



Mathematics (National 5): question paper 1

**Commentary on candidate
evidence**

Workshop 1

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 process.
- ✓ 2 •² answer not in simplest form; see note 2 of the marking instructions.

Response 2

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

- ✓ •¹ correct process.
- ✓ •² incorrect conversion of 39/16 not penalised; see note 4 of the marking instructions.

Response 3

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

- × •¹ incomplete process.
- ✓ 1 •² follow through working met the criterion for this mark; see COR 1.

Comments on candidates' performance

Many candidates achieved full marks. However, some did not simplify correctly, mostly those who did not 'cross cancel' a numerator and denominator before multiplying.

Question 2

Response 4

The candidate was awarded **2/3 marks**. See COR 1 of the marking instructions.

- ✓ •¹ correct expansion of 2nd bracket
- × •² incorrect expansion of 1st bracket
- ✓ 1 •³ consistent follow through

Response 5

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

- ✓ •¹ correct expansion of 1st bracket.
- ✓ •² correct expansion of 2nd bracket.
- × •³ incorrect collection of like terms.

Response 6

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

- ✓ •¹ correct expansion of 2nd bracket.
- × •² incorrect expansion of 1st bracket.
- × •³ incorrect follow through.

Comments on candidates' performance

Many candidates achieved full marks. However, some incorrectly expanded $(x+7)^2$ to give $x^2 + 49$, but were able to follow through correctly from this error.

Question 3

Response 7

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

- ✓ •¹ correct scaling.
- × •² incorrect value x .
- ✓ 1 •³ consistent value for y .

Response 8

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

- ✓ •¹ correct scaling.
- × •² incorrect value for x .
- × •³ inconsistent value for y .

Response 9

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

- ✓ •¹ correct scaling.
- × •² incorrect process to calculate value for y ($9y = 36$).
- ✓ 1 •³ consistent value for x .

Comments on candidates' performance

Many candidates achieved full marks. The scaling of the equations was very well done, but some incorrectly carried out calculations involving a negative number when adding or subtracting the scaled equations.

Question 4

Response 10

The candidate was awarded **0/1 marks** in (a)(i).

✗ •¹ incorrect value of a .

The candidate was awarded **1/1 marks** in (a)(ii).

✓ •² correct value of b .

The candidate was awarded **1/1 marks** in (b).

✓ 1 •³ consistent follow through value of c ; see note 2 of the marking instructions.

Response 11

The candidate was awarded **0/1 marks** in (a)(i).

✗ •¹ incorrect value of a .

The candidate was awarded **0/1 marks** in (a)(ii).

✗ •² incorrect value of b .

The candidate was awarded **0/1 marks** in (b).

✗ •³ inconsistent follow through value of c .

Response 12

The candidate was awarded **1/1 marks** in (a)(i).

✓ •¹ correct value of a .

The candidate was awarded **1/1 marks** in (a)(ii).

✓ •² correct value of b .

The candidate was awarded **1/1 marks** in (b).

✓1 •³ correct value of c ; see note 2 of the marking instructions.

Comments on candidates' performance

Many candidates achieved full marks in part (a)(ii) but many failed to achieve any marks in parts (a)(i) and (b) of this question. In 4(a)(i), a common incorrect answer was 3. In 4(b), many candidates did not appear to know what to do.

Question 5

Response 13

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

✓ •¹ correct discriminant.

✓2 •² incomplete statement; see note 4 of the marking instructions.

Response 14

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

✓ •¹ correct discriminant; see note 6 of the marking instructions.

^ •² no statement.

Response 15

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

✗ •¹ incorrect discriminant.

✓1 •² consistent statement; see note 3 of the marking instructions.

Response 16

The candidate was awarded **0/2 marks**.

✗ •¹ incorrect discriminant

✓2 •² incomplete statement; see note 4 of the marking instructions.

Comments on candidates' performance

Performance in this question was poorer than in previous years.

Most candidates knew how to find the discriminant but some made errors in carrying out the calculations. For example, $6^2 - 4 \times 4 \times (-1) = 36 - (-16) = 20$ was a fairly common error. Some candidates gave an incomplete description of the nature of the roots, omitting a key part of the statement (two, real, or distinct).

Question 6

Response 17

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

- ✗ •¹ incorrect substitution; see note 2(b) of the marking instructions.
- ✓ •² correct calculation of AB^2 .
- ✓ •³ correct calculation of AB .

Response 18

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

- ✓ •¹ correct substitution.
- ✓ •² correct calculation of AB^2 .
- ^ •³ no attempt to calculate AB .

Response 19

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

- ✓ •¹ correct substitution.
- ✗ •² incorrect calculation of AB^2 .
- ✗ •³ mark not available; see note 4(b) of the marking instructions.

Response 20

The candidate was awarded **0/3 marks**.

- ✗ •¹ incorrect substitution; see note 2(b) of the marking instructions.
- ✗ •² incorrect calculation of AB^2 .
- ✗ •³ mark not available; see note 4(b) of the marking instructions.

Comments on candidates' performance

Many candidates achieved either 0 marks or 1 mark. Common errors included

incorrectly substituting $\cos \frac{1}{5}$ into the cosine rule and/or carrying out the calculations in the wrong order.

For example, $5^2 + 6^2 - 2 \times 5 \times 6 \times \frac{1}{5} = 61 - 60 \times \frac{1}{5} = 1 \times \frac{1}{5} = \frac{1}{5}$ was a fairly common error.

Question 7

Response 21

The candidate was awarded **2/3 marks** in (a).

Method 1

- ✓ •¹ correct gradient.
- ✓ •² correct substitution.
- ✓2 •³ equation not in terms of P and T .

The candidate was awarded **0/1 marks** in (b).

- ✗ •⁴ incorrect strategy.

Response 22

The candidate was awarded **2/3 marks** in (a).

Method 2

- ✗ •¹ incorrect gradient; see note 4(a) of the marking instructions.
- ✓1 •² consistent substitution
- ✓1 •³ consistent equation in terms of P and T

The candidate was awarded **1/1 marks** in (b).

- ✓1 •⁴ consistent follow through calculation.

Response 23

The candidate was awarded **2/3 marks** in (a).

Method 2

- ✓ •¹ correct gradient.
- ✓ •² correct substitution of gradient and point.
- ✗ •³ incorrect substitution of terms P and T .

The candidate was awarded **0/1 marks** in (b).

- ✗ •⁴ incorrect follow through calculation.

Response 24

The candidate was awarded **2/3 marks** in (a).

Method 2

- ✓ •¹ correct gradient.
- ✓ •² correct substitution.
- ✗ •³ incorrect simplification of equation.

The candidate was awarded **1/1 marks** in (b)

- ✓ 1 •⁴ consistent follow through calculation.

Comments on candidates' performance

Performance in this question was poorer than in previous years.

The larger coordinate numbers appeared to be challenging for some candidates who carried out calculations incorrectly when finding the gradient or simplifying the equation of the line in 7(a) and when estimating the salary in 7(b).

A few used incorrect coordinates eg (20000, 5) and (50000, 25) and (1,2) & (5,5), to find the gradient. Some did not express their final equation in terms P and T .

Question 8

Response 25

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

- ✓ •¹ correct rationalisation.
- ✗ •² incorrect simplification.

Response 26

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

- ✓ •¹ correct rationalisation.
- ^ •² no attempt to simplify.

Response 27

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

- ✓ •¹ correct rationalisation.
- ✗ •² incorrect simplification.

Comments on candidates' performance

Many candidates achieved the first mark for rationalising the denominator, but some were unable to express their answer in its simplest form.

Question 9

Response 28

The candidate was awarded **2/3 marks** in (a)

- ✓ •¹ correct median.
- ✓ •² correct quartiles.
- ✗ •³ SIQR calculated; see note 5(b) of the marking instructions.

The candidate was awarded **1/2 marks** in (b).

- ✗ •⁴ no reference to average.
- ✓¹ •⁵ consistent valid comparison.

Response 29

The candidate was awarded **0/3 marks** in (a).

- ✗ •¹ incorrect median.
- ✗ •² incorrect quartiles.
- ✗ •³ incorrect follow through: SIQR calculated; see Note 5(b).

The candidate was awarded **1/2 marks** in (b).

- ✓¹ •⁴ consistent valid comparison.
- ✗ •⁵ comparison refers to “on average”; see Note 4(b) bullet point 3.

Response 30

The candidate was awarded **2/3 marks** in (a).

- ✗ •¹ incorrect median.
- ✓ •² correct quartiles.
- ✓ •³ correct IQR.

The candidate was awarded **1/2 marks** in (b).

- ✓¹ •⁴ consistent valid comparison.
- ✗ •⁵ no reference to **ages** or **readers**.

Response 31

The candidate was awarded **2/3 marks** in (a).

- ✗ •¹ value missing.
- ✓1 •² consistent quartiles; see note 3(a) of the marking instructions.
- ✓1 •³ consistent follow through.

The candidate was awarded **0/2 marks** in (b).

- ✗ •⁴ no reference to ages of **readers**.
- ✗ •⁵ no reference to ages of readers; see note 2(b) and reference to range (note 4(b)-bullet point 2).

Comments on candidates' performance

In part (a) most candidates achieved 2 or 3 marks with many achieving full marks. A few calculated SIQR instead of IQR.

In part (b) few candidates achieved full marks, although some achieved partial credit. Typical incorrect responses were:

- ◆ did not include reference to the ages of the newspaper readers and magazine readers eg on average the newspaper was older, the magazine was more consistent.
- ◆ did not state 'on average' in the statement about the median eg the newspaper readers were older.
- ◆ simply stated that one median/IQR was higher/lower than the other.

Question 10

Response 32

The candidate was awarded **3/4 marks**.

- ✓ •¹ correct right-angled triangle.
- ✓ •² valid Pythagoras statement.
- ✗ •³ incorrect calculation of third side.
- ✓1 •⁴ consistent follow through calculation of width.

Response 33

The candidate was awarded **2/4 marks**.

- ✓ •¹ correct right-angled triangle (implied by •²).
- ✓ •² valid Pythagoras statement.
- ✗ •³ incorrect calculation of third side.
- ✗ •⁴ incorrect calculation of width.

Response 34

The candidate was awarded **4/4 marks**.

- ✓ •¹ correct right-angled triangle (implied by •²).
- ✓ •² valid Pythagoras statement (using scaled triangle).
- ✓ •³ correct calculation of third side.
- ✓ •⁴ correct calculation of width.

Response 35

The candidate was awarded **0/4 marks**.

- ✗ •¹ mark not available; see note 6 of the marking instructions.
- ✗ •² incorrect Pythagoras statement (no right angle indicated on diagram).
- ✗ •³ incorrect calculation of third side
- ✗ •⁴ mark not available; see note 6 of the marking instructions.

Comments on candidates' performance

Although performance in this question was slightly poorer than in most previous years it was largely because of disappointing numeracy skills. For example, $50^2 - 30^2 = 250 - 90 \rightarrow \sqrt{160} = 40$ and $50^2 - 30^2 = 20^2 \rightarrow 20$ were fairly common calculation errors.

Question 11

Response 36

The candidate was awarded **0/1 marks**.

- ✗ •¹ incorrect value.

Response 37

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

- ✓ •¹ correct value.

Comments on candidates' performance

Very few candidates gave the correct answer. The most common answer was $330^\circ = 11 \times 30^\circ \rightarrow \sin 330^\circ = 11 \times \sin 30^\circ = 5.5$

Question 12

Response 38

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

Method 1

- ✓ •¹ correct application of law of indices.
- ✓ •² correct simplification.
- ✗ •³ incorrect expression with positive power; see COR 1.

Response 39

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

Method 1

- ✓ •¹ correct application of law of indices.
- ✗ •² incorrect simplification.
- ✗ •³ mark not available.

Response 40

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

Method 1

- ✓ •¹ correct application of law of indices.
- ✗ •² incorrect simplification.
- ✗ •³ incorrect follow through expression with positive power; similar to COR 1.

Comments on candidates' performance

Most candidates achieved the first mark for $\frac{5c^{-2}}{c^7}$, some achieved the second mark for $5c^{-9}$, but few achieved the final mark.

A common incorrect final step was $5c^{-9} = \frac{1}{5c^9}$.

Question 13

Response 41

The candidate was awarded **0/1 marks** in (a).

✗ •¹ incorrect value of a .

The candidate was awarded **1/1 marks** in (b).

✓ •² correct value of b .

Response 42

The candidate was awarded **0/1 marks** in (a).

✗ •¹ incorrect value of a .

The candidate was awarded **1/1 marks** in (b).

✓ •² correct value of b .

Response 43

The candidate was awarded **0/1 marks** in (a).

✗ •¹ incorrect value of a .

The candidate was awarded **0/1 marks** in (b).

✗ •² incorrect value of b .

Comments on candidates' performance

Very few candidates answered part (a) correctly but many answered (b) correctly.

A common response was $a = 2$ and $b = 1$.

Question 14

Response 44

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

- ✓ •¹ correct elimination of denominators.
- ✓ •² correct rearrangement.
- ✗ •³ incorrect solution (inequality symbol).

Response 45

The candidate was awarded **0/3 marks**.

- ✗ •¹ incorrect elimination of denominators.
- ✗ •² incorrect rearrangement.
- ✗ •³ mark not available; see note 4(b) of the marking instructions.

Response 46

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

- ✗ •¹ incorrect elimination of denominators.
- ✓¹ •² consistent rearrangement.
- ^ •³ no attempt to solve.

Response 47

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

- ✗ •¹ incorrect elimination of denominators.
- ✓¹ •² consistent rearrangement.
- ✗ •³ final answer not in simplest form; see general marking principle (j).

Comments on candidates' performance

Most candidates found this question challenging. Most were unable to correctly eliminate the denominators but some were able to achieve 1 or 2 marks for following through their working to obtain a consistent answer.