Centre Number	Candidate Number	Name
(Inte	CAMBRIDGE INTER	RNATIONAL EXAMINATIONS
MATHEMAT	CS	0580/01
Paper 1		0581/01
		May/June 2003
Candidates ans Additional Mater	wer on the Question Pap ials: Electronic calcula Geometrical instr Mathematical tab Tracing paper (o	per. ator ruments oles (optional) ptional)
READ THESE INST	RUCTIONS FIRST	
Write your Centre nu	mber, candidate numbe	er and name on all the work you hand in.
Write in dark blue or	black pen in the spaces	provided on the Question Paper.
Do not use staples, p	aper clips, highlighters,	glue or correction fluid.
If working is needed The number of marks The total of the mark Electronic calculators If the degree of accu to three significant fig For π , use either you	for any question it must is given in brackets [] is for this paper is 56. is should be used. racy is not specified in f gures. Give answers in o r calculator value or 3.1	 be shown below that question. at the end of each question or part question. the question, and if the answer is not exact, give the answer degrees to one decimal place. 42.
If you have been given a details. If any details are	label, look at the incorrect or ir correct details in	For Examiner's Use

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Examiner's Use4 Mahesh and Jayraj share \$72 in the ratio 7:5. How much does Mahesh receive? \$72 in the ratio 7 : 5 7 + 5 = 12 parts 1 part = 72 ÷ 12 = 6 42 Answer \$..... Mahesh receives 7 parts which is 7×6 [2] 5 The population of a city is 550 000. It is expected that this population will increase by 42% by the year 2008. Calculate the expected population in 2008. 42% of 550 000 =42÷+ 100 x 550 000 = 231 000 Expected population in 2008 = 550 000 + 231 000 781 000 = 781 000 Answer [2] 6 Areeg goes to a bank to change \$100 into riyals. The bank takes \$2.40 and then changes the rest of the money at a rate of 1 = 3.75 rivals. How much does Areeg receive in riyals? \$100 - \$2.40 = \$97.60 Since \$1 = 3.75 Rivals $$97.60 = 3.75 \times 97.60 = 366$ [2] Write down the value of $(1\frac{1}{2})^{-2}$ as a fraction. 7 $\left(\left|\frac{1}{2}\right|\right)^{-2} = 1/\left(\left|\frac{1}{2}\right|\right)^{2}$ $= 1/\left(\frac{3}{2}\right)^2$ $=1/(\frac{9}{4}) = \frac{4}{9}$ [2] v = 4uv - 3v. 8 **(a)** Find the value of y when u = -3 and v = 2. y = 4uv - 3v= 4 x (-3) x 2 - 3 x 2 = -24 - 6 = -30 Answer (a) y = -30[1] **(b)** Factorise 4uv - 3v. Answer (b) $(4\mu - 3)$ 4uv - 3v = v (4u - 3)[1]

3

For

9 Solve the equation

x + 4 = 3(2 - x). x + 4 = 3(2 - x) x + 4 = 6 - 3x x + 3x = 6 - 4 4x = 2 $x = \frac{1}{2} \text{ or } 0.5$

10 There are approximately 500 000 grains of wheat in a 2 kilogram bag.

(a) Calculate the mass of one grain in grams.

1 2. or 0.5

[3]

Answer x =

(b) Write your answer to part (a) in standard form.

$$0.004 = 4 \times 10^{-3}$$

Answer (b)
$$(4 \times 10^{-3})$$
 [1]

11 Solve the simultaneous equations

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a-2b = 5.
3a + 2b = 7
a - 2b = 5
Adding the equations,
3a + a + 2b - 2b = 7 + 5
4a = 12
a = 12/4
a = 3
Substituting a = 3 in 3a + 2b = 7,
3 \times 3 + 2b = 7
9 + 2b = 7
2b = -2
b = -1
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Answer $a = \frac{3}{b = \dots -1}$ [3]

3a+2b=7

12 The diagram shows a pole of length *l* centimetres.

-----*l* cm-----(a) Hassan says that l = 88.2. Round this to the nearest whole number. Answer (a) l =88[1] **(b)** In fact the pole has a length 86 cm, to the nearest centimetre. Complete the statement about *l*. Answer (b) $.85.5... \leq l < ...$ [2] On a journey a bus takes 35 minutes to travel the first 10 kilometres. 13 It then travels a further 20 kilometres in the next 40 minutes. The bus started the journey at 18 50. (a) At what time did it complete the journey? The journey ends 75 minutes later. 75 minutes is 1 hour 15 minutes 1 hour 15 minutes after 18 50 is 20 05 Answer (a). 20 05 [1] Calculate the average speed of the whole journey in **(b)** (i) kilometres/minute, Average speed = $(30 \div 75)$ km per minute =0.4 [2] (ii) kilometres/hour. $0.4 \times 60 = 24$ 24.....km/h Answer (b)(ii)..... [1] 14 Show **all your working** for the following calculations. The answers are given so it is only your working that will be given marks.

- (a) $\frac{1}{2} + \frac{2}{3} = 1\frac{1}{6}$, Answer (a) $\frac{1}{9} = \frac{3}{6}$ and $\frac{9}{3} = \frac{1}{6}$ $\frac{3}{6} + \frac{1}{6} = \frac{7}{6}$ $\frac{7}{6} = \frac{1}{6}$ (b) $1\frac{1}{5} \times 1\frac{3}{4} = 2\frac{1}{10}$. Answer (b) $1\frac{1}{5} = \frac{6}{5}$ and $1\frac{3}{4} = \frac{7}{4}$ $\frac{6}{5} \times \frac{7}{4} = (6 \times 7)/(5 \times 4)$ $= \frac{49}{20} = 9\frac{9}{20} = 9\frac{1}{10}$ [2]
- 15 The diagram shows a square of side 8 cm and four congruent triangles of height 7 cm.

7 cm

8 cm Calculate (a) Area = $\frac{1}{2}$ (base x height) (i) the area of one triangle, $= 0.5 \times 8 \times 7 = 28$ [2] (ii) the area of the whole shape. Area of the square = 8×8 Whole area = 4 × 28 + 8 × 8 =176 [2] **(b)** The shape is the net of a solid. Write down the special name for this solid.

Answer (b) Pyramid [1]

16 In the diagram AB is the diameter of a circle, centre O. The length of AB is 12 cm.





A straight road between P and Q is shown in the diagram. R is the point south of P and east of Q. PR = 8.3 km and QR = 4.8 km.

Calculate

the length of the road PQ, (a) $PQ^{2} = 4.8^{2} + 8.3^{2}$ = 91.93 $PQ = \ddot{O} 91.93$ = 9.59 [2] **(b)** the bearing of Q from P. Tan QPR = $4.8 \div 8.3$ 0.578313253 = Angle QPR 30.0° = Bearing of Q from ዋ 180 30 + = 210° 210° = [3] Answer (b)

17

[1]

[1]

[1]

В

8.3 cm

SCALE 5.5 cm 120 35 16.6 cm D CIn the diagram the lines *AB* and *CD* are parallel. The lines AD and BC intersect at X. Angle $XDC = 35^{\circ}$ and angle $CXD = 120^{\circ}$. (a) (i) Write down the size of angle *BAX*. Answer(a)(i) Angle $BAX = \dots 35^{\circ}$ (ii) Write down the size of angle *ABX*. Answer(a)(ii) Angle $ABX = \dots 25^{\circ}$ (b) Complete the statement Similar

Triangle AXB is to triangle *DXC*. (c) AB = 8.3 cm, BX = 5.5 cm and CD = 16.6 cm.Calculate the length of *CX*. CX/BX

For similar triangles CD/AB = 16.6/8.3 = CX/5.5 $CX = (16.6 \times 5.5)/8.3$ СХ = ((

Answer (*c*)cm [2]

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Summary of Comments on IGCSE Mathematics Paper 1 June 2003

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- Q1(a) It is better to work out $7.1^3 + 2.9^3$ first on the calculator but leave the answer on the calculator. Then do \sqrt{ANS} = Beware of working out ($\sqrt{7.1^3}$) + 2.9³
- Q1(b) Cut off after the second figure from the decimal point. (If the third figure is 5 or above increase the second figure by 1) Do not confuse with 2 significant figures, which would be 20.
- Q2(a) The answer could be observed from the diagram or done as a calculation with directed numbers as shown.
- Q2(b) Using the calculator and set –2.5, add 1.6. Be careful to add rather than subtract.
- Q3(a) Alternatively all could be changed into decimals or percentages but they need to be in the same form to compare. The original forms should be in the answer space.
- Q3(b) Make sure that the fraction is fully cancelled and not just to $\frac{34}{50}$.

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- Q4 To divide an amount in a given ratio always add the numbers in the ratio and divide into the total amount. Be careful not to do the common error of working out 72 ÷ 7 or even 72 ÷ 5.
- Q5 Alternatively an increase of 42% means the new population will be 142% of the original. Finding $142 \div 100 \times 550\ 000$ will lead directly to the correct answer.
- Q6 Remember to subtract the \$2.40 first. Then take care not to divide instead of multiply by 3.75. Check if the answer is sensible. Should the amount in riyals be more or less than the dollars?

- Q7 The rule is $x^{-n} = 1/x^n$. Using the calculator sequence $[1.5][y^x][+/-][2][=]$ gives 0.44444..., which would earn 1 mark but still needs changing into a fraction.
- Q8(a) Show the calculation before working out on the calculator. Careful use of the calculator will eliminate the problem of handling negative quantities. [4][×][+/–][3][×][2][–][3][×][2][=]
- Q8(b) Look for the common factor, *v*, and put it outside the bracket. Check the factorising by expanding the answer to get back to the original expression.

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Q9 Expand the bracket, then add 3x to both sides and subtract 4 from both sides. Finally divide by 4. Take care not to follow 4x = 2 by x = 2. Q10(a) 1 kg = 1000 g. Take care to divide by 500 000 and not do 500 $000 \div 2000(\text{or } 2)$. Division can result in answers that are less than 1. Q10(b) Standard form is $a \times 10^{n}$. 'a' is always from 1 to any value less than 10. 'n' is a whole number, positive for large values (greater than 10) and negative for small values (less than 1). Q11 Alternatively multiply the second equation by 3 and subtract to eliminate 'a'. Check the answers by substituting them into the other equation to see if they give the correct value. a - 2b = 5 gives $3 - 2 \times (-1) = 3 + 2 = 5$

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- Q12(a) As it is a whole number asked for do not write 88.0 as this would indicate rounding to 1 decimal place.
- Q12(b) Do not be tempted to put the upper limit as 86.4 or 86.49 or even 86.49999... The < rather than \leq sign allows the upper limit to be the halfway value without the confusion of rounding up.

- Q13(a) In a 24-hour clock time do not include the words hours or minutes. It can be written as 8.05pm but why do extra work which is easy to get wrong?
- Q13(b) Average speed = **Total** distance ÷ **Total** time

Usually part (i) leads onto part (ii) but alternatively part (ii) could be done by working out $30 \div 1.25$ A very common error is to think that there are 100 minutes in 1 hour!

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- Q14(a) To add fractions they must have a common denominator. Then just add the numerators. Very clear step-by-step working is essential when the answer is given.
- Q14(b) Multiplying of fractions can only be done with the mixed number written as an improper fraction. Then multiply the numerators and multiply the denominators. Change back to a mixed number and cancel if necessary.
- The half is often missed out in the area of the triangle formula. Q15(a)(i) A square has equal sides, so the area is the side multiplied by (ii) itself. (Not the side multiplied by 4 which gives the perimeter).
- Q15(b) Square-based pyramid is correct but only 1 mark so pyramid is adequate.

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- Q16(a) Angle in a semicircle is a right angle. Drawings are usually not to scale if calculations are asked for. In those cases do not measure any angles; they will be wrong. This triangle may look close to isosceles but do not be deceived.
- Q16(b) Make sure your calculator is set in degree mode, not rads or grads.

Trig ratios must be learned, they are not given.

Q16(c) Remember to halve the diameter to find the radius, which is essential for area. If the accuracy is not specified give three significant figures. More will not be penalised but less may well be.

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- Q17(a) Use Pythagoras to find the longest side so square and add. Keep the value from squaring and adding in the calculator for finding the square root.
- Q17(b) Bearings are measured from the north in a clockwise direction. Hence Q from P must be 180° added to angle QPR.
 QPR can be calculated using sine or cosine once PQ is known but safer to use the values given rather than the one worked in part (a).

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- Q18(a)(i) Alternate angles (angles enclosed in a letter z) are equal (ii) 180 – (120 + 35) from angles sum of triangle and angle AXB = 120° (opposite angles)
- Q18(b) Triangles the same shape (equal angles) but different size are similar.Do not confuse with congruent which is identical in shape and size.
- Q18(c) This can also be done by the sine rule for triangles without right angles but that is not in the core level syllabus.