

## Practice Test Answer and Alignment Document

### Mathematics: Algebra II

### Pencil-and-Paper

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.	B	N-CN.A.2
2.	C, G	A-REI.A.2-1
3.	B	F-IF.A.3
4.	1	A-APR.B.2
5.	D	F-IF.C.8.b
6.	C	N-RN.A.2
7.	C	F-BF.B.4.a
8.	D	A-SSE.A.2.a
9.	C	F-LE.A.4
10.	B	A-APR.B.3
11.	B, E	F-TF.A.2
12.	B	N-RN.A.2

<b>Item Number</b>	<b>Answer Key</b>	<b>Evidence Statement Key/ Content Scope</b>
13.	A	F-IF.C.7.c

## Section 2

Item Number	Answer Key	Evidence Statement Key/ Content Scope
1.	C	S-ID.B.6.a
2.	B, C, E	A-REI.D.11
3.	C	A2.M.4 A-REI.D.11
4.	<p><b><u>Sample Top Score Response</u></b></p> <p><b>Part A:</b></p> <p>A quadratic equation with real coefficients that has <math>x = -5i</math> as a solution must also have <math>x = 5i</math> as a solution. One such equation is <math>(x - 5i)(x + 5i) = 0</math>, which is equivalent to <math>x^2 + 25 = 0</math>.</p> <p><b>Part B:</b></p> <p>There is no quadratic equation with real coefficients that has <math>x = -5i</math> as its <b>only</b> solution. If the only solution is <math>x = -5i</math>, then the quadratic equation is a multiple of <math>(x + 5i)^2 = 0</math>, which is equivalent to <math>x^2 + 10ix - 25 = 0</math>, and that equation cannot be equivalent to one with real coefficients because <math>\frac{10i}{-25}</math> is not a real number.</p> <p><b>Refer to the Holistic Rubric for 4-Point Reasoning Constructed Response Items for score point information.</b></p>	A2.R.4 N-RN.A.2 N-CN.C.7
5.	2	A2.M.6 F-TF.B.5
6.	D	A2.R.10 A-APR.B.3
7.	B	F-LE.B.5-2
8.	D	A-REI.A.2-2

### Section 3

Item Number	Answer Key	Evidence Statement Key/ Content Scope
1.	B	F-BF.A.1.a
2.	A, C	A2.R.6 N-RN.A.2
3.	<p><b><u>Sample Top Score Response</u></b></p> <p>An estimate for the number of members in the 4<sup>th</sup> month is 211. An estimate for the number of members in the 8<sup>th</sup> month is 273.</p> <p>Average rate of change:</p> $\frac{273 - 211}{8 - 4} = \frac{62}{4} = 15\frac{1}{2} \text{ members per month.}$ <p>The expression <math>280(0.76)^t</math> approaches zero as <math>t</math> increases. So, <math>300 - 280(0.76)^t</math> approaches 300 as <math>t</math> increases. Therefore, 300 is the maximum number of members.</p> <p><b>Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.</b></p>	<p>A2.M.4 F-IF.B.6-3 F-LE.B.5-1</p>
4.	A	A2.M.5 F-BF.A.2

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

## Section 4

Item Number	Answer Key	Evidence Statement Key/ Content Scope
1.	A	A-SSE.B.3.c
2.	B	F-TF.A.1
3.	0	A2.R.4 A-APR.B.3
4.	<p><b><u>Sample Top Score Response</u></b></p> <p><b>Part A:</b> The function <math>f(x) = 84.16(0.66)^x</math> models the data. An exponential function was chosen because the data seems to decrease rapidly at first, then level off a bit.</p> <p>The constant 84.16 represents the box office revenue, in million dollars, predicted by the function 0 weeks after the movie opened, that is, during the movie's opening week.</p> <p>The constant 0.66 means that the revenue is decreasing on average by <math>1 - 0.66 = 0.34</math> or 34% each week.</p> <p><b>Part B:</b> 100,000 is 0.1 million, so the time when the function has a value less than 0.1 should be determined. By graphing <math>y = 84.16(0.66)^x</math> and <math>y = 0.1</math> 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 16.</p> <p><b>Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.</b></p>	A2.M.2 S-ID.B.6.a
5.	A	A2.R.1 A-REI.A.2-2
6.	D	A2.M.2 F-LE.A.2-1
7.	D	A-REI.C.7

<b>Item Number</b>	<b>Answer Key</b>	<b>Evidence Statement Key/ Content Scope</b>
8.	B	F-BF.A.2