# MCAS Grade 10 Mathematics
# Paper-Based Practice Test Answer Key

## Session 1

| PBT Item No. | Standard | Item Type* | Max Points | Correct Answer** |
|---|---|---|---|---|
| 1 | G-C.A.2 | SR | 1 | B |
| 2 | N-RN.A.1 | SR | 1 | A,E,F |
| 3 | G-CO.C.9 | SR | 1 | D |
| 4 | F-BF.B.3 | SR | 1 | D |
| 5 | S-ID.A.1 | SR | 1 | C |
| 6 | G-GPE.B.5 | CR | 4 | *See page 2* |
| 7 | A-APR.A.1 | SR | 1 | D |
| 8 | G-CO.D.12 | SR | 1 | B |
| 9 | A-REI.D.12 | SR | 1 | D |
| 10 | A-SSE.A.1 | SA | 1 | 25 |
| 11 | N-RN.B.3 | SR | 2 | A;D |
| 12 | G-SRT.C.7 | SR | 1 | B |
| 13 | F-IF.A.2 | CR | 4 | *See page 3* |
| 14 | S-CP.B.6 | SR | 2 | A;D |
| 15 | A-SSE.B.3 | SR | 1 | A |
| 16 | A-REI.A.1 | SR | 1 | B |
| 17 | G-GPE.A.1 | SR | 1 | B |
| 18 | F-IF.C.9 | SR | 2 | C;D |
| 19 | N-Q.A.2 | SR | 1 | C |
| 20 | G-CO.A.5 | SR | 1 | A |
| 21 | A-REI.C.5 | SR | 1 | C |

## Session 2

| PBT Item No. | Standard | Item Type* | Max Points | Correct Answer** |
|---|---|---|---|---|
| 22 | G-SRT.B.5 | SR | 1 | B |
| 23 | A-CED.A.1 | SR | 1 | D |
| 24 | G-SRT.A.1 | SR | 1 | A,D,F |
| 25 | N-Q.A.3 | SR | 1 | D |
| 26 | F-LE.A.1 | SR | 1 | C |
| 27 | S-CP.A.4 | CR | 4 | *See page 4* |
| 28 | G-SRT.C.8 | SR | 1 | C |
| 29 | F-IF.B.6 | SR | 1 | D |
| 30 | G-CO.A.3 | SR | 1 | D |
| 31 | F-BF.A.2 | SR | 1 | C |
| 32 | G-CO.B.7 | SR | 2 | D;B |
| 33 | A-REI.B.3 | SR | 1 | C |
| 34 | N-Q.A.1 | CR | 4 | *See page 5* |
| 35 | G-C.B.5 | SA | 2 | Part A: A<br>Part B:<br>$7.3 \leq XZ < 7.4$ |
| 36 | S-ID.B.5 | SR | 1 | A |
| 37 | F-IF.A.1 | SR | 1 | A,E |
| 38 | G-GMD.A.3 | SR | 1 | B |
| 39 | F-LE.B.5 | SR | 2 | A,C;B |
| 40 | G-SRT.A.3 | SR | 1 | B |
| 41 | S-ID.C.8 | SR | 1 | C |
| 42 | G-CO.C.11 | SR | 1 | C |

*Mathematics item types are selected-response (SR), short-answer (SA), and constructed-response (CR).

**Answers are provided here for selected-response and short-answer items only. Pages 2–5 of this document provide sample responses and scoring guidelines for constructed-response items.

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## Scoring Guide for PBT Item # 6: Constructed Response Item

| Score | Description |
|---|---|
| 4 | The student response demonstrates an exemplary understanding of the Geometry concepts involved in proving the slope criteria for parallel and perpendicular lines and using them to solve geometric problems. The student calculates the slope of a graphed line, creates an equation of a line parallel to it, analyzes a different line, and creates an equation of a line perpendicular to it, which passes through a given point. |
| 3 | The student response demonstrates a good understanding of the Geometry concepts involved in proving the slope criteria for parallel and perpendicular lines and using them to solve geometric problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points. |
| 2 | The student response demonstrates a fair understanding of the Geometry concepts involved in proving the slope criteria for parallel and perpendicular lines and using them to solve geometric problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points. |
| 1 | The student response demonstrates a minimal understanding of the Geometry concepts involved in proving the slope criteria for parallel and perpendicular lines and using them to solve geometric problems. |
| 0 | The student response contains insufficient evidence of an understanding of the Geometry concepts involved in proving the slope criteria for parallel and perpendicular lines and using them to solve geometric problems. As a result, the response does not merit any points. |

## Sample Response:

The following are the most common correct answers. Other versions of the correct answers also receive credit.

### Part A

$-\frac{1}{2}$ or $-\frac{3}{6}$

$\frac{5-2}{-4-2} = \frac{3}{-6} = -\frac{3}{6} = -\frac{1}{2}$; Student must show coordinates in the slope formula or state, “I went up 3 units and left 6 units.” OR equivalent explanation

### Part B

$y = -\frac{1}{2}x - 4$

### Part C

No, line r is not parallel. The slope of the line is $-\frac{1}{3}$ and not $-\frac{1}{2}$, and parallel lines must have the same slope.

### Part D

$y = 2x - 12$

## Scoring Guide for PBT Item # 13: Constructed Response Item

| Score | Description |
|---|---|
| 4 | The student response demonstrates an exemplary understanding of the Functions concepts involved in using function notation, evaluating functions for inputs in their domains, and interpreting statements that use function notation in terms of a context. The student interprets a real-life situation modeled by a function. |
| 3 | The student response demonstrates a good understanding of the Functions concepts involved in using function notation, evaluating functions for inputs in their domains, and interpreting statements that use function notation in terms of a context. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points. |
| 2 | The student response demonstrates a fair understanding of the Functions concepts involved in using function notation, evaluating functions for inputs in their domains, and interpreting statements that use function notation in terms of a context. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points. |
| 1 | The student response demonstrates a minimal understanding of the Functions concepts involved in using function notation, evaluating functions for inputs in their domains, and interpreting statements that use function notation in terms of a context. |
| 0 | The student response contains insufficient evidence of an understanding of the Functions concepts involved in using function notation, evaluating functions for inputs in their domains, and interpreting statements that use function notation in terms of a context. As a result, the response does not merit any points. |

## Sample Response:

The following are the most common correct answers. Other versions of the correct answers also receive credit.

### Part A

$\$75$; When $n = 0$, $f(n) = 75$. OR equivalent explanation

### Part B

$\$2.50$; The function decreases by $2.5$ as $n$ increases by 1. OR equivalent explanation

### Part C

$\$25$; $f(20) = -2.5(20) + 75 = -50 + 75 = 25$

### Part D

30 days; $-2.5n + 75 = 0; 2.5n = 75; n = 30$

## Scoring Guide for PBT Item # 27: Constructed Response Item

| Score | Description |
|---|---|
| 4 | The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in constructing and interpreting two-way frequency tables of data, using the two-way table as a sample space to decide if events are independent, and to approximate conditional probabilities. The student completes a two-way table of data, uses the table to calculate a joint and a conditional probability, and determines whether the events represented by the data in the table are independent. |
| 3 | The student response demonstrates a good understanding of the Statistics and Probability concepts involved in constructing and interpreting two-way frequency tables of data, using the two-way table as a sample space to decide if events are independent, and to approximate conditional probabilities. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points. |
| 2 | The student response demonstrates a fair understanding of the Statistics and Probability concepts involved in constructing and interpreting two-way frequency tables of data, using the two-way table as a sample space to decide if events are independent, and to approximate conditional probabilities. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points. |
| 1 | The student response demonstrates a minimal understanding of the Statistics and Probability concepts involved in constructing and interpreting two-way frequency tables of data, using the two-way table as a sample space to decide if events are independent, and to approximate conditional probabilities. |
| 0 | The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in constructing and interpreting two-way frequency tables of data, using the two-way table as a sample space to decide if events are independent, and to approximate conditional probabilities. As a result, the response does not merit any points. |

## Sample Response:

The following are the most common correct answers. Other versions of the correct answers also receive credit.

### Part A

$450$; $750 - 300 = 450$

### Part B

$0.45$; $\frac{450}{1000} = \frac{9}{20} = 0.45$

### Part C

$0.4$; $\frac{300}{750} = \frac{2}{5} = 0.4$; "given" implies conditional probability, so we only need to look at the people surveyed who said they had watched the commercial, which is 750 people. Out of the 750 people, 300 said they had bought the shampoo. OR equivalent explanation

### Part D

The events are dependent. Events A and B are independent if $P(A \cap B) = P(A)P(B)$; $0.3 \neq 0.75 \cdot 0.35$ (Events A and B are also independent if $P(A|B) = P(A)$ or $P(B|A) = P(B)$). OR equivalent explanation

## Scoring Guide for PBT Item # 34: Constructed Response Item

| Score | Description |
|---|---|
| 4 | The student response demonstrates an exemplary understanding of the Number and Quantity concepts involved in using units as a way to understand problems and to guide the solution of multi-step problems. The student uses dimensional analysis and solves problems that require the manipulation of units. |
| 3 | The student response demonstrates a good understanding of the Number and Quantity concepts involved in using units as a way to understand problems and to guide the solution of multi-step problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points. |
| 2 | The student response demonstrates a fair understanding of the Number and Quantity concepts involved in using units as a way to understand problems and to guide the solution of multi-step problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points. |
| 1 | The student response demonstrates a minimal understanding of the Number and Quantity concepts involved in using units as a way to understand problems and to guide the solution of multi-step problems. |
| 0 | The student response contains insufficient evidence of an understanding of the Number and Quantity concepts involved in using units as a way to understand problems and to guide the solution of multi-step problems. As a result, the response does not merit any points. |

## Sample Response:

The following are the most common correct answers. Other versions of the correct answers also receive credit.

### Part A

12 minutes 48 seconds; $3.2 \cdot 4 = 12.8$ minutes, (multiply 0.8 by 60 to get seconds) OR equivalent

### Part B

412.5 ft/min; $\frac{1320}{3.2} = 412.5$ OR equivalent

### Part C

4.7 miles per hour; $\frac{1\ mile}{12.8\ minutes} \cdot \frac{60\ minutes}{1\ hour} \approx \frac{4.7\ miles}{1\ hour}$ OR equivalent

### Part D

Yes, Elias will reach his goal. If he runs for 40 minutes he will cover 12.5 laps each day, which is 62.5 laps in 5 days. $\frac{62.5}{4} = 15.625$, so he will cover 15.625 miles in the week, which is greater than 15 miles. OR equivalent explanation