

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.	B	N-CN.A.2
2.	C, G	A-REI.A.2-1
3.	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 $n \geq 1$. 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
4.	1	A-APR.B.2
5.	For every increase of 1 in the value of x , the value of $f(x)$ [decreases] by [75%].	F-IF.C.8.b
6.	$\frac{3}{4}$	N-RN.A.2
7.	C	F-BF.B.4.a

Item Number	Answer Key	Evidence Statement Key/ Content Scope
8.	The student should select the points 3 and 4 on the number line.	A-SSE.A.2.a
9.	C	F-LE.A.4
10.	B	A-APR.B.3
11.	$\sin(\theta) = \frac{3}{5}$ $\sin(\pi + \theta) = -\frac{3}{5}$	F-TF.A.2
12.	<p>The quantity $9^{3.5}$ should be placed in the first box on the left.</p> <p>The quantity 4^7 should be placed in the box in the middle.</p> <p>The quantity $(4^6)(4^2)$ should be placed in the last box on the right.</p>	N-RN.A.2
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><u>Sample Top Score Response</u></p> <p>Part A: 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 $x^2 + 25 = 0$.</p> <p>Part B: 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 $\frac{10i}{-25}$ is not a real number.</p> <p>Refer to the Holistic Rubric for 4-Point Reasoning Constructed Response Items for score point information.</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.	The processing fee consists of a fixed amount of [\$0.15] plus [3.5%] of the purchase amount.	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.	<p>On the interval $x > 1$, the claim is true.</p> <p>On the interval $0 < x < 1$, the claim is false.</p> <p>On the interval $-1 < x < 0$, the claim is true.</p> <p>On the interval $x < -1$, the claim is false.</p>	A2.R.6 N-RN.A.2
3.	<p><u>Sample Top Score Response</u></p> <p>An estimate for the number of members in the 4th month is 211. An estimate for the number of members in the 8th month is 273.</p> <p>Average rate of change:</p> $\frac{273 - 211}{8 - 4} = \frac{62}{4} = 15\frac{1}{2}$ <p>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.</p> <p>Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.</p>	A2.M.4 F-IF.B.6-3 F-LE.B.5-1
4.	A	A2.M.5 F-BF.A.2

Item Number	Answer Key	Evidence Statement Key/ Content Scope
5.	<p><u>Sample Top Score Response</u></p> <p>The two graphs intersect at the points $(x, y) = (-12, 46)$ and $(x, y) = (2, 4)$.</p> <p>The x coordinates of the points of intersection of the graph are those points for which $P(x) = Q(x)$.</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 $x = -12$, then $y = (-3)(-12) + 10 = 36 + 10 = 46$</p> <p>If $x = 2$, then $y = (-3)(2) + 10 = -6 + 10 = 4$</p> <p>Therefore, the points of intersection are $(x, y) = (-12, 46)$ and $(x, y) = (2, 4)$.</p> <p>Refer to the Holistic Rubric for 4-Point Reasoning Constructed Response Items for score point information.</p>	A2.R.8 A-REI.D.11
6.	<p>From 7:00 a.m. to 9:00 a.m., the number of cars parked in the garage increased.</p> <p>From 1:00 p.m. to 4:00 p.m., the number of cars parked in the garage decreased.</p> <p>From 5:00 p.m. to 8:00 p.m., the number of cars parked in the garage decreased.</p>	F-IF.B.6-3

Section 4

Item Number	Answer Key	Evidence Statement Key/ Content Scope
1.	A	A-SSE.B.3.c
2.	The measure of θ is [120] degrees, which is equivalent to $[\frac{2\pi}{3}]$ radians.	F-TF.A.1
3.	0	A2.R.4 A-APR.B.3
4.	<p><u>Sample Top Score Response</u></p> <p>Part A:</p> <p>The function $f(x) = 84.16(0.66)^x$ 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 $1 - 0.66 = 0.34$ or 34% each week.</p> <p>Part B:</p> <p>100,000 is 0.1 million, so the time when the function has a value less than 0.1 should be determined. By graphing $y = 84.16(0.66)^x$ 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 16.</p> <p>Refer to the Holistic Rubric for 4-Point Modeling Constructed Response Items for score point information.</p>	A2.M.2 S-ID.B.6.a
5.	A	A2.R.1 A-REI.A.2-2

Item Number	Answer Key	Evidence Statement Key/ Content Scope
6.	$7.53 = 5.88r^{20}$ or $7.53 = 5.88(1 + r)^{20}$ or equivalent	A2.M.2 F-LE.A.2-1
7.	The student should plot points at (2, 1) and (5, 4).	A-REI.C.7
8.	$\frac{4}{5}$	F-BF.A.2