MCAS Grade 10 Mathematics
Computer-Based Practice Test Answer Key

Session 1

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

Session 2

CBT 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	*See page 4*
25	N-Q.A.3	SR	1	D
26	F-LE.A.1	SR	1	*See page 4*
27	S-CP.A.4	CR	4	*See page 9*
28	G-SRT.C.8	SR	1	C
29	F-IF.B.6	SR	1	*See page 4*
30	G-CO.A.3	SR	1	D
31	F-BF.A.2	SR	1	C
32	G-CO.B.7	SR	2	Part A: D Part B: *See page 4*
33	A-REI.B.3	SR	1	C
34	N-Q.A.1	CR	4	*See page 10*
35	G-C.B.5	SA	2	Part A: A Part B: $7.3 \le XZ < 7.4$
36	S-ID.B.5	SR	1	*See page 5*
37	F-IF.A.1	SR	1	A,E
38	G-GMD.A.3	SR	1	B
39	F-LE.B.5	SR	2	*See page 5*
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 correct answers for technology-enhanced (TE) items. Pages 6–10 provide sample responses and scoring guidelines for constructed-response items.

Correct Answer for CBT Item #2: Technology-Enhanced Item

$t^{\frac{1}{3}}$ $t^{\frac{2}{3}}$ $t^{\frac{3}{2}}$

$\dfrac{t^{\frac{1}{3}}}{t^{\frac{2}{3}}}$ $\dfrac{t^{\frac{2}{3}}}{t^{\frac{1}{3}}}$ $\dfrac{t^{\frac{4}{3}}}{t}$

Correct Answer for CBT Item #5: Technology-Enhanced Item

Customer Satisfaction

Customer Satisfaction Rating	Number of Customers
1-2	2
3-4	0
5-6	3
7-8	5
9-10	5
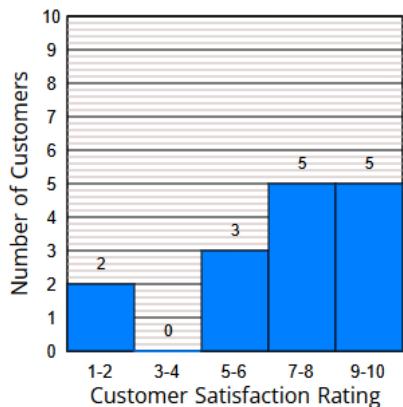
Correct Answer for CBT Item #9: Technology-Enhanced Item
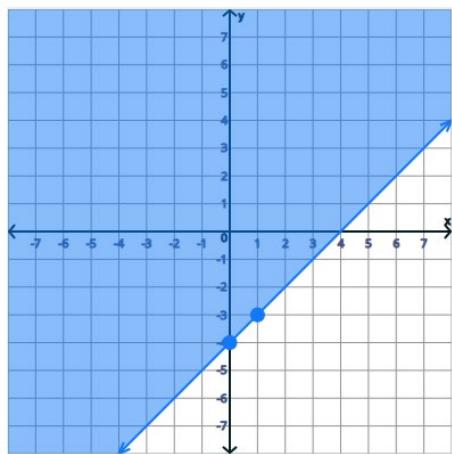
Correct Answer for CBT Item #11: Technology-Enhanced Item

Part A:

Statement	True	False
The sum of two rational numbers is rational.	⦿	○
The product of two rational numbers is irrational.	○	⦿
The sum of a rational number and an irrational number is rational.	○	⦿

Part B:

The sum of $\frac{\pi}{2}$ and $\frac{\pi}{2}$ is [an irrational number].

The product of $\frac{1}{2}$ and π is [an irrational number].

Correct Answer for CBT Item #16: Technology-Enhanced Item

Step	Explanation
$4(x+5) = 88$	Given
$4x + 20 = 88$	[He used the distributive property.]
$4x = 68$	[He subtracted 20 from both sides.]
$x = 17$	[He divided both sides by 4.]

Correct Answer for CBT Item #18: Technology-Enhanced Item

Part B:

Statement	True	False
The graphs of the functions open in opposite directions.	⦿	○
The functions have the same domain.	⦿	○
The functions have the same range.	○	⦿

Correct Answer for CBT Item #20: Technology-Enhanced Item
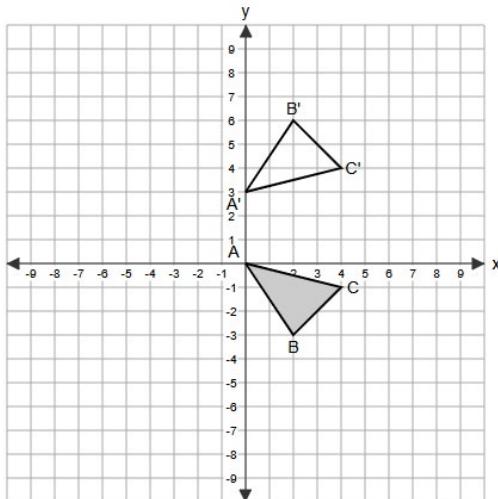
Correct Answer for CBT Item #24: Technology-Enhanced Item
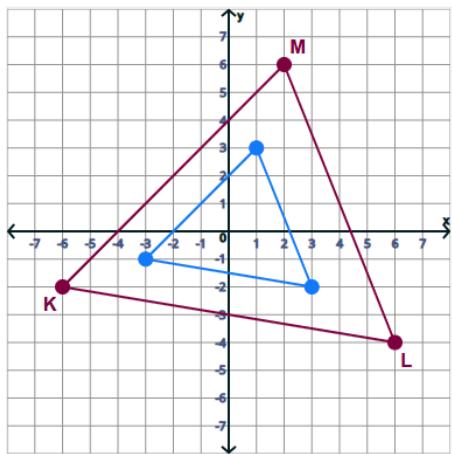
Correct Answer for CBT Item #26: Technology-Enhanced Item

Situation	Modeled by a Linear Function	Modeled by an Exponential Function
As 5-pound bricks are added to a cart, the total weight increases.	◉	○
The number of people registered on a website doubles every month.	○	◉
The total distance traveled by a turtle walking at a constant speed increases over time.	◉	○

Correct Answer for CBT Item #29: Technology-Enhanced Item

On average, $f(x)$ [decreases ▾] by [3.6 ▾] units as x increases by 1 unit over the interval $-1 \le x \le 2$.

Correct Answer for CBT Item #32: Technology-Enhanced Item

Part B:

$\triangle$ [H] [K] [J] $\cong \triangle EFG$

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Correct Answer for CBT Item #36: Technology-Enhanced Item

Travel Survey

	Likes Traveling	Dislikes Traveling	Totals
Ages 18–30	40	10	50
Ages 31–60	20	30	50
Totals	60	40	100

Correct Answer for CBT Item #39: Technology-Enhanced Item

Part A:

Increasing	Decreasing
Rye	Pinehill
Smithfield	Troy

Part B:

Least			Greatest
Rye	Troy	Pinehill	Smithfield

Scoring Guide for CBT 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 CBT 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 CBT 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 CBT 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