OCR
Oxford Cambridge and RSA

Cambridge **TECHNICALS LEVEL 3**

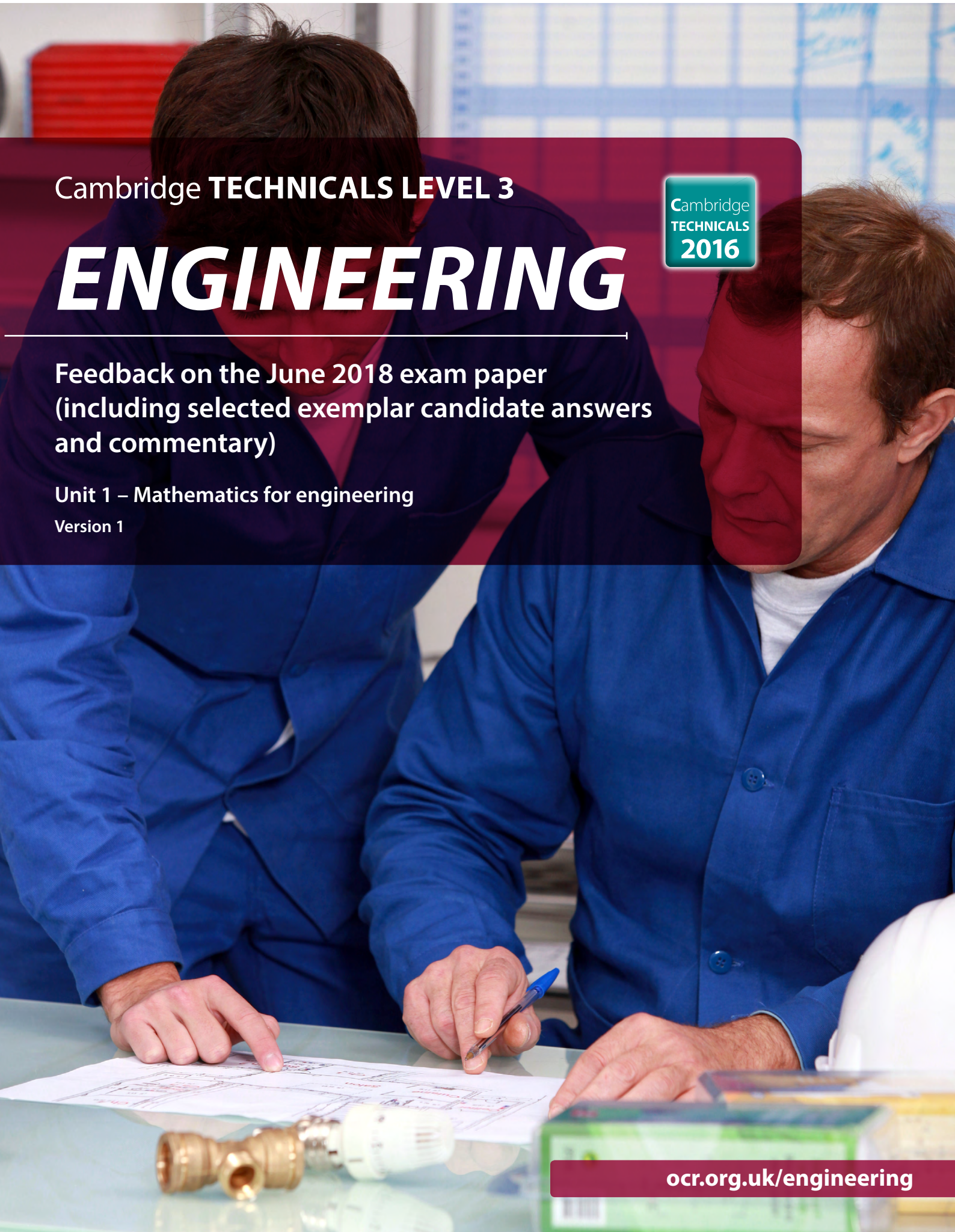
ENGINEERING

Cambridge TECHNICALS 2016

Feedback on the June 2018 exam paper (including selected exemplar candidate answers and commentary)

Unit 1 – Mathematics for engineering

Version 1



ocr.org.uk/engineering

CONTENTS

INTRODUCTION

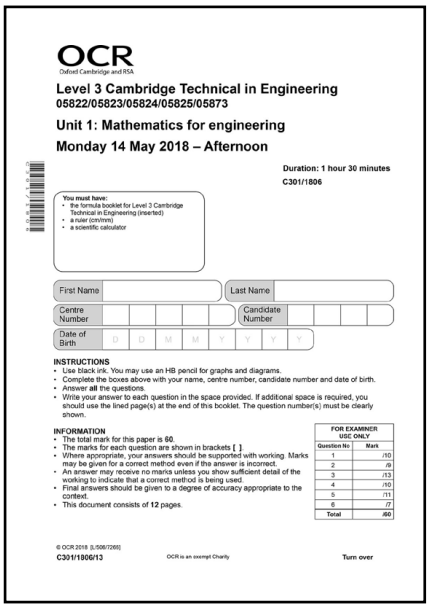
This resource brings together the questions from the June 2018 examined unit (Unit 1), the marking guidance, the examiners comments and the exemplar answers into one place for easy reference.

We have also included exemplar candidate answers with commentary for questions 4(a)(i), 5(a)(i), 5(a)(ii), 6(i) and 6(ii).

The marking guidance and the examiner's comments are taken from the Report to Centre for this question paper.

The Question Paper, Mark Scheme and the Report to Centre are available from:

https://interchange.ocr.org.uk/Modules/PastPapers/Pages/PastPapers.aspx?menuindex=97&menuid=250



OCR
Oxford Cambridge and RSA

Level 3 Cambridge Technical in Engineering
05822/05823/05824/05825/05873

Unit 1: Mathematics for engineering
Monday 14 May 2018 – Afternoon

Duration: 1 hour 30 minutes
C301/1806

You must have:
- the formula booklet for Level 3 Cambridge Technical in Engineering (inserted)
- a ruler (cm/mm)
- a scientific calculator

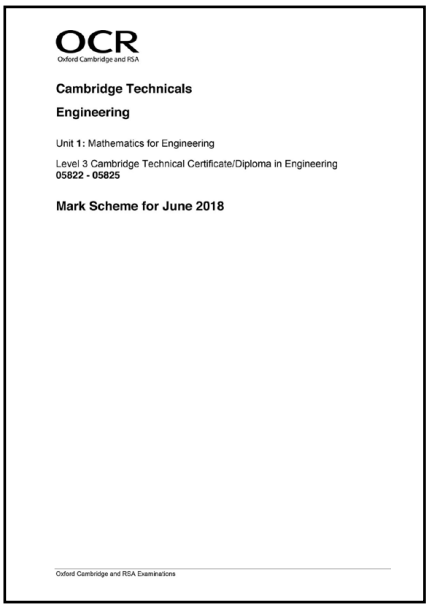
First Name | Last Name
Centre Number | Candidate Number
Date of Birth D D M M Y Y Y Y

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number, candidate number and date of birth.
- Answer **all** the questions.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION
- The total mark for this paper is **60**.
- The marks for each question are shown in brackets **[ ]**
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- An answer may receive no marks unless you show sufficient detail of the working to indicate that a correct method is being used.
- Final answers should be given to a degree of accuracy appropriate to the context.
- This document consists of **12** pages.

FOR EXAMINER USE ONLY	
Question No	Mark
1	/10
2	/9
3	/13
4	/10
5	/11
6	/7
Total	/60

C301/1806/13 OCR is an exempt Charity **Turn over**



OCR
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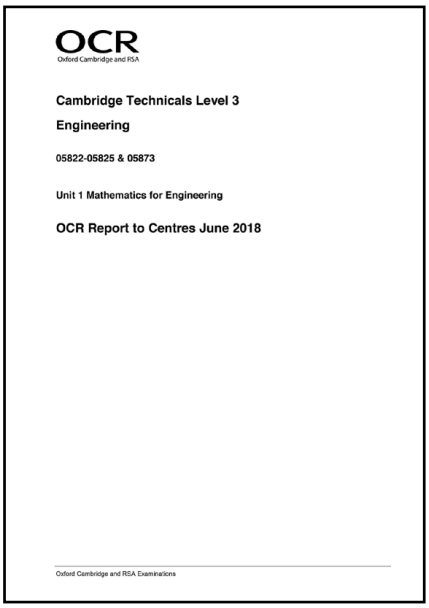
Cambridge Technicals
Engineering

Unit 1: Mathematics for Engineering

Level 3 Cambridge Technical Certificate/Diploma in Engineering
05822 - 05825

Mark Scheme for June 2018

Oxford Cambridge and RSA Examinations



OCR
Oxford Cambridge and RSA

Cambridge Technicals Level 3
Engineering

05822-05825 & 05873

Unit 1 Mathematics for Engineering

OCR Report to Centres June 2018

Oxford Cambridge and RSA Examinations

GENERAL EXAMINER COMMENTS ON THE PAPER

Significant figures

As in previous series, there are a number of answers that are not exact and so an approximate answer is necessary. In such cases, unless the demand states otherwise, 3 significant figures is expected. Usually more than this is acceptable but often fewer significant figures will be penalised. Furthermore, it might be that the answer to one part, given to 3 significant figures, is required for a subsequent part. In such cases the loss of accuracy from the first part will render the answer to the next part out of the tolerance that would normally be allowed. In this series the only place where this occurred was in Question 2(c). An answer of 59 m would be penalised in (i)because of the rounding to 2 significant figures but the accuracy mark in (ii) was given as an "error carried forward" if the answer was half of the answer given in (i).

However, potential engineers should be aware that many calculations will yield a numeric answer that, for the given context, is "good enough" but is not accurate and that they should understand the meaning of the word "exact". An answer which is exact is not an approximation while any number that is rounded or truncated is an approximation and not exact.

Show that

This examination process is usually used when the answer is required in a later part – by giving the answer, the later part can be done using a correct value instead of a possibly incorrect value that the candidate found in the earlier part. However, if steps leading to the final answer are not shown then the candidate has not demonstrated the correct process – the final line showing the correct answer could simply be the candidate writing down what they have been told. In this series this only occurred in Question 5(b)(ii).

To write $\frac{dy}{dx} = 2\cos\frac{\pi}{6} - 2\sin\frac{\pi}{6} = 0$ in this case is not good enough.

Other points

Candidates should be encouraged to write clearly. Some scripts contained text and working that was difficult to read or understand.

When the extra page is used it must be indicated in the appropriate question in the script. If an additional sheet is used it must contain the candidate's name and question number(s) and referenced in the scripts.

As in January, while candidates generally performed to expectation, there seem to be a number of gaps in their knowledge.

It is hoped that the following points may help centres to prepare future cohorts of candidates for this unit.

Resources which might help address the examiner comments:

From the link below, you'll find 'The OCR guide to examinations' (along with many other skills guides)
http://www.ocr.org.uk/i-want-to/skills-guides/

Command verbs definitions
http://www.ocr.org.uk/Images/273311-command-verbs-definitions.pdf

Question 1

Answer **all** the questions.

1 (a) Collect like terms and factorise the expression $3x + y - x + 5y$.

$2x + 6y$
$= 2(x + 3y)$

[2]

(b) Write as a single fraction.

$$\frac{2x-1}{2} + \frac{1-x}{5}$$

$$\Rightarrow \frac{5(2x-1) + 2(1-x)}{10}$$

$$= \frac{8x-3}{10}$$

[3]

(c) Solve the following equation.

$$\frac{x-3}{2} - \frac{1}{3} = 1 - x$$

$3(x - 3) - 2 = 6 - 6x$
$\Rightarrow 9x = 17$
$\Rightarrow x = \frac{17}{9}$ (= 1.88 .....)

[3]

(d) A formula for the velocity of a car, v, is given by $v = at^2$.

Rearrange this formula so that t is the subject.

$v = at^2 \Rightarrow t^2 = \frac{v}{a} \Rightarrow t = \sqrt{\frac{v}{a}}$

[2]

Mark scheme guidance

Question 1(a):

B1 Allow ecf.

Question 1(b):

B1 Sight of 10 as common denominator.

B1 $8x$ In a single fraction.

B1 -3 in a single fraction.

Question 1(c):

B1 Multiply out by a multiple of 6 or by 2 and by 3 in separate steps.

M1 Collect terms.

A1 Recurring decimal can be rounded to 1.89.

N.B. If ans incorrect then sight of $\frac{3x - 11}{6}$ earns B1, followed possibly M1.

Question 1(d):

B1 Make t^2 the subject.

B1 Allow ecf.

SC: $t = \sqrt{\frac{v}{a}}$ **B1**.

Examiner comments

Part (a) was generally well done.

Part (b) was also reasonably well done; errors often occurred in the numerator.

Part (c) proved to be beyond most candidates. The general process "multiply throughout by a common denominator to clear fractions, then expand brackets and collect like terms" gave rise to many quite basic errors. A typical example was to multiply by 2 but failing to multiply throughout, yielding steps such as:

$(x - 3) - \frac{1}{3} = 2 - 2x$

It was rare to see candidates multiply correctly by 6; most multiplied by 2 and continuing to work with fractions.

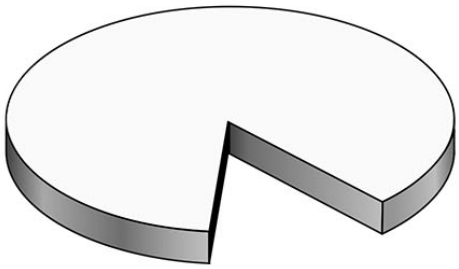
In part (d) a common misunderstanding seen was that at^2 was taken to be $(at)^2$.

Questions 2(a) and (b)

2 (a) Write down the exact value of $2\sin 60°$.

$\sqrt{3}$ ..... **[1]**

(b) A cylindrical metal plate of radius 10 cm and height 1.5 cm has a sector with angle 60° cut from it.



Calculate the volume of the metal plate remaining.

Volume remaining $= \pi r^2 h. \quad \frac{300}{360} = \pi \times 150 \times \frac{5}{6}$

$= \frac{750\pi}{6} = 125\pi \approx 392.7\ (\text{cm}^3)$

..... **[3]**

Mark scheme guidance

Question 2(a):

B1 Isw.

Question 2(b):

M1 Soi volume of cylinder.

M1 Soi volume of sector.

A1 Accept answer as 125π.

A1 Accept 393.

If answer is given in different units then the units must be given.

Examiner comments

In part (a), candidates failed to appreciate what the word "exact" means. Part of the specification states that candidates should know the exact value of sin 60. The use of the calculator to give an approximate value for $\sqrt{3} \approx 1.732...$ was not therefore the correct response required.

Able candidates multiplied the volume of the plate by $\frac{5}{6}$ to give the correct answer.

Others found the volume of the sector and subtracted it from the volume for the whole plate, thus requiring three calculations. A rather odd but very common error was to find the volume of the whole plate correctly but then, in finding the volume of the sector, failing to multiply by the height.

Question 2(c)

(c) An engineer needs to calculate the height of a tower, as represented by the line BT in Fig.1.

He walks away from the foot of the tower, B, on horizontal ground to a point A. From A he measures the angle of elevation to the top of the tower, T, to be 20°.

He then walks 30 metres directly towards the tower to a point C where he measures the angle of elevation to the top of the tower to be 30° as shown in Fig. 1.

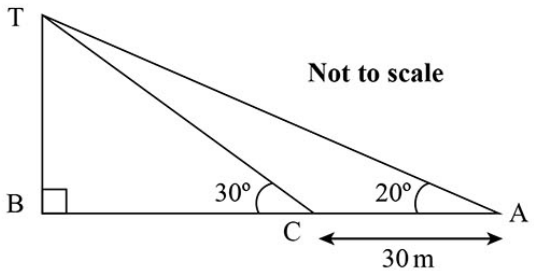


Fig. 1

(i) Using the sine rule in triangle ACT, calculate the length CT.

10

$$\frac{CT}{\sin 20} = \frac{AC}{\sin \textit{their}\ 10}$$

$$\Rightarrow CT = 30\ \frac{\sin 20}{(\text{m})\ \sin 10} \approx 59.09$$

..... [3]

(ii) Hence find the height of the tower BT.

$$\frac{TB}{TC} = \sin 30 \Rightarrow TB = 29.5\text{m}$$

..... [2]

Mark scheme guidance

Question 2(c)(i):

B1 Angle CTA = 10 (may be seen on diagram).

M1 Sine rule.

A1 Accept 59.1

Question 2(c)(ii):

M1 Correct ratio with 30.

A1 Ft *their* CT giving this answer as half of (i).

Examiner comments

Part (c) required the sine formula, necessitating finding the angle at T to be 10°. Finding CT was usually quite straightforward, though some found the length of the wrong side (i.e. TA).

The answer to part (ii) should have been exactly half the answer given in (i), and if this was the case then full marks were awarded, even if wrong, as error would be carried forward.

Question 3

3 (a) You are given the equation $\log_{10} x + \log_{10}(6 - x) = \log_{10} 5$.

By first expressing the left hand side as a single logarithm, solve the equation.

$\Rightarrow \log_{10} x(6 - x) = \log_{10} 5$
$\Rightarrow 6x - x^2 = 5$
$\Rightarrow x^2 - 6x + 5 \ (= 0)$
$\Rightarrow x = 1, 5$

[4]

(b) Abbie bought 4 sockets and 5 plugs. The cost was £18.50.
Renu bought 6 sockets and 2 plugs. The cost was £22.80.

Let s pence be the cost of a socket and p pence the cost of a plug.

(i) Write down two simultaneous equations in s and p.

$4s + 5p = 1850$
$6s + 2p = 2280$

[2]

(ii) Hence find the cost of a socket and a plug.

$4s + 5p = 1850$ (i)
$6s + 2p = 2280$ (ii)
(i) × 3: $12s + 15p = 5550$
(ii) × 2: $12s + 4p = 4560$
$\Rightarrow \quad 11p = 990 \Rightarrow p = 90$
$\Rightarrow 6s + 180 = 2280 \Rightarrow s = 350$

[4]

(c) Solve the equation $x^2 + 3x - 6 = 0$, giving the roots correct to 3 decimal places.
Show all your working.

$\Rightarrow x = \dfrac{-3 \pm \sqrt{9 + 24}}{2} = \dfrac{-3 \pm \sqrt{33}}{2}$
$= 1.372, -4.372$

[3]

Mark scheme guidance

Question 3(a):

B1 Sight of $x(6 - x)$

M1 Removing logs to form a quadratic.

A1 Correct quadratic (can be seen in factorised form).

Both

A1 S.C $x = 1, 5$ with no working B4.

Question 3(b)(i):

B1 Allow consistent use of pounds..

Question 3(b)(ii):

M1 Attempt at elimination method.

A1 2 correct equations.

A1 For one.

A1 For the other one.

Accept 0.9 or 3.5 or 0.90 and 3.50.

Alt: Substitution M1 making one variable the subject for one and substituting in the other.

A1 Correct eqn.

Question 3(c):

M1 Correct formula.

A1 Soi $\sqrt{33}$

Examiner comments

Part (a) was the least well answered question in the paper. Candidates seemed to be unaware of the basic logarithm rules and made no progress in spite of the lead given to write the left hand side as a single logarithm.

Part (b) was well answered with many candidates obtaining all 6 marks for parts (i) and (ii). It was good to see many candidates interpreting their answer correctly – i.e. the cost of a plug is 90p and the cost of a socket is £3.50.

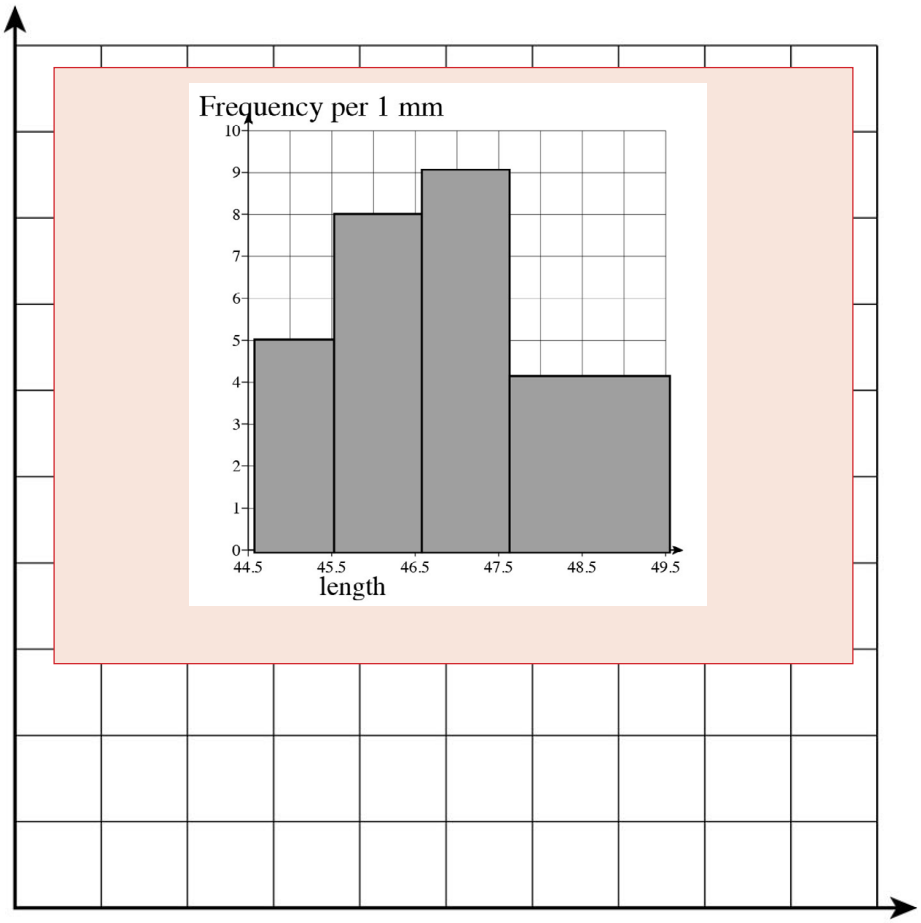
Part (c) was a quadratic equation which did not factorise. Most candidates were able to use the formula correctly to obtain the correct two roots. This was a case where the "norm" of three significant figures was change to three decimal places. Consequently, although three significant figures are allowed, some candidates lost the final mark by giving an even more approximate answer.

Question 4(a)(i)

4 (a) Components are produced on a machine in a factory. The length of each component needs to be in the range 45 mm to 55 mm.
In one period of a day all components produced are measured.
Their lengths, l mm, are summarised in the table below.

Length, l mm	$44.5 < l \leqslant 45.5$	$45.5 < l \leqslant 46.5$	$46.5 < l \leqslant 47.5$	$47.5 < l \leqslant 49.5$
Frequency	5	8	9	8

(i) On the grid below draw a histogram to display the data. Label the axes clearly.



[4]

Mark scheme guidance

B1 Vertical axis is a frequency density (may be implied by height of 4 for 4th bar).

B1 Horizontal axis is length.

B1 First three bars.

B1 Last bar double width and half the height.

Examiner comments

Responses to part (a) indicated clearly that most candidates had no understanding of histograms and how they differed from bar charts. In this question the data were continuous and the sizes of the groups were different, meaning that a bar chart was inappropriate. The vertical scale was therefore frequency density and the height of the last bar was half the height indicated by the frequency.

A further error caused by candidates being more familiar with bar charts is that in a histogram the horizontal scale is linear. So putting a label $44.5 < l \leq 45.5$ under the first "bar" is incorrect.

Exemplar Candidate Work

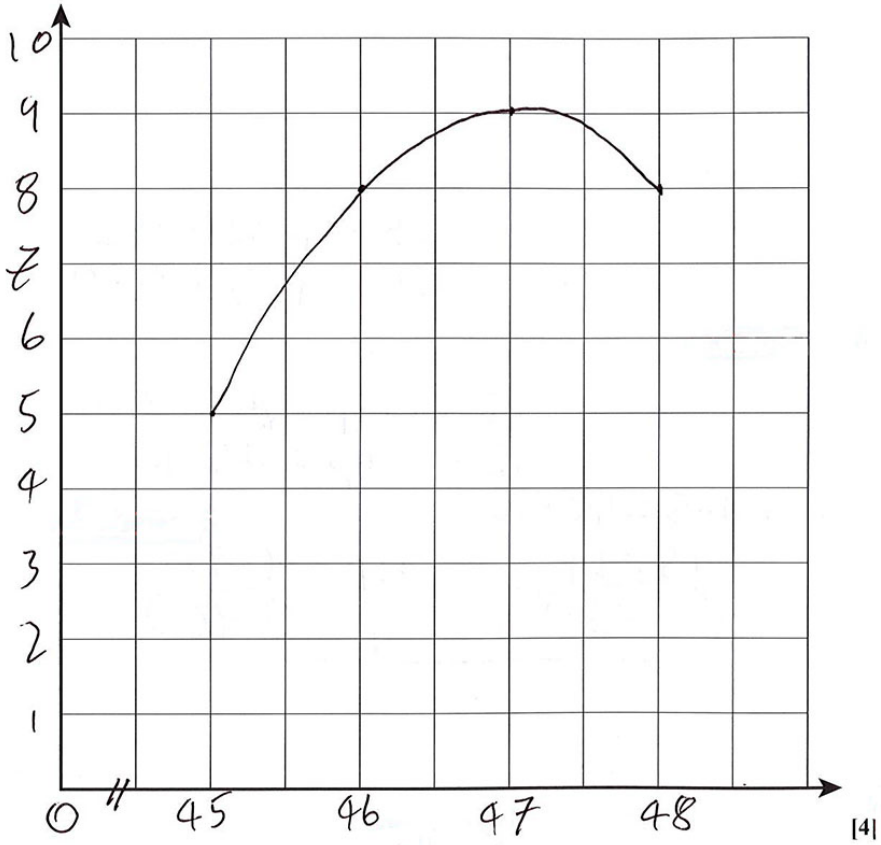
Question 4(a)(i) – Low level answer

4 (a) Components are produced on a machine in a factory. The length of each component needs to be in the range 45 mm to 55 mm.
In one period of a day all components produced are measured.
Their lengths, l mm, are summarised in the table below.

Length, l mm	44.5 < l ⩽ 45.5	45.5 < l ⩽ 46.5	46.5 < l ⩽ 47.5	47.5 < l ⩽ 49.5
Frequency	5	8	9	8

45 46 47 48 30

(i) On the grid below draw a histogram to display the data. Label the axes clearly.



[4]

Commentary

This candidate was fortunate to earn 1 mark as the mark for the scale on the horizontal axis was not linked to a histogram. The candidate does not understand what a histogram is. Marks could have been earned if there had been some understanding demonstrated.

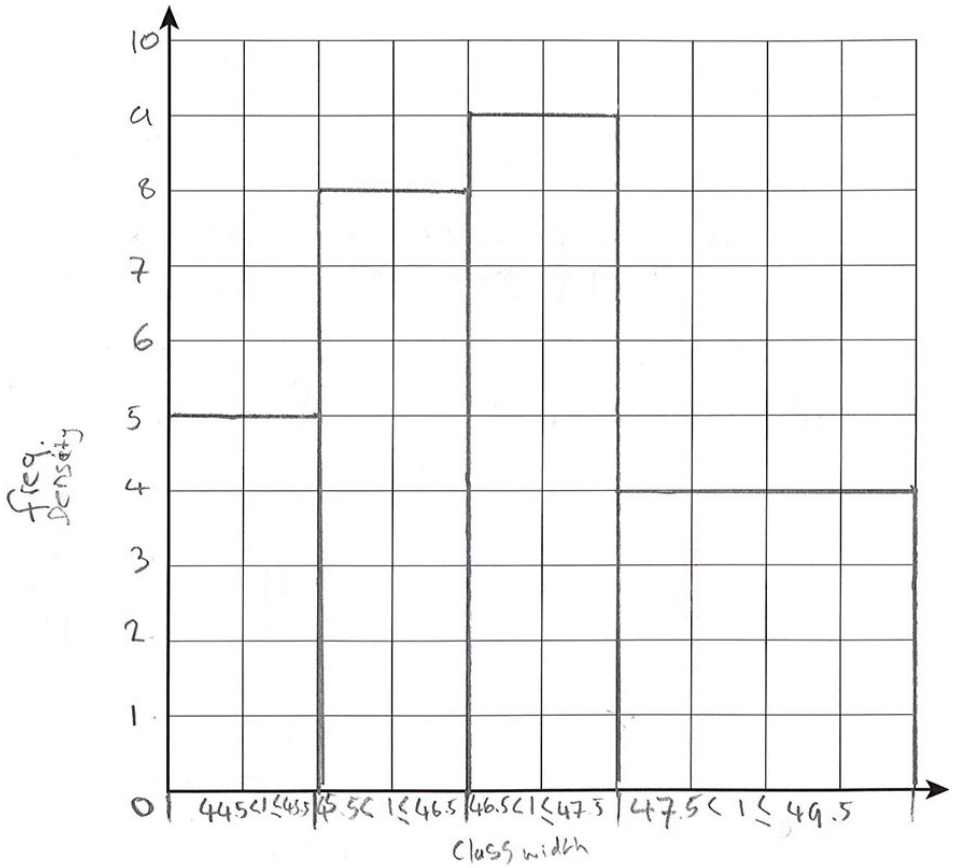
Exemplar Candidate Work

Question 4(a)(i) – High level answer

4 (a) Components are produced on a machine in a factory. The length of each component needs to be in the range 45 mm to 55 mm.
In one period of a day all components produced are measured.
Their lengths, l mm, are summarised in the table below.

Length, l mm	$44.5 < l \leqslant 45.5$	$45.5 < l \leqslant 46.5$	$46.5 < l \leqslant 47.5$	$47.5 < l \leqslant 49.5$
Frequency	5	8	9	8
class width	1	1	1	2
freq density	5	8	9	4

(i) On the grid below draw a histogram to display the data. Label the axes clearly.



[4]

Commentary

This candidate clearly had some understanding of histograms. The vertical axis is a frequency density and the width of the bars are proportional to the width of each range. This means that it is the area of each bar that relates to the number in each group and so the candidate has correctly drawn the height of the last bar to be half the frequency.

One mark however has been lost as the distribution is continuous and so the horizontal axis should be a linear scale. In this respect the candidate has confused a histogram with a bar chart.

Questions 4(a)(ii), (iii) and (b)

(ii) Find an estimate for the mean length of these components.

$((5 \times 45 + 8 \times 46 + 9 \times 47 + 8 \times 48.5) \div 30)$
$(= 1404 \div 30)$
$= 46.8$

..... **[3]**

The manager decides that all lengths are in the lower part of the acceptable range and so adjusts the machine so that every component will be exactly 2 mm longer.

(iii) State, if any, what effect this would have on the value of the standard deviation (SD).

The standard deviation will not change. **[1]**

(b) Aaron has a fair 8-sided die with faces numbered 1, 2, 3, 4, 5, 6, 7, 8. When he rolls it, it lands on one face, the number of which he notes.

He rolls it twice. Find the probability that the die lands on the face numbered 2 both times.

$P(2) = \left(\frac{1}{8}\right)^2 = \frac{1}{64} (= 0.0156....)$

..... **[2]**

Mark scheme guidance

Question 4(a)(ii):

M1 Taking midintervals of 1st 3 soi.

M1 Multiply values by frequency and divide by *their* 30 soi.

Question 4(b):

M1 Square a fraction: soi.

A1 Accept 3 sf.

Examiner comments

Given that candidates are allowed scientific calculators, it was expected that the mean length in (ii) would be done on their calculators and full marks were awarded for a correct answer with no working.

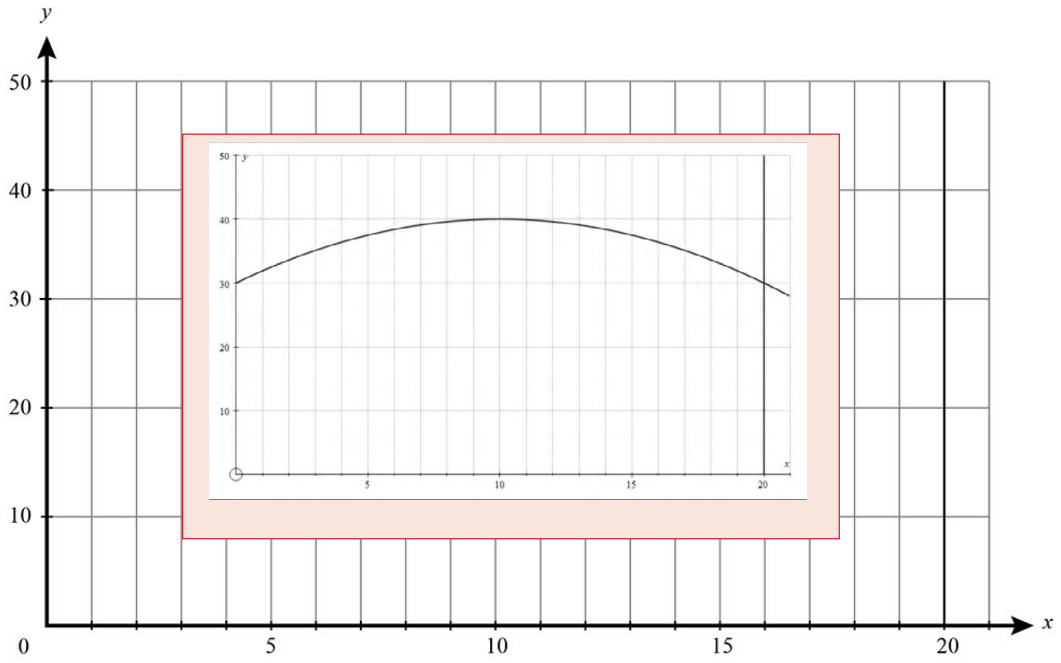
In part (iii) no calculations were required, but simply a requirement to understand what standard deviation represents. The responses "more", "less" and "the same" occurred equally.

In part (b), candidates were expected to realise that the rolls of the die would be independent of other rolls meant that the answer for one roll ($\frac{1}{8}$) had to be squared for the two (independent) events.

Question 5(a)

5 (a) (i) On the grid below is drawn the line $x = 20$.

On the same grid sketch the curve $y = 30 + 2x - \frac{1}{10}x^2$ for $0 \leqslant x \leqslant 20$.



[3]

(ii) The shape enclosed by the curve and the lines $x = 0$, $y = 0$ and $x = 20$ is a plan view of a swimming pool which is full of water. The units are metres.

Find by integration the surface area of the water in the pool.

$$A = \int_0^{20}\left(30 + 2x - \frac{1}{10}x^2\right)dx = \left[30x + x^2 - \frac{1}{30}x^3\right]_0^{20}$$

$$= \left(600 + 400 - \frac{800}{3}\right) - 0 = 733.3\,\text{m}^2$$

.....

.....

.....

.....

.....

.....

.....

.....

[3]

Mark scheme guidance

Question 5(a)(i):

B1 Curve with a single maximum within range.

B1 Through (0,30) and (20, 30).

B1 Through (10, 40).

Question 5(a)(ii):

M1 Integrate, seen by all 3 powers increased by 1 and one term correct.

Ignore limits.

M1 Use correct limits in their integration attempt by substituting and subtracting in the correct order.

A1 Awrt 733.

Examiner comments

The sketching of the curve in part (a)(i) was usually well done, though it was evident that most candidates actually plotted the curve.

In part (ii) integration was either well done or omitted.

Exemplar Candidate Work

Question 5(a)(i) – High level answer

5 (a) (i) On the grid below is drawn the line $x = 20$.

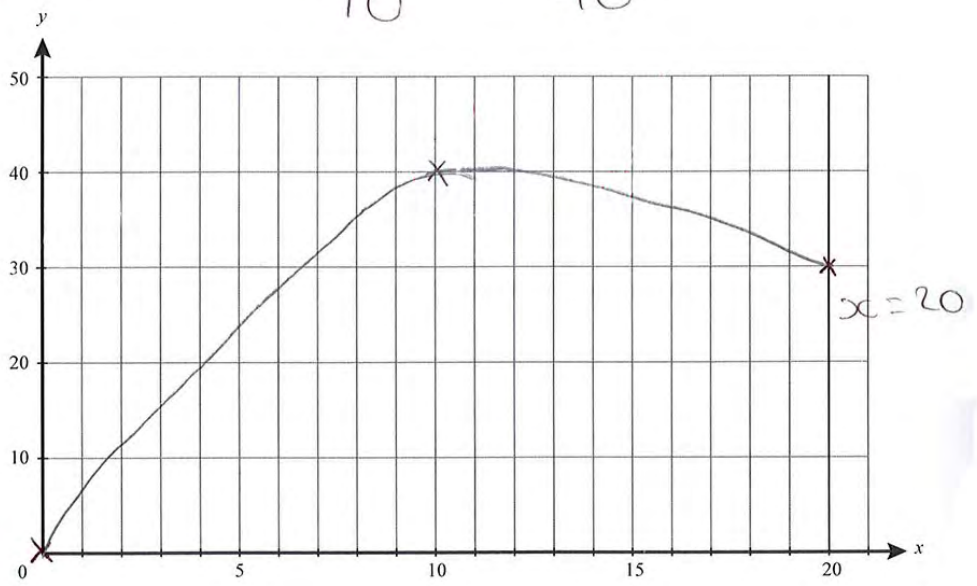
On the same grid sketch the curve $y = 30 + 2x - \frac{1}{10}x^2$ for $0 \leqslant x \leqslant 20$.

$30+20-\frac{1}{10}10^2(10)30+0-\frac{1}{10}0^2$ (0)

$30+40-\frac{1}{10}20^2$ (20)

$30+20-10$

$70-40$



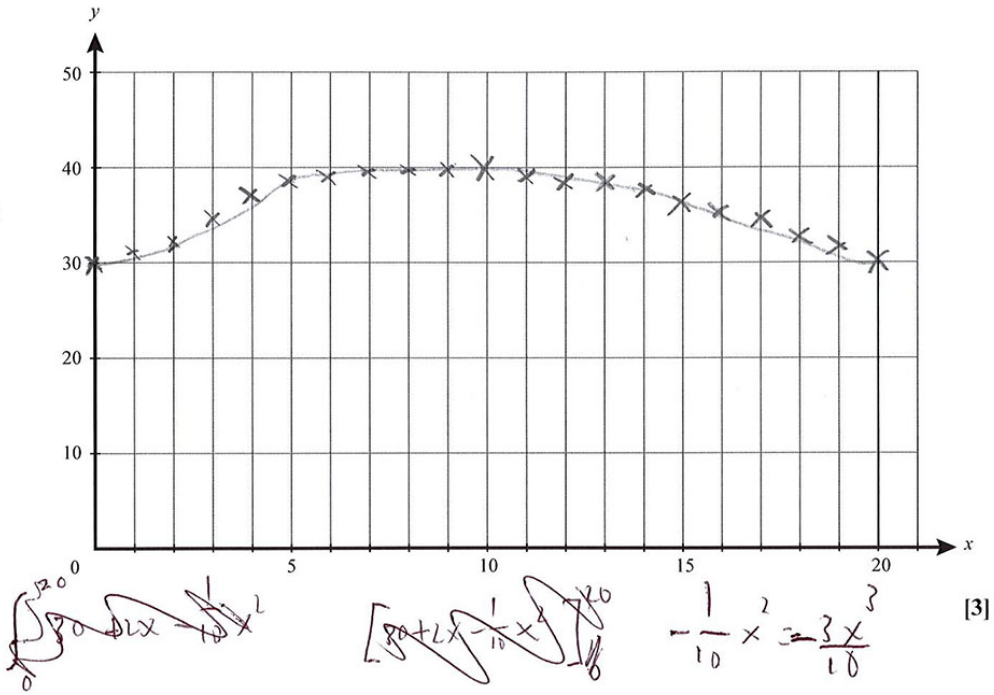
[3]

Commentary

This candidate lost a mark because the graph should go through (0, 30) and not (0, 0). The working above the grid is not well organised and although the "30" of the calculation when x = 0 can be clearly seen, the candidate obviously missed it and gave the value as 0 instead of 0 + 30 = 30. There are two factors to this misreading of his own work. (i) a more methodical way to set out the calculations is advised and (ii) the candidate should have been aware that this was a quadratic function and therefore symmetrical in the line x = 10.

Exemplar Candidate Work

Question 5(a)(ii) – High level answer



[3]

(ii) The shape enclosed by the curve and the lines $x = 0$, $y = 0$ and $x = 20$ is a plan view of a swimming pool which is full of water. The units are metres.

Find by integration the surface area of the water in the pool.

[3]

$= +1400 m^3$

Commentary

The candidate clearly has an understanding of what was required and as a result gained both the method marks. The candidate however was not consistent with his integration; two of the terms have been integrated correctly but the first is incorrect as the "3" results from the integration process have been placed in the numerator and not the denominator. Candidates should be careful to think about each term; in this case the error resulted in an incorrect answer and therefore the loss of the accuracy mark.

Question 5(b)

(b) You are given that $y = 2\sin x + \cos 2x$.

(i) Find an expression for $\frac{dy}{dx}$.

$\frac{dy}{dx} = 2\cos x - 2\sin 2x$

..... [2]

(ii) Verify that there is a turning point at $x = \frac{\pi}{6}$ and determine whether it is a maximum or a minimum point.
You must show all your working.

When $x = \frac{\pi}{6}$, $2\cos x - 2\sin 2x = \sqrt{3} - \sqrt{3} = 0$

e.g. $\frac{d^2y}{dx^2} = -2\sin\frac{\pi}{6} - 4\cos\frac{\pi}{3} (= -3) < 0$

So maximum.

..... [3]

Mark scheme guidance

Question 5(b)(i):

B1 1st term.

B1 2nd term.

Question 5(b)(ii):

B1 Substitute and get 0.

B1 $\sqrt{3}$ must be seen.

M1 Any correct method.

A1 (all working must be seen and correct – answer with no working gets 0).

Examiner comments

In part (b) , while many candidates were able to differentiate the trigonometrical ratios in part (i), full marks to part (ii) was rare. Since candidates could not solve the equation $2\cos x - 2\sin 2x = 0$ within the specification topics this was a verify question which simply means substitute the value $\frac{\pi}{6}$ into the gradient function and show that the value is 0. This is the case mentioned above and we expected to see both terms equalling $\sqrt{3}$, to show that the correct calculation had been done rather than just writing down 0. Unfortunately a significant number of candidates failed to realise that calculus of trigonometrical functions requires the use of radians and so failed to switch their calculators. The consequence was that they did not get 0, which was the expected value.

Question 6

6 The centre of a circle, C, has coordinates (2, 3).
The point A with coordinates (5, 5) lies on the circumference of the circle.
The point B has coordinates (0, 6).

(i) By considering the lengths of CA and CB, show that B lies on the circle.

$CA^2 = (5-2)^2 + (5-3)^2 = 13$
$CB^2 = (0-2)^2 + (6-3)^2 = 13$
$\Rightarrow CA = CB$

.....

.....

..... **[3]**

(ii) Find the coordinates of the point D where DA is a diameter of the circle.

$$\mathbf{AC} = -\begin{pmatrix} 5-2 \\ 5-3 \end{pmatrix} = -\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$\Rightarrow \mathbf{AD} = -2\begin{pmatrix} 3 \\ 2 \end{pmatrix} = -\begin{pmatrix} 6 \\ 4 \end{pmatrix}$$

$\Rightarrow$ D is $(5-6, 5-4)$ i.e. $(-1, 1)$

..... **[3]**

(iii) Write down the equation of the circle in the form $(x-a)^2 + (y-b)^2 = r^2$
where a, b and r are to be determined.

$(x-2)^2 + (y-3)^2 = 13$ **[1]**

Mark scheme guidance

Question 6(i):

M1 Distance for one.

A1 Both correct.

A1 Conclusion.

Question 6(ii):

M1 Attempt to move in steps.

A1 AD oe.

Question 6(iii):

B1 Ecf ***r*** above.

Examiner comments

Part (i) required the use of Pythagoras. Some candidates attempted a vector approach but since they were asked to consider lengths, they gained no marks. A few forgot to draw a conclusion to their calculations.

In part (ii) a step method (or vector method) was required and many candidates obtained the correct answer with little or no working.

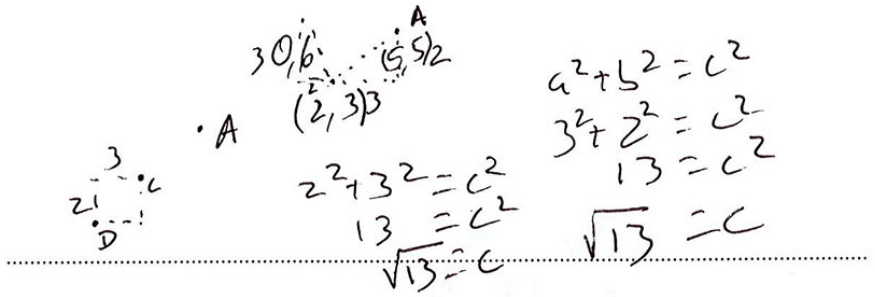
Part (iii) was a simple test of what the values a, b and r represented in the standard equation for a circle.

Exemplar Candidate Work

Question 6(i) – High level answer

6 The centre of a circle, C, has coordinates (2, 3).
The point A with coordinates (5, 5) lies on the circumference of the circle.
The point B has coordinates (0, 6).

(i) By considering the lengths of CA and CB, show that B lies on the circle.



[3]

Commentary

This candidate has failed to complete the question. He knew what to do and completed the numerical work correctly, giving the same value for the lengths of CA and CB. It was necessary to do this to answer the question but simply getting the same length was not the total answer. It was necessary to say that because the distance was the same, given that A lay on the circle B, did as well.

The consequence of not finishing the question lost a mark. Candidates should ask themselves whether they have answered the question after they have completed the algebra or arithmetic required.

Exemplar Candidate Work

Question 6(ii) – High level answer

(ii) Find the coordinates of the point D where DA is a diameter of the circle.

$5-(3\times2)=5-6=-1$

$5-(2\times2)=5-4=1$

$(1,-1)=D$

[3]

Commentary

This candidate knew what to do but was confused by his own working which would have benefited from a description of what was being done. Consequently it is not clear which line relates to the working to find the x coordinate and which to the y coordinate. Unfortunately, therefore, the candidate wrote them the wrong way round, thus losing the last mark.

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