MCAP Maryland Comprehensive Assessment Program

# Practice Test Answer and Alignment Document
## Mathematics – Algebra II
## Online

The following pages include the answer keys for all machine-scored items. A sample student response for the top score is included for all hand-scored constructed response items.

- Some answer keys include one possible sample student response. Other valid methods for solving the problem can earn full credit unless a specific method is required by the item.
- In items where the scores are awarded for full and partial credit, the definition of partial credit will be confirmed during range-finding (reviewing sets of real student work).
- If students make a computation error, they can still earn points for reasoning or modeling.

## Section 1

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 1. | A | N-CN.C.7 |
| 2. | For the recursive rule $f(1) = 5$ and $f(n) = 3 + f(n-1)$, for $n > 1$, the explicit rule is $f(n) = 5 + 3(n-1)$, for $n \geq 1$.<br>For the recursive rule $f(1) = 5$ and $f(n) = 3 \cdot f(n-1)$, for $n > 1$, the explicit rule is $f(n) = 5(3)^{n-1}$, for $n \geq 1$. | F-IF.A.3 |
| 3. | C | F-LE.A.4 |
| 4. | $(x, y) = ([3], [7])$ | F-TF.A.2 |
| 5. | D | A-APR.D.6 |
| 6. | $\frac{3}{4}$ | N-RN.A.2 |
| 7. | B | F-IF.C.9 |
| 8. | The student should select the points at 3 and 4 on the number line. | A-SSE.A.2-1 |

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 9. | The equation of the midline of the graph should be $y = -3$.<br>The period of the graph should be 2.<br>The amplitude of the graph should be 2.<br>The graph should pass through the points at (–3, –5), (–2, –1), (–1, –5), (0, –1), (1, –5), (2, –1), and (3, –5). | F-IF.C.7e |
| 10. | 1 | A-APR.B.2 |
| 11. | The quantity $9^{3.5}$ should be placed in the first box on the left.<br>The quantity $4^7$ should be placed in the box in the middle.<br>The quantity $(4^6)(4^2)$ should be placed in the last box on the right. | N-RN.A.2 |
| 12. | C, G | A-REI.A.2-1 |
| 13. | B | F-BF.B.4a |

## Section 2

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 1. | C | A2.M.4<br>A-REI.D.11 |
| 2. | B, C, E | A-REI.D.11 |
| 3. | $7.53 = 5.88r^{20}$<br>or<br>$7.53 = 5.88(1 + r)^{20}$<br>or any equation equivalent to either of these equations | A2.M.2<br>F-LE.A.2-1 |
| 4. | A | A2.R.1<br>A-REI.A.2-2 |
| 5. | **Sample Top Score Response**<br>A quadratic equation with real coefficients that has $x = -5i$ as a solution must also have $x = 5i$ as a solution. One such equation is $(x - 5i)(x + 5i) = 0$, which is equivalent to $x^2 + 25 = 0$.<br>There is no quadratic equation with real coefficients that has $x = -5i$ as its **only** solution. If the only solution is $x = -5i$, then the quadratic equation is a multiple of $(x + 5i)^2 = 0$, which is equivalent to $x^2 + 10ix - 25 = 0$, and that equation cannot be equivalent to one with real coefficients because $10i$ is not a real number.<br>**Refer to the Holistic Rubric for 4-Point Reasoning Constructed Response Items for score point information.** | A2.R.4<br>N-RN.A.2<br>N-CN.C.7 |

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 6. | From 7:00 a.m. to 9:00 a.m., the number of cars parked in the garage increased.<br>From 1:00 p.m. to 4:00 p.m., the number of cars parked in the garage decreased.<br>From 5:00 p.m. to 8:00 p.m., the number of cars parked in the garage decreased. | F-IF.B.6-3 |
| 7. | The student should plot points at (2, 1) and (5, 4). | A-REI.C.7 |
| 8. | B | F-TF.C.8 |

## Section 3

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 1. | C | S-ID.B.6a |
| 2. | **Sample Top Score Response**<br>According to the model, the number of members in the 4th month is $m(4) = 300 - 280(0.76)^4$, which is approximately 207. According to the model, the number of members in the 8th month is $m(8) = 300 - 280(0.76)^8$, which is approximately 269.<br>Average rate of change:<br>$\frac{269-207}{8-4} = \frac{62}{4} = 15\frac{1}{2}$ members per month. The expression $280(0.76)^t$ approaches zero as $t$ increases. So, $300 - 280\,(0.76)^t$ approaches 300 as $t$ increases. Therefore, 300 is the maximum number of members.<br>**Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.** | A2.M.4<br>F-IF.B.6-3<br>F-LE.B.5-1 |
| 3. | $\frac{4}{5}$ | F-BF.A.2 |
| 4. | 0 | A2.R.4<br>A-APR.B.3 |

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 5. | **Sample Top Score Response**<br>The two graphs intersect at the points $(x, y) = (-12, 46)$ and $(x, y) = (2, 4)$.<br>The $x$ coordinates of the points of intersection of the graph are those points for which $P(x) = Q(x)$.<br>$P(x) = Q(x)$<br>$x^2 + 7x - 14 = -3x + 10$<br>$x^2 + 10x - 24 = 0$<br>$(x + 12)(x - 2) = 0$<br>$x = -12$ or $x = 2$<br>If $x = -12$,<br>then $y = (-3)(-12) + 10 = 36 + 10 = 46$<br>If $x = 2$ ,<br>then $y = (-3)(2) + 10 = -6 + 10 = 4$<br>Therefore, the points of intersection are $(x, y) = (-12, 46)$ and $(x, y) = (2, 4)$.<br>**Refer to the Holistic Rubric for 4-Point Reasoning Constructed Response Items for score point information.** | A2.R.8<br>A-REI.D.11 |
| 6. | D | A2.M.5<br>F-TF.B.5 |

## Section 4

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 1. | B | F-BF.A.1a |
| 2. | On the interval $x > 1$, the claim is true.<br>On the interval $0 < x < 1$, the claim is false.<br>On the interval $-1 < x < 0$, the claim is true.<br>On the interval $x < -1$, the claim is false. | A2.R.6<br>N-RN.A.2 |
| 3. | 2 | A2.M.6<br>F-TF.B.5 |
| 4. | D | A-REI.A.2-2 |
| 5. | **Sample Top Score Response**<br>The function $f(x) = 81.67(0.67)^x$ models the data. An exponential function was chosen because the data seems to decrease rapidly at first, then level off a bit.<br>The constant 81.67 represents the box office revenue, in millions of dollars, predicted by the function 0 weeks after the movie opened—that is, during the movie's opening week.<br>The constant 0.67 means that the revenue is decreasing on average by $1 - 0.67 = 0.33$ or 33% each week.<br>100,000 is 0.1 million, so the time when the function has a value less than 0.1 should be determined. By graphing $y = 81.67(0.67)^x$ and $y = 0.1$ on the same graph, it can be seen that the least number of weeks after the movie opened when the function value is less than 0.1 is 17.<br>**Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.** | A2.M.2<br>S-ID.B.6a |

| Item Number | Answer Key | Evidence Statement Key/ Content Scope |
|---|---|---|
| 6. | D | A2.R.10<br>A-APR.B.3 |
| 7. | The processing fee consists of a fixed amount of [$0.15] plus [3.5%] of the purchase amount. | F-LE.B.5-2 |
| 8. | A | A-SSE.B.3c |