Commentary on candidate evidence

The candidate evidence has achieved the following marks for each question of this course assessment component.

Question 1

Response 1

The candidate was awarded **1/2 marks.**

✓•1 correct substitution
×•2 incorrect evaluation

Response 2

The candidate was awarded **1/2 marks.**

✓•1 correct substitution
×•2 incorrect evaluation

Comments on candidates' performance

Most candidates knew to calculate $5 \times (-2)^3$ but 40 was a common answer.
Other answers often given were $5 \times \pm 6 = \pm 30$ and $5 \times \pm 16 = \pm 80$.
Some candidates calculated $(5 \times -2)^3$ and gave answers of -1000 or 1000.

Question 2

Response 3

The candidate was awarded **1/2 marks**.

✓•1 multiplication started correctly

×•2 incorrect simplification of $\frac{36}{56}$

Response 4

The candidate was awarded **1/2 marks**; see note 3 of the marking instructions.

✓•1 multiplication started correctly
×•2 incorrect working subsequent to correct answer

Response 5

The candidate was awarded **1/2 marks.**

✓•1 multiplication started correctly
×•2 incorrect answer

Comments on candidates' performance

Most candidates achieved full marks for $\frac{3}{8} \times \frac{12}{7} = \frac{9}{14}$.

However, some did not simplify $\frac{36}{56}$ correctly or calculated 3×12 or 8×7 incorrectly.

Question 3

Response 6

The candidate was awarded **2/3 marks.**

✓•1 three correct terms
✓•2 correct expansion of brackets
×•3 incorrect collection of x^2 and x terms

Response 7

The candidate was awarded **2/3 marks.**

✓•1 three correct terms
×•2 $+35x$ term incorrect
✓•3 consistent collection of like terms

Comments on candidates' performance

Most candidates achieved full marks.

Question 4

Response 8

The candidate was awarded **2/3 marks.**

✓•1 correct fraction
✓•2 correct substitution into arc length formula
×•3 incorrect calculation

Response 9

The candidate was awarded **2/3 marks**; see commonly observed response (COR) 1 of the marking instructions.

✓•1 correct fraction
×•2 incorrect substitution into arc length formula
✓•3 consistent calculation

Response 10

The candidate was awarded **1/3 marks.**

×•1 incorrect fraction
✓•2 consistent substitution into arc length formula
×•3 incorrect calculation

Response 11

The candidate was awarded **1/3 marks.**

✓•1 correct fraction
×•2 substitution into area of sector formula instead of arc length formula
×•3 incorrect calculation

Comments on candidates' performance

Most candidates knew to calculate $\frac{240}{360} \times 3 \cdot 14 \times 60$ but many were unable to carry out the calculation correctly.

Some attempted to calculate $\frac{120}{360} \times 3 \cdot 14 \times 60$ or $\frac{240}{360} \times 3 \cdot 14 \times 30^2$ but were mostly unable to carry out the calculation correctly.

Question 5

Response 12

The candidate was awarded **2/3 marks** for part (a) and **2/2 marks** for part (b).

✓•1 correct median
✓•2 correct quartiles identified
×•3 incorrect calculation of SIQR
✓•4 valid comment comparing medians; see note 3(a) of the marking instructions
✓•5 valid comment comparing SIQRs; see note 4(a) of the marking instructions

Response 13

The candidate was awarded **2/3 marks** for part (a) and **0/2 marks** for part (b).

✓•1 correct median stated
×•2 quartiles identified incorrectly
✓•3 correct follow through to calculate consistent SIQR
×•4 invalid comment comparing medians; equivalent to note 3(b) (1st bullet point) of the marking instructions
×•5 invalid comment comparing SIQRs; see note 1 and note 4(b) (3rd bullet point) of the marking instructions

Response 14

The candidate was awarded **1/3 marks** for part (a); see COR 1(b) and **1/2 marks** for part (b).

✓•1 correct median
×•2 quartiles not identified
×•3 mark not available since quartiles have not been identified
×•4 invalid comment comparing medians; see note 3(b) (2nd bullet point) of the marking instructions
✓•5 consistent valid comment comparing SIQRs; see note 1 of the marking instructions

Response 15

The candidate was awarded **0/3 marks** for part (a) and **2/2 marks** for part (b).

×•1 mark not available for unordered list; see note 3(a) of the marking instructions
×•2 mark not available for unordered; see note 3(a) of the marking instructions
×•3 incorrect calculation of SIQR
✓•4 consistent valid comment comparing medians; see note 1 of the marking instructions
✓•5 consistent valid comment comparing SIQRs; see note 1 of the marking instructions

Comments on candidates' performance

In part (a) most candidates found the median although some found the mean. Most candidates knew how to find the SIQR but some were unable to carry out the calculations correctly; $8-3\cdot5=5\cdot5$ and $4\cdot5\div2=2\cdot21$ were common errors.

In part (b) many candidates made comments that showed that they did not have a clear understanding of the meaning of the terms 'median' and 'semi-interquartile range'.

- Common unacceptable responses included:

- the median was higher in Endoch
- it was colder in Grantford
- the SIQR was more in Grantford
- (on average) the SIQR was more consistent in Endoch
- the weather was better and more consistent

Question 6

Response 16

The candidate was awarded **3/3 marks** for part (a) and **0/1 mark** for part (b).

✓•1 correct use of (1·5, 14) and (3·5, 8) to find gradient
✓•2 correct substitution of point and gradient into equation of line
✓•3 correct equation in terms of F and E
×•4 incorrect calculation of fuel consumption

Response 17

The candidate was awarded **2/3 marks** for part (a) and **1/1 mark** for part (b).

✓•1 correct use of (1·5, 14) and (3·5, 8) to find gradient
✓•2 correct substitution of point and gradient into equation of line
×•3 incorrect calculation of c
✓•4 correct follow through to calculate consistent fuel consumption

Response 18

The candidate was awarded **2/3 marks** for part (a) and **1/1 mark** for part (b).

×•1 invalid points used to find gradient; see note 2 and COR 4 of the marking instructions
✓•2 consistent substitution of point and gradient into equation of line
✓•3 consistent equation in terms of F and E
✓•4 correct follow through to calculate consistent fuel consumption

Response 19

The candidate was awarded **1/3 marks** for part (a) and **0/1 mark** for part (b).

×•1 incorrect gradient; $\frac{6}{-3}$
✓•2 correct substitution of point and gradient into equation of line; see note 3 of the marking instructions
×•3 equation not given in terms of F and E
×•4 incorrect calculation of consistent fuel consumption

Comments on candidates' performance

In part (a) most candidates used the correct strategy but common errors included:

- incorrect evaluation of $\frac{14-8}{1\cdot 5-3\cdot 5}$
- incorrect calculation in expansion of brackets
  eg $y-8=-3(x-3\cdot 5)\rightarrow y-8=-3x+9\cdot 5\rightarrow y=-3x+17\cdot 5$
- not expressing the final equation in terms of F and E

In part (b) there were some disappointing responses.
Common calculation errors included:

- $F=-3\times 1\cdot 1+18\cdot 5=-3\cdot 1+18\cdot 5=15\cdot 4$
- (a) $F=-3E+19\rightarrow$ (b) $F=-3\times 1\cdot 1+19=-3\cdot 3+19=16\cdot 3$

Question 7

Response 20

The candidate was awarded **2/3 marks**.

Method 1
×•1 no multiplication by 2
✓•2 consistent division by h
✓•3 consistent subtraction of y

Response 21

The candidate was awarded **2/3 marks**.

Method 1
✓•1 correct multiplication by 2
✓•2 correct division by h
×•3 incorrect subtraction of y

Response 22

The candidate was awarded **2/3 marks**.

Method 1
×•3 incorrect subtraction of y
✓•1 consistent multiplication by 2
✓•2 consistent division by h

Response 23

The candidate was awarded **1/3 marks**.

Method 2
×•2 correct expansion of bracket but no subtraction of *hy*
×•1 no multiplication by 2
✓•3 consistent subtraction of y

Comments on candidates' performance

Most candidates achieved partial credit in this question.

Many did not deal correctly with the $\frac{1}{2}$ eg $x = \frac{A}{\frac{1}{2}h} - y$ and $x = \frac{A-y}{\frac{1}{2}h}$ were common responses.

Many did not expand the brackets correctly eg $A = \frac{1}{2}hx + hy$ and $A = \frac{1}{2}hx + y$ were common first steps.

Question 8

Response 24

The candidate was awarded **1/1 mark** for part (a), **1/1 mark** for part (b) and **3/4 marks** for part (c).

✓•1 correct equation; see note 1 of the marking instructions
✓•2 correct equation; see note 1 of the marking instructions
✓•3 correct scaling
✓•4 correct value for *c*
✓•5 correct value for *g*
×•6 incorrect units given in final answer; see note 4 of the marking instructions

Response 25

The candidate was awarded **1/1 mark** for part (a), **1/1 mark** for part (b) and **3/4 marks** for part (c).

✓•1 correct equation; see note 1 of the marking instructions
✓•2 correct equation; see note 1 of the marking instructions
✓•3 correct scaling
✓•4 correct value for *c*
✓•5 correct value for *g*

×•6 words ‘cement’ and ‘gravel’ not given in final answer; see note 4 of the marking instructions

Response 26

The candidate was awarded **1/1 mark** for part (a), **1/1 mark** for part (b) and **1/4 marks** for part (c).

✓•1 correct equation
✓•2 correct equation
✓•3 correct scaling
×•4 incorrect value for *c*
×•5 inconsistent value for *g*
×•6 no units or words ‘cement’ and ‘gravel’ given in final answer; see note 4 of the marking instructions

Comments on candidates’ performance

Nearly all candidates scored full marks in parts (a) and (b), although some inappropriately included units in their equations, eg $7c + 3g = 215\text{kg}$.

Most candidates achieved three or four marks in part (c); a significant number did not achieve the final mark as they left their answer as $c = 20$ and $g = 25$, but did not state ‘one bag of cement weighs 20kg and one bag of gravel weighs 25kg’ as was required for the award of the communication mark.

Question 9

Response 27

The candidate was awarded **0/1 mark** for part (a), **1/1 mark** for part (bi) and **1/1 mark** for part (bii).

×•1 incorrect equation; see note 1 of the marking instructions
✓•2 correct value
✓•3 correct value

Response 28

The candidate was awarded **0/1 mark** for part (a), **0/1 mark** for part (bi) and **1/1 mark** for part (bii).

×•1 incorrect equation
×•2 incorrect value
✓•3 ‘correct’ values have been switched; see note 3 of the marking instructions

Comments on candidates’ performance

Most candidates achieved no mark for part (a); there were a significant number of 'no responses'.
Common incorrect responses included: 4 and axis of symmetry = 4

Most candidates achieved no mark for part (b)(i); many gave an answer of 4 instead of -4.

Most candidates achieved the mark for part (b)(ii), although some achieved this mark for giving the 'correct' answers to parts (i) and (ii) in reverse order.

Question 10

Response 29

The candidate was awarded **1/1 mark** for part (a) and **0/2 marks** for part (b).

✓•[1] correct answer
×•[2] invalid pathway
×•[3] mark unavailable since working is eased (no addition required)

Response 30

The candidate was awarded **1/1 mark** for part (a) and **0/2 marks** for part (b).

✓•[1] correct answer
×•[2] invalid pathway
×•[3] mark unavailable since working is eased (no halving required)

Response 31

The candidate was awarded **0/1 mark** for part (a) and **1/2 marks** for part (b).

×•[1] incorrect answer
×•[2] invalid pathway
✓•[3] correct follow through to calculate consistent components

Response 32

The candidate was awarded **0/1 mark** for part (a) and **2/2 marks** for part (b); see note 4(b) of the marking instructions.

×•[1] incorrect answer
✓•[2] consistent follow through from part (a)
✓•[3] correct follow through to calculate consistent components

Response 33

The candidate was awarded **0/1 mark** for part (a) and **1/2 marks** for part (b).

✗•1 sum of components not calculated
✓•2 valid pathway
✗•3 sum of components not calculated

Comments on candidates' performance

This topic is still proving to be difficult for candidates but there was a slight improvement in performance compared to similar questions in previous years. In part (a) some candidates identified a valid pathway but did not state the components of the resultant vector.

Part (b) proved to be more demanding than part (a).

Question 11

Response 34

The candidate was awarded **2/3 marks**; see COR 1(a) of the marking instructions.

✗•1 angle AOB incorrect
✓•2 consistent follow through to find angle FOB
✓•3 consistent follow through to find angle OFB

Response 35

The candidate was awarded **3/3 marks**; see note 6 of the marking instructions.

✓•1 angle AOB correct (benefit of doubt)
✓•2 angle FOB correct (benefit of doubt)
✓•3 angle OFB correct and clearly indicated

Response 36

The candidate was awarded **2/3 marks**; see note 6 of the marking instructions.

✓•1 angle AOB correct (benefit of doubt)
✓•2 angle FOB correct (benefit of doubt)
✗•3 angle OFB not clearly indicated

Comments on candidates' performance

Responses were not as good as in previous years. Some responses only included random calculations which could not be clearly attached to any of the angles in the diagram.

Common errors included:

- incorrect answers to $360 \div 5$
- starting with $AOB = 360 \div 4 = 90^\circ$
- starting with $AOB = 60^\circ$

In questions that involve angles in a diagram, candidates should be encouraged to write the sizes of any angles they calculate in the appropriate places in the diagram. Calculations done elsewhere on the page and not clearly attached to any angle(s) are unlikely to gain marks.

Question 12

Response 37

The candidate was awarded **2/3 marks**.

Method 2

✓•1 simplified denominator; $\frac{\sqrt{2}}{2\sqrt{10}}$

✓•2 rationalised denominator; $\frac{\sqrt{2}\sqrt{10}}{20}$

×•3 incorrect working subsequent to $\frac{\sqrt{5}}{10}$; see note 2 of the marking instructions

Response 38

The candidate was awarded **2/3 marks**; see note 4 of the marking instructions.

Method 1 then Method 2.

✓•1 rationalised denominator; $\frac{\sqrt{2} \times \sqrt{40}}{40}$

✓•2 simplified $\sqrt{40}$ and simplified fraction; $\frac{\sqrt{20}}{20}$

×•3 no further working

Response 39

The candidate was awarded **2/3 marks**; see note 4 of the marking instructions.

Method 2 then Method 3

✓•1 simplified denominator; $\frac{\sqrt{2}}{2\sqrt{10}}$

✓•2 fraction in simplest form; $\frac{1}{2\sqrt{5}}$

×•3 no further working

Comments on candidates' performance

Most candidates achieved partial credit in this question.
Many achieved the first mark for rationalising the denominator to obtain $\frac{\sqrt{80}}{40}$ or simplifying the denominator to obtain $\frac{\sqrt{2}}{2\sqrt{10}}$ but only a minority were able to progress correctly from there.

Question 13

Response 40

The candidate was awarded **1/2 marks**; see note 2(b) of the marking instructions.

If the candidate had already been penalised for the omission of brackets in question 10 then the award would have been **2/2 marks** since the omission of brackets is only penalised once in each question paper.

Comments on candidates' performance

Most candidates found this question challenging.
Some found the correct *y* coordinate but few found the correct *x* coordinate.
Common incorrect answers included $(45, \pm 3), (225, \pm 3)$ and $(-3, 135)$.

Question 14

Response 41

The candidate was awarded **2/3 marks**.

Method 1
×•1 incorrect elimination of denominators
✓•2 correct follow through from line 2 to 6
✓•3 consistent answer; see note 3 of the marking instructions

Response 42

The candidate was awarded **1/3 marks**.

Method 1
×•1 incorrect elimination of denominators
✓•2 correct follow through from line 2 to 4
×•3 mark unavailable since working is eased; see note 3 of the marking instructions

Response 43

The candidate was awarded **1/3 marks**.

Method 2
✓•1 correct collection of algebraic terms, expressed as a fraction in simplest form
×•2 no further working
×•3 no further working

Comments on candidates' performance

The majority of candidates found this question challenging. Most were unable to correctly eliminate the denominators but some were able to achieve one or two marks for following through their working to obtain a consistent answer.

Question 15

Response 44

The candidate was awarded **1/1 mark** for part (a) and **2/4 marks** for part (b).

✓•1 correct answer (units not required)
×•2 incorrect equation (h = 17 instead of h = −17)
×•3 incorrect rearrangement of equation (line 4)
✓•4 consistent factorisation
✓•5 consistent solution and value chosen

Response 45

The candidate was awarded **1/1 mark** for part (a) and **1/4 marks** for part (b).

✓•1 correct answer
✓•2 correct equation
×•3 equation not equated to zero
×•4 no factorisation
×•5 incorrect solution

Comments on candidates' performance

Most candidates achieved full credit for part (a), but a common incorrect response was $12 \times 2 - 5 \times 2^2 = 24 - 100 = -76$.

Most candidates achieved no marks for part (b); there were a significant number of 'no responses'. Few realised that they had to solve a quadratic equation and therefore did not progress as far as the final two marks.

Common errors included:

- using guess and check

- starting with $12t - 5t^2 = 17$
- not rearranging $12t - 5t^2 = \mp 17$ into $5t^2 - 12t \mp 17 = 0$ or equivalent