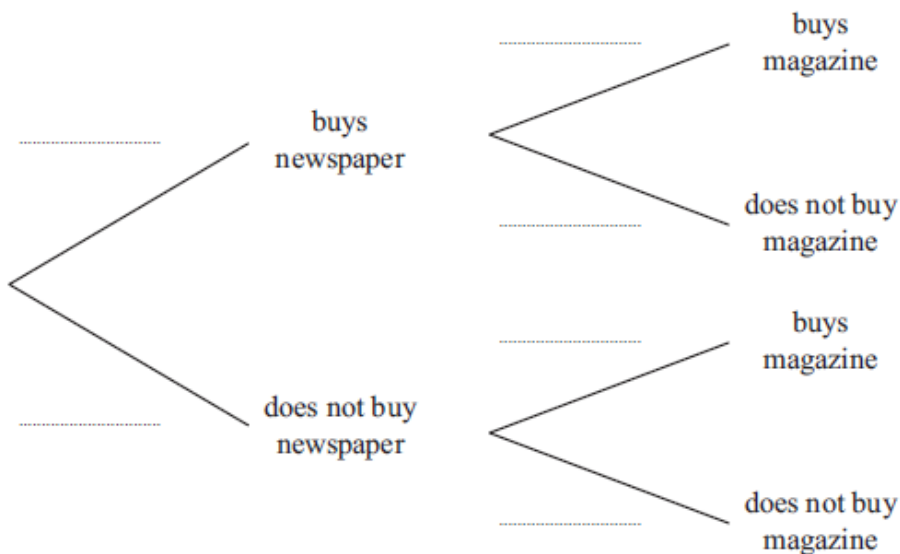
- 20.3** Martin and Luke are students in the same maths class.  
 The probability that Martin will bring a calculator to a lesson is 0.8  
 The probability that Luke will bring a calculator to a lesson is 0.6  
 (a) Complete the probability tree diagram.



- (b) Work out the probability that **both** Martin and Luke will **not** bring a calculator to a lesson.  
 (2)

*March 2011 – Unit 1 (Modular) – Higher – Calculator – Q11*

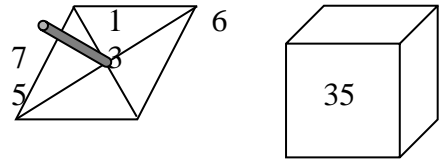
- 20.4.** In a newsagent's shop, the probability that any customer buys a newspaper is 0.6  
 In the same shop, the probability that any customer buys a magazine is 0.3  
 (a) Complete the probability tree diagram.



- (b) Work out the probability that a customer will buy either a newspaper or a magazine but not both.  
 (3)

*March 2012 – Unit 1 (Modular) – Higher – Calculator – Q9*

- 20.5** Sally has a fair 4-sided spinner numbered 1, 3, 5 and 7 and a fair 6-sided die.



He spins the spinner once and rolls the die once.  
To get the score he **adds** the numbers together.

- (a) Work out the probability that the score will be 3 **(2)**
- (b) Work out the probability the score will be less than 5. **(3)**

*Practice Paper Set B – Unit 1 (Modular)–Higher – Calculator – Q13*