Edexcel **GCSE Mathematics (1387)**

Intermediate Tier 2004

Model Answers

In general, the number of significant figures in an answer should not exceed the number of significant figures in the input data, or if this data has differing numbers of significant figures, the data with the lowest number of significant figures.

Brian Daugherty

Statements in italics are for information rather than a part of the answer

Paper 3 (Non-Calculator), 8 June 2004

Question 1

$$\text{Area of carpet} = 5 \times 2 = 10m^2$$

Question 2

(a) (i)

$$3e + 2f$$

(ii)

$$3p^2$$

(b)

$$5(-3) + 1$$

$$= -15 + 1$$

$$= -14$$

Question 3

$$\begin{array}{r} 329 \\ 26 \\ \hline 1974 \\ 6580 \\ \hline 8554 \end{array}$$

(Note : Since there is a total of one decimal place in the original two numbers, we need to shift the decimal point in 8554 by one place)

Answer is

$$855.4$$

Question 4

(a)

	France	Germany	Spain	Total
Female	2	23	9	34
Male	15	2	9	26
Total	17	25	18	60

(b)

$$\frac{25}{60} = \frac{5}{12}$$

Question 5

(a)

$$45\% \; of \; 800$$

$$= \frac{45}{100} \times \frac{800}{1}$$

$$= 360$$

(b) As a fraction

$$\frac{176}{800}$$

To convert to a percentage

$$\frac{176}{800} \times 100$$

$$= 22\%$$

Question 6

(a)

$$\frac{11}{12} - \frac{5}{6}$$

$$= \frac{11}{12} - \frac{10}{12}$$

$$= \frac{1}{12}$$

(b) Estimate as

$$\frac{70 \times 400}{200}$$

$$= 140$$

Question 7

(a) (i)

$$60^\circ$$

(ii) Because all angles are equal

(b) (i)

$$130^\circ$$

(ii) QRS is an iscoceles triangle, therefore angle SQR = angle SRQ, i.e. 50 degrees. Since the angle on a straight line = 180, angle PQS = 180 -50 = 130 degrees.

(c)

$$64^\circ$$

Question 8

Goals scored	Number of students	
1	9	9
2	3	6
3	5	15
4	3	12

$$\text{Mean } = \frac{42}{20} = 2.1$$

Question 9

(a)

$$0905$$

(b)

$$7km$$

(c)

$$10min$$

(d)

$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$
$$= \frac{7}{20min} km/min$$
$$= \frac{7}{\frac{1}{3}} km/h$$
$$= 21km/h$$

Question 10

Each apex transforms as follows

$$(1,3) \rightarrow (2,6)$$
$$(1,-1) \rightarrow (2,-2)$$
$$(3,-1) \rightarrow (6,-2)$$

Question 11

If n=2

$$n^2 + 3 = 4 + 3 = 7$$

Question 12

(a) Sum of interior angles is given by

$$(n-2) \times 180$$

which for a pentagon

$$= (3) \times 180 = 540^\circ$$

This is a regular pentagon - each angle is

$$\frac{540}{5} = 108^\circ$$

So exterior angle

$$= 180 - 108 = 72^\circ$$

(b)

$$8560mm^2 = \frac{8560}{10 \times 10} = 85.60cm^2$$

(c) (i)

$$100.5mm$$

(ii)

$$101.5mm$$

Question 13

$$x + 2x + 100 + 47 = 360$$

$$3x + 147 = 360$$

$$3x = 213$$

$$x = 71$$

Angle D $= 2x = 2 \times 71 = 144^\circ$, and this is therefore the largest angle.

Question 14

(a) (i)

$$2.21$$

(ii)

$$0.013$$

(b)

$$39 = 3 \times 13$$

17 is already prime

so

$$\text{LCM} = 3 \times 13 \times 17$$
$$= 3 \times 221 = 663$$

Question 15

Three required expressions are

$$\frac{\pi abc}{2d}, 2a^2, 2(c^2 + d^2)$$

Question 16

$$0.2 \times 200 = 40$$

Question 17

(a)

$$108 = 2 \times 54$$
$$= 2^2 \times 27$$
$$= 2^2 \times 3 \times 9$$

(b)

$$24 = 2 \times 12$$
$$= 2^2 \times 6$$
$$= 2^3 \times 3$$

So

$$\text{H.C.F.} = 2^2 \times 3 = 12$$

Question 18

Set compasses to length PB and mark off an equal distance the other side of P (which I will call C). Using a slightly wider distance place point of compasses on B and mark off arcs above and below P. Place compasses on C and repeat operation. Connect the two points where these arcs intersect, to form required perpendicular.

Question 19

$$\text{Volume} = 15 \times 10 = 150cm^3$$

Question 20

$$y = 2x + 6$$

Question 21

Area of triangle

$$= \frac{1}{2} \times \frac{5}{8} \times 6\frac{2}{5}$$
$$= \frac{1}{2} \times \frac{5}{8} \times \frac{32}{5}$$
$$= 2cm^2$$

Area of square

$$= 2 \times 18 = 36cm^2$$

Therefore the side of square

$$= 6cm$$

and perimeter of the square

$$= 24cm$$

Question 22

(a)

$$x^2 - 3x$$
$$= x(x - 3)$$

(b)

$$k^5 \div k^2 = k^3$$

(c) (i)

$$4(x + 5) + 3(x - 7)$$
$$= 4x + 20 + 3x - 21$$
$$= 7x - 1$$

(ii)

$$(x + 3y)(x + 2y)$$
$$= x^2 + 2xy + 3xy + 6y^2$$
$$= x^2 + 5xy + 6y^2$$

(d)

$$(p + q)^2 + 5(p + q)$$
$$= (p + q)((p + q) + 5)$$
$$= (p + q)(p + q + 5)$$

Question 23

(a)

$$32s$$

(Note : Corresponding to 20 on vertical axis)

(b) Box plot of form as shown for (c), except the box itself stretches from 16 (the lower quartile) to 45 (the upper quartile), with center line of 32 (representing the median, corresponding to 20 on the vertical axis). Lines projecting either side extend to 9 on the left and 57 to the right.

(c) Apart from straightforward comparison of items mentioned in (b), could also comment on the fact that the inter-quartile range is less for the girls, as is the range.

Question 24

(a)

$$6y + 5x = 15$$
$$6y = -5x + 15$$
$$y = -\frac{5}{6}x + 2.5$$

(b) When x = -21

$$y = -\frac{5}{6}(-21) + 2.5$$

$$= \frac{105}{6} + 2.5$$

$$= 17.5 + 2.5 = 20$$

(c) (i) Lines enclose area bounded by both axes, $6y + 5x = 15$ (as shown on graph) and the line x=1.5

(ii)

$$(1, 1)$$

Question 25

(a) Straight line $\Rightarrow ABC = 120°$
Cyclic quadrilateral $\Rightarrow ADC = 60°$

(b) CDB = CAB = 25°
So

$$ADB = 60 - 25 = 35°$$

(c) CAD = 65°
so
DAB = 90°
and only a diameter would subtend a right angle at the circumference, so BD **is a diameter.**

Paper 4 (Calculator), 15 June 2004

Question 1

(a) Drawing

(b) Angle will be 63° or 64° to the nearest degree (65° or something similar would be acceptable)

Question 2

(a) Number of hamburgers is

$$(0 \times 1) + (1 \times 1) + (2 \times 4) + (3 \times 8) + (4 \times 8) + (5 \times 7)$$

$$= 100$$

(b) To change *£26.99* to dollars

$$26.99 \times 1.42 = 38.33$$

to the nearest cent

Therefore they are cheaper in the USA by $2.83

Question 3

(a)

x	-2	-1	0	1	2	3
y	-1	1	3	5	7	9

(b) Drawing of graph with positive gradient of magnitude 2 going through y=3

(c) (i)

$$y = 0.4$$

(ii)

$$x = 1.2$$

Question 4

(a) Required elevation would show triangle to the left, rectangle to the right

(b) Required elevation would show 'rectangle shape' on top and shorter 'rectangle shape' on bottom, i.e shorter on left hand side.

Question 5

(a) If d=no. of extra days

$$35.50 + 18.25d = 163.25$$

$$d = \frac{(163.25 - 35.50)}{18.25} = 7$$

Therefore days machine was hired = 8 days

(b) Total cost

$$= 64 \times \frac{117.5}{100}$$

$$= £75.20$$

(c) Total amount

$$= 2.38 \times \frac{54000}{1000}$$

$$= 2.38 \times 54$$

$$= £128.52$$

Question 6

Draw enough shapes to show that they will cover the entire grid, without any gaps.

Question 7

The multiplier in each case is

$$\frac{10}{4} = 2.5$$

giving 200g plain flour
150g ground almonds
225g soft brown sugar
150g butter
10 ripe pears

Question 8

(a) (i)

$$70°$$

(ii)

$$315°$$

(b) Shaded circle of radius 3 cm, centered on Manchester

Question 9

(a) graphing data

(b) positive correlation

(c) line of best fit

(d) (i) 140 pages (or similar answer)

(ii) 250g (or similar answer)

Question 10

(a)

$$\frac{1}{6},\ \frac{3}{8},\ \frac{1}{2},\ \frac{2}{3},\ \frac{3}{4}$$

(b)

$$\frac{3}{5},\ 65\%,\ \frac{2}{3},\ 0.72,\ \frac{3}{4}$$

Question 11

(a)

$$Feb = \frac{147 + 161 + 238}{3} = 182$$

$$Mar = \frac{161 + 238 + 135}{3} = 178$$

$$Apr = \frac{238 + 135 + 167}{3} = 180$$

$$May = \frac{135 + 167 + 250}{3} = 184$$

(b) 20% off the normal prices gives 80% of normal price

Taking 30% off this 80% means a further deduction of

$$80 \times 0.3 = 24\% \text{ off normal prices}$$

giving a total deduction of 54% off normal prices

Question 12

(a) No allowance made for negative responses, or neutral responses

(b) (i) It is asking for the extremes but not the middle ranges **or** The concepts of 'a lot' and 'not much' are not properly defined

(ii) How much money, on average, do you spend on each visit to the canteen? (With relevant boxes, e.g. *£1*, *£1.50*, *£2*, *£2.50*

Question 13

(a)

$$20y - 16 = 18y - 9$$

$$2y = 7$$

$$y = \frac{7}{2}$$

(b)

$$\frac{40 - x}{3} = 4 + x$$

$$40 - x = 12 + 3x$$

$$4x = 28$$

$$x = 7$$

Question 14

(a) No. of large boxes

$$= x - 4$$

So no. of eggs

$$= 12(x - 4) = 12x - 48$$

(b) Total no. of eggs bought

$$= 6x + (12x - 48)$$

$$= 6x + 12x - 48$$

$$= 18x - 48$$

Question 15

x	$x^3 - 2x$
4	56
5	115
4.5	82.125
4.3	70.907
4.2	65.688

So answer is between 4.2 and 4.3

4.25 68.27

So answer is 4.2 to 1 d.p.

Question 16

(a)

$$10^{-9}$$

(b) No of calculations per second

$$= \frac{1}{5 \times 10^{-9}}$$

$$= 0.2 \times 10^9$$

$$= 2 \times 10^8$$

Question 17

(a)

$$1.9626315789$$

(b)

$$1.96$$

Question 18

	1	2	3	4
No. of dots	10	14	18	22

A constant first difference of 4 $\Rightarrow$ the general expression is

$$4n + k$$

where k is a constant. Inspection shows $k = 6$, so general term is

$$4n + 6$$

Question 19

Volume of the puck

$$= \pi(3.8)^2 \times 2.5cm^3$$

Mass of the puck

$$= \pi(3.8)^2 \times 2.5 \times 1.5$$
$$= 170g$$

Question 20

(a) Using Pythagoras

$$DG^2 = 6^2 + 10^2 = 136$$
$$DG = 11.7m$$

(b)

$$\cos x = \frac{8}{10}$$
$$x = 36.9^\circ$$

Question 21

$$6x - 2y = 33 \quad (1)$$
$$4x + 3y = 9 \quad (2)$$

(1) $\times 2$

$$12x - 4y = 66 \quad (3)$$

(2) $\times 3$

$$12x + 9y = 27 \quad (4)$$

(4) - (3)

$$13y = -39$$
$$y = -13$$

Into (2)

$$4x + 3(-13) = 9$$
$$4x = 48$$
$$x = 12$$

Question 22

$$\frac{133}{72} = 1.847$$

$$\frac{160}{82} = 1.951$$

since ratios are different, shapes are not similar

Question 23

(a) Complete 'first choice' by inserting 0.4 at the bottom

The 'second choice' will be the same top and bottom, each of which is also identical with the 'first choice', i.e. 0.6 and 0.4 respectively.

(b) Total playing time of the 5 CDs

$$= (30 \times 42) - (25 \times 42.8) = 190$$

So mean time of 5 CDs sold

$$= \frac{190}{5} = 38mins$$

Question 24

(a) After three years, value

$$= 12000(1 - 0.25)^3$$
$$= 12000(0.75)^3$$
$$= £5062.50$$

(b)

$$(1 - 0.2)^4 = (0.8)^4 = 0.4096$$

Paper 3 (Non-Calculator), 5 November 2004

Question 1

(a)

£88.20

(b)

$$\frac{27.30}{0.65} = 42$$

(c) Cheese

$$\frac{2}{5} \times 70 = 28g$$

Topping

$$\frac{3}{5} \times 70 = 42g$$

Question 2

$$2\% \times 60,000 + 1\% \times 20,000$$
$$= 1200 + 200$$
$$= £1400$$

Question 3

(a)

$$1 - \left(\frac{1}{2} + \frac{1}{6}\right)$$
$$= 1 - \left(\frac{3}{6} + \frac{1}{6}\right)$$
$$= 1 - \left(\frac{4}{6}\right)$$
$$= \frac{2}{6}$$
$$= \frac{1}{3}$$

(b)

$$12\frac{1}{2} \div \frac{5}{8}$$
$$= \frac{25}{2} \div \frac{5}{8}$$
$$= \frac{25}{2} \times \frac{8}{5}$$
$$= \frac{5}{1} \times \frac{4}{1}$$
$$= \frac{20}{1} = 20$$

Question 4

(i) Each side of tangram has length 8cm

So side of square A will be (by symmetry, with help of $\triangle$s B) 4cm

So area of A
$$= 4 \times 4 = 16cm^2$$

(ii) Area of B
$$= \frac{1}{2} \times 4 \times 4$$
$$= 8cm^2$$

(iii) Area of C = $\frac{1}{2}$ one side multiplied by corresponding height
$$= 4 \times 4 = 16cm^2$$

take side to be side that forms part of side of tangram, and the corresponding height will be 4 cm

Question 5

(a) (i)

$$3a + 4b - 2a - b$$
$$= a + 3b$$

(ii)

$$5x^2 + 2x - 3x^2 - x$$
$$= 2x^2 + x$$

(b) (i)

$$4(2x - 3)$$
$$8x - 12$$

(ii)

$$p(q - p^2)$$
$$pq - p^3$$

(c)

$$5(3p + 2) - 2(5p - 3)$$
$$15p + 10 - 10p + 6$$
$$5p + 16$$

Question 6

(i) Enlargement by a factor of 2 about the origin O

enlargement by 2 involves multiplying all the coordinates of vertices of P by 2

(ii) Treat the line x=1 as a mirror - the new vertices of P become

$$(0,1),\ \ (0.5,2),\ \ (0,3),\ \ (-0.5,2)$$

Question 7

(i) Bearing of B from P

$$= 360 - 138 = 222^\circ$$

(ii) Bearing of P from A

$$= 180 + 63 = 243^\circ$$

Question 8

The exterior angles sum to 360°
A single exterior angle of a hexagon will be

$$\frac{360}{6} = 60^\circ$$

Question 9

Bus			
Car			
Bike			
Walk			
Others			

with each column representing a maximum of 5, for example

Question 10

In one day he walks

$$\frac{18000}{3500}\ miles$$

In one year he walks

$$\frac{18000 \times 365}{3500}\ miles$$

$$\approx \frac{18000}{10} = 1800\ miles$$

Question 11

Favorite Snack	frequency	Angle
Burger	20	80°
Chips	45	180°
Hot Dog	10	40°
Kebab	15	60°
Total	90	

Question 12

(a)

$$2(3p+q)+p+q$$

$$6p+2q+p+q$$

$$7p+3q$$

(b)

$$\frac{1}{2}(180-x)$$

(c)

$$3p+q=11 \quad (5)$$

$$p+q=3 \quad (6)$$

(5) - (6)

$$2p=8$$

$$p=4$$

Inserting $p=4$ into (6)

$$4+q=3$$

$$q=-1$$

Question 13

(a) (i)

$$4\times10^7$$

(ii)

$$0.00003$$

(b) Using results from (a), expression becomes

$$3\times10^{-5}\times4\times10^7$$

$$=12\times10^2$$

$$=1.2\times10^3$$

Question 14

There are several ways of doing this. From the way the line is presented, I would assume that this the method they are suggesting

Choose a point O somewhere 'inside' the angle. Set the compasses to OA and draw a circle with compass point on O, such that it cuts the line at B. Join B and O and extend to circumference of circle at C. Join A and C and this will be the perpendular to A (because angle at A will be the angle subtended by diameter BC). You can then bisect this right angle - with compass point on O, draw two arcs intersecting OC and OB. With compass points on these intersections draw two more arcs intersecting each other. Draw a line connecting this latter intersection and O.

Could also use the following method, although you might not have too much space -

Construct a perpendicular to the given line. Easiest to construct a perpendicular bisector. Set compasses to a width greater than half the length of the line. With the point of compasses on ends of line in turn, construct arcs above and below line so that you have two sets of intersecting arcs. Connect these intersections to form the perpendicular bisector. Next, set compasses to length between A and point where bisector crosses the line, Use this distance to mark off a point C the same distance along the bisector (using compasses, with its point on aforementioned point where bisector crosses line). Connect C with A.

Question 15

Volume equals the area of the cross-section multiplied by length

$$\frac{1}{2} \times 3 \times 4 \times 7$$

$$= 42cm^2$$

Question 16

(a) (i)

$$\frac{x^6}{x^2} = x^4$$

(ii)

$$\left(y^4\right)^3 = y^{12}$$

(b)

$$(t+4)(t-2)$$

$$t^2 - 2t + 4t - 8$$

$$t^2 + 2t - 8$$

(c)

$$-2, -1, 0, 1, 2, 3$$

Question 17

(a)

$$D = ut + kt^2$$

$$D = (20)(1.2) + (-5)(1.2)^2$$

$$= 1.2(20 + (-5)(1.2))$$

$$= 1.2(20 - 6)$$

$$= 1.2(14)$$

$$= 16.8$$

(b)

$$ut = D - kt^2$$

$$u = \frac{D - kt^2}{t}$$

$$= \frac{50 - (-5)(5^2)}{5}$$

$$= \frac{175}{5}$$

$$= 35$$

could just insert numbers in straightaway and then rejig the resulting formula, although this would not be the most 'elegant' way to do it from a mathematical viewpoint

(c) as in (b)

$$u = \frac{D - kt^2}{t}$$

Question 18

(a)

$$25 < A \leq 35$$

(b)

$15 < A \leq 25$	44
$15 < A \leq 35$	100
$15 < A \leq 45$	134
$15 < A \leq 55$	153
$15 < A \leq 65$	160

(c) Draw cumulative frequency table, using information from (b)

(d) (i)

$$30$$

(ii)

$$24 - 41$$

(e) Draw a box stretching from 30 to 44. A vertical line within the box at 38 indicates the median. From both ends of the box project horizontal lines which terminates at a small vertical line at 24, to the left, and at a small vertical line at 54, to the right.

Question 19

(a) Draw the line $x = 2$: $x \geq 2$ will be the area to the right of this line

Draw the line $y = x$ (i.e. a straight line thru the origin at 45°): $y \geq x$ will be the area above this line.

Draw the line $y = -x + 6$ (i.e. crossing the y-axis at y=6 and with a negative gradient of 1: $y \leq -x + 6$ (i.e. $x + y \leq 6$) will be the area below this line.

Shade in area that satisfies all three inequalities above simultaneously - i.e. the area bounded by a triangle with vertices (2,2), (2,4) and (3,3).

(b)

$$(2,4),(2,3),(2,2),(3,3)$$

inequality signs here indicate that points on lines are actually included within the region R

Question 20

(a)

$$\angle BCA = 55^\circ$$

AC, being a diameter wii subtend a right angle at the circumference (at B), so $\angle BCA = 180 - 90 - 35$

(b) $\angle ABD = 55^\circ$, so

$$\angle DBC = 90 - 55 = 35^\circ$$

(c)

$$\angle BOA = 110^\circ$$

this is twice $\angle BCA$ (from (a)) which is the angle AB subtends at the circumference - and so the angle it subtends at center will be twice this

Paper 4 (Calculator), 9 November 2004

Question 1

(a)

$$475 \times 1.57$$

$$= 745.75 \; Euros$$

(b)

$$16\% \; of \; 650$$

$$= 0.16 \times 650$$

$$= 104$$

Question 2

(a)

$$x + 2x = 12$$

$$3x = 12$$

$$x = 4$$

(b)

$$2y - 1 = 13$$

$$2y = 14$$

$$y = 7$$

Question 3

angle adjacent to $138^\circ = 180 - 138 = 42^\circ$
so third unknown angle inside $\triangle$

$$= 180 - (65 + 42)$$

$$= 73^\circ$$

so

$$a = 360 - 73 = 287^\circ$$

Question 4

(a) Draw three more shapes centered on P so that you have four like shapes separated by 90 degrees from each other.

(b) Start off with the arrangement as in (a), then insert a few shapes in a 'reverse' manner' to fill the gaps, enough to show that the shape will tesselate

Question 5

(a) Draw in a horizontal line from 1230 to 1240. From 1240 to 1310 draw a straight line to horizontal axis (this second slope should be the mirror image of the initial slope)

(b) Draw a line from 30 on the vertical axis to 1300 on the horizontal axis.

(c) 19 miles

i.e. read off the distance of the point where the line for the passenger train crosses that of the goods train.

Question 6

3 kg of apples cost

$$\frac{3}{4} \times 3.36$$

$$= £2.52$$

2.5 kg of pears cost

$$4.12 - 2.52 = £1.60$$

1 kg of pears cost

$$\frac{1.60}{2.5} = £0.64 = 64p$$

Question 7

(a)

$$2$$

(b)

$$45 - 8 = 37$$

(c)

$$7$$

Question 8

(a)

$$8x + 8(x + 2)$$

$$= 8x + 8x + 16$$

$$= 16x + 16$$

$$= 16(x + 1)$$

(b) (i)

$$16(x+1) = 72$$

(ii)

$$16(x+1) = 72$$

$$x + 1 = 4.5$$

$$x = £3.50$$

so

a cup costs $£3.50$

a mug costs $3.50 + 2 = £5.50$

Question 9

(a) 12 cms corresponds to

$$12 \times 25000 = 300,000cm$$

$$= 3\ km$$

(b) Mark off an angle at A which has an angle of 64° between **North** and the line you are going to draw yourself. Use a set square and straight edge to reconstruct a new North line going through B. Draw another line which has an angle of 48° between North and the line you are going to draw to the 'left' of North (this will correspond to an angle of 312° measured clockwise from North). Mark off the intersection of the two lines you have drawn.

Question 10

No. of tiles required

$$= 16 \times 10 = 160$$

remember 50cm is half a meter

Cost

$$= 160 \times 4.19$$

$$= £670.40$$

Question 11

(a) Circumference

$$= \pi \times diameter$$

$$= \pi \times 12$$

$$= 37.6991....$$

$$= 37.7cm$$

(b) Area of each individual triangle

$$= \frac{1}{2} \times 10 \times 10$$

$$= 50cm^2$$

so area of square

$$= 50 \times 4 = 200cm^2$$

could always use Pythagoras on one of the 'half' triangles : $x^2 + x^2 = 20^2 \Rightarrow 2x^2 = 400 \Rightarrow x^2 = 200$. And since x^2 is the area of the square, the required area is 200 cm^2

Question 12

(a) as a fraction

$$\frac{108}{240}$$

convert to a percentage

$$\frac{108}{240} \times 100$$

$$= 45\%$$

(b)

$$40\%\ of\ 240 = 96$$

$$70\%\ of\ 200 = 140$$

so percentage of all students who went to party

$$\frac{236}{440} \times 100 = 53.\dot{6}\dot{3}$$

Question 13

(a) plot three points

(b) fairly good positive correlation

(c) draw line of best fit

(d)

$$\approx £1120$$

answers will vary slightly due to slight differences in your line of best fit

(e) $£1000$ corresponds to $\approx 2150cm^2$ If length is $48cm$, then width

$$\approx \frac{2150}{48} \approx 44.79166666...$$

$$\approx 45cm$$

cannot give a too accurate answer because area is only estimated in the first place

Question 14

(a) Value

$$= 8000\,(1.05)^3$$

$$= £9261$$

(b)

$$A$$

(c)

$$x(1.05) = 3885$$

$$x = \frac{3885}{1.05}$$

$$= £3700$$

You could always work out the compound interest the 'long' way, but I would recommend mastering this method

Question 15

(a) Average Speed

$$= \frac{200}{21.2}$$

$$= 9.433962264150943396226415094339 6 \; m/s$$

number of figures depends on your calculator

(b)

$$9.43 \; m/s$$

the input data has three significant figures, so answer should have a maximum of three significant figures

Question 16

x	$\mathbf{x^3 + 4x}$
4	80
5	145
4.5	109.125
4.3	96.707
4.4	102.784
4.35	99.512875

so

$$x = 4.4 \text{ to 1 dec place}$$

must calculate expression for 4.35 to see whether the answer is 4.3 or 4.4 to one decimal place

Question 17

(a)

$$4(2x + 1) = 2(3 - x)$$

$$8x + 4 = 6 - 2x$$

$$10x = 2$$

$$x = \frac{2}{10} = \frac{1}{5}$$

(b)

$$2p^2 - 4pq$$

$$2p(p - 2q)$$

(c)

$$x^2 + 7x + 6$$

$$(x + 1)(x + 6)$$

Question 18

(a)

$$\frac{30}{100} = 0.3$$

(b)

$$250 \times 0.7 = 175$$

Question 19

$$\tan x = \frac{5}{12.5} = 0.4$$

$$x = 21.8014....$$

$$= 21.8cm \text{ to 1 dec. place}$$

Question 20

Using Pythagoras

$$17^2 = 10^2 + CD^2$$

$$CD^2 = 17^2 - 10^2$$

$$= 189$$

$$CD = 13.7477.....$$

$$CD = 13.7 \text{ to 1 dec. pl.}$$

Question 21

$$y = \sqrt{\frac{r + t \sin x^\circ}{r - t \sin x^\circ}}$$

$$= \sqrt{\frac{8.8 + 7.2 \sin 40^\circ}{8.8 - 7.2 \sin 40^\circ}}$$

$$= 1.794065....$$

$$= 1.79 \text{ to 3 sig figs}$$

Question 22

$$\mathbf{L_1} : \mathrm{y} = 2\mathrm{x} + 3$$

This has a gradient of 2
so gradient of $\mathbf{L_2}$ is also 2, giving

$$y = 2x + c$$

At (3,2)

$$2 = 2(3) + c$$

$$2 = 6 + c$$

$$c = 2 - 6 = -4$$

so equation of $\mathbf{L_2}$ is

$$y = 2x - 4$$

Question 23

(a) No of videos watched by all 60 members

$$= 2.8 \times 60 = 168$$

No of videos watched by all boys

$$= 3.3 \times 40 = 132$$

No of videos watched by girls

$$= 168 - 132 = 36$$

So mean number watched by girls

$$= \frac{36}{20} = 1.8$$

(b) The lists must be of the same size

p and q are equal

Question 24

(a) Equating corresponding sides of similar triangles

$$\frac{CD}{10} = \frac{5}{4}$$

$$CD = \frac{50}{4}$$

$$= 12.5cm$$

(b)

$$\frac{ED + 4.8}{10} = \frac{4.8}{4}$$

$$ED + 4.8 = \frac{48}{4}$$

$$ED = 12 - 4.8$$

$$ED = 7.2cm$$