

ADDITIONAL PRACTICE ITEMS ANSWER KEY

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
1	MGSE9-12.G.SRT.3	1	A	The correct answer is choice (A). The missing angle of the triangle in choice (A) is 52° , making it similar to the triangle given. Choices (B), (C), and (D) are incorrect because they have angle measures that are different than the original triangle.
2	MGSE9-12.G.GMD.3	2	N/A	See scoring rubric and exemplar response on page 216.
3	MGSE9-12.G.CO.8	2	N/A	See scoring rubric and exemplar response on page 217.
4	MGSE9-12.G.SRT.7	1	D	The correct answer is choice (D) $\cos 40^\circ = \sin 50^\circ$. The sine of an angle is equal to the cosine of the angle's complement. Choices (A), (B), and (C) are incorrect because they do not correspond to any trigonometric identities.
5	MGSE9-12.G.CO.6	2	N/A	See scoring rubric and exemplar response on page 218.
6	MGSE9-12.G.GPE.4	2	A	The correct answer is choice (A) (0, 5). The point is only 5 units away from the center of the circle. Choices (B), (C), and (D) are incorrect because they are 10 units away from the center of the circle.
7	MGSE9-12.G.SRT.6	1	N/A	See scoring rubric and exemplar response on page 219.
8	MGSE9-12.G.C.2	2	D	The correct answer is choice (D) 25. The measure of arc CD is 80° and the measure of angle DAC is 40° . Since the angles in a triangle add to 180° , the measure of angle AOB is 50° ; if $2x = 50$, then $x = 25$. Choice (A) is incorrect because it is the measure of angle AOB . Choice (B) is incorrect because the answer is true only if the triangle is isosceles. Choice (C) is incorrect because a computation error was made when determining the value of x .
9	MGSE9-12.N.RN.2	2	A	The correct answer is choice (A) $-56x^2$. The given expression can be rewritten as $-4 \cdot \sqrt{28 \cdot 7 \cdot x^4}$, which simplifies to $-56x^2$. Choices (B), (C), and (D) are incorrect because the perfect squares are not factored out of the radical correctly.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
10	MGSE9-12.N.RN.3	1	A	The correct answer is choice (A) $4 + \sqrt{7}$. Choice (B) is incorrect because it simplifies to 4. Choice (C) is incorrect because it simplifies to $\frac{6}{5}$. Choice (D) is incorrect because it simplifies to 0.
11	MGSE9-12.N.RN.2	2	N/A	See scoring rubric and exemplar response on page 220.
12	MGSE9-12.A.APR.1	2	A/B/F	The correct answers are choices (A), (B), and (F). Choices (A) and (B) are correct because they combine like terms correctly. Choice (F) is correct because the binomials are multiplied correctly. Choices (C) and (D) are incorrect because they do not combine like terms correctly. Choice (E) is incorrect because after the binomials are multiplied, the x terms are not combined correctly.
13	MGSE9-12.G.GMD.3	2	D	The correct answer is choice (D) 523 cubic yards. Choice (A) is incorrect because the value is squared and not cubed. Choice (B) is incorrect because the radius is squared instead of cubed. Choice (C) is incorrect because $\frac{3}{4}$ was used instead of $\frac{4}{3}$.
14	MGSE9-12.F.IF.7a	2	Part A: D Part B: B	Part A: The correct answer is choice (D) $h = 2$ and $k = 4$. The maximum of the function is at point (2, 4), so the value of h is 2 and the value of k is 4. Choices (A), (B), and (C) are incorrect because they all give incorrect values for the maximum of the function, (h, k) . Part B: The correct answer is choice (B) The value of a is a number between -1 and 0 . The function must have a negative number for a , and the shape of the graph indicates that it will be between -1 and 0 . Choice (A) is incorrect because the graph with a value of a less than -1 would be a less wide parabola. Choices (C) and (D) are incorrect because the graph would have a minimum and an increasing end behavior.
15	MGSE9-12.A.CED.2	2	N/A	See scoring rubric and exemplar response on page 221.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
16	MGSE9-12.F.IF.5	2	Part A: B Part B: E	Part A: The correct answer is choice (B) the amount of fish food required in a fish tank as a function of the number of fish in the tank. It is the only choice that models the domain (the number of fish in a tank) as using only positive integers. Part B: The correct answer is choice (E) the amount of precipitation as a function of the outdoor temperature. It is the only choice that models the domain (the outdoor temperature) as using positive and negative real numbers.
17	MGSE9-12.F.IF.6	2	C	The correct answer is choice (C) -3 . Rate of change is found by finding the slope of the line containing the indicated points. Choice (A) is incorrect because it incorrectly computes the slopes. Choice (B) is incorrect because it reverses the numerator and denominator in the slope formula. Choice (D) is incorrect because it incorrectly computes the slope.
18	MGSE9-12.G.GPE.1	2	C	The correct answer is choice (C) center: $(3, -1)$, radius: 2. When the equation is changed to standard form using completing the square, the h - and k -values are 3 and -1 and $r^2 = 4$, so $r = 2$. Choices (A) and (B) are incorrect because the radius comes from taking the square root of the constant in standard form. Choice (D) is incorrect because the signs of the center are opposite.
19	MGSE9-12.F.IF.8a	2	N/A	See scoring rubric and exemplar response on page 222.
20	MGSE9-12.S.CP.3	3	N/A	See scoring rubric and exemplar response on page 223.
21	MGSE9-12.G.MG.1	2	N/A	See scoring rubric and exemplar response on page 224.
22	MGSE9-12.A.SSE.3	2	N/A	See scoring rubric and exemplar response on page 225.
23	MGSE9-12.G.MG.2	2	A	The correct answer is choice (A) 2 years. The fertilizer will run out halfway into the third year, lasting only 2 full years. Choice (B) is incorrect because the fertilizer will not last through 3 years. Choice (C) is incorrect because the number of times the fertilizer is applied is subtracted from the total amount instead of divided. Choice (D) is incorrect because the number of times a year the fertilizer is applied is not divided by the total amount of fertilizer.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
24	MGSE9-12.S.CP.7	1	B	The correct answer is choice (B) $\frac{2}{3}$. An even number or a number less than 3 includes the outcomes of 1, 2, 4, and 6 and there are 6 outcomes in the sample space; $\frac{4}{6}$ simplifies to $\frac{2}{3}$. Choice (A) is incorrect because the probability of rolling a 1 and the probability of rolling a number less than 3 were added together without subtracting the overlap. Choice (C) is incorrect because it is the probability of an even number only. Choice (D) is incorrect because it is the probability of a number less than 3 only.
25	MGSE9-12.S.CP.3	2	B	The correct answer is choice (B) $\frac{1}{3}$. With the conditional probability we assume that an odd number was rolled, which reduces our sample space to 1, 3, and 5. Out of those possibilities, the probability of rolling a 5 is $\frac{1}{3}$, 1 successful outcome out of 3 total outcomes. Choice (A) is incorrect because it is the probability of rolling 5 without knowing an odd number was rolled. Choice (C) is incorrect because it is the probability of rolling an odd number. Choice (D) is incorrect because it is the complement of the correct answer.
26	MGSE9-12.F.IF.8a	1	N/A	See scoring rubric and exemplar response on page 226.

ADDITIONAL PRACTICE ITEMS SCORING RUBRICS AND EXEMPLAR RESPONSES

Item 2

Scoring Rubric

Points	Description
1	The student correctly answers the question.
0	The student does not correctly answer the question.

Exemplar Response

The correct response is shown below.

The volume of a square pyramid is found by multiplying one-third times the height of the pyramid times the square of the side length of the base. For this pyramid, the volume is $\frac{1}{3} \times 12 \times 5 \times 5$. The volume of a cone is found by multiplying one-third times the height of the cone times pi times the square of the radius of the base. For this cone, the volume is $\frac{1}{3} \times 12 \times \pi \times 5 \times 5$. Both volumes have factors of $\frac{1}{3}$, 12, 5, and 5, so the volume of the cone is pi times the volume of the pyramid.

Item 3**Scoring Rubric**

Points	Description
1	The student selects the correct options in both drop-down menus.
0	The student does not select the correct options in both drop-down menus.

Exemplar Response

The correct response is shown below.

$\triangle ABC \cong \triangle$ by congruence.

“NLM” is correct because of the correspondence between the markings of the two triangles: the double tick mark is on side AB and on side NL , an angle mark is on angle B and on angle L , and the single tick mark is on side BC and on side LM . “SAS” is correct because the markings show corresponding congruent angles between pairs of corresponding congruent sides.

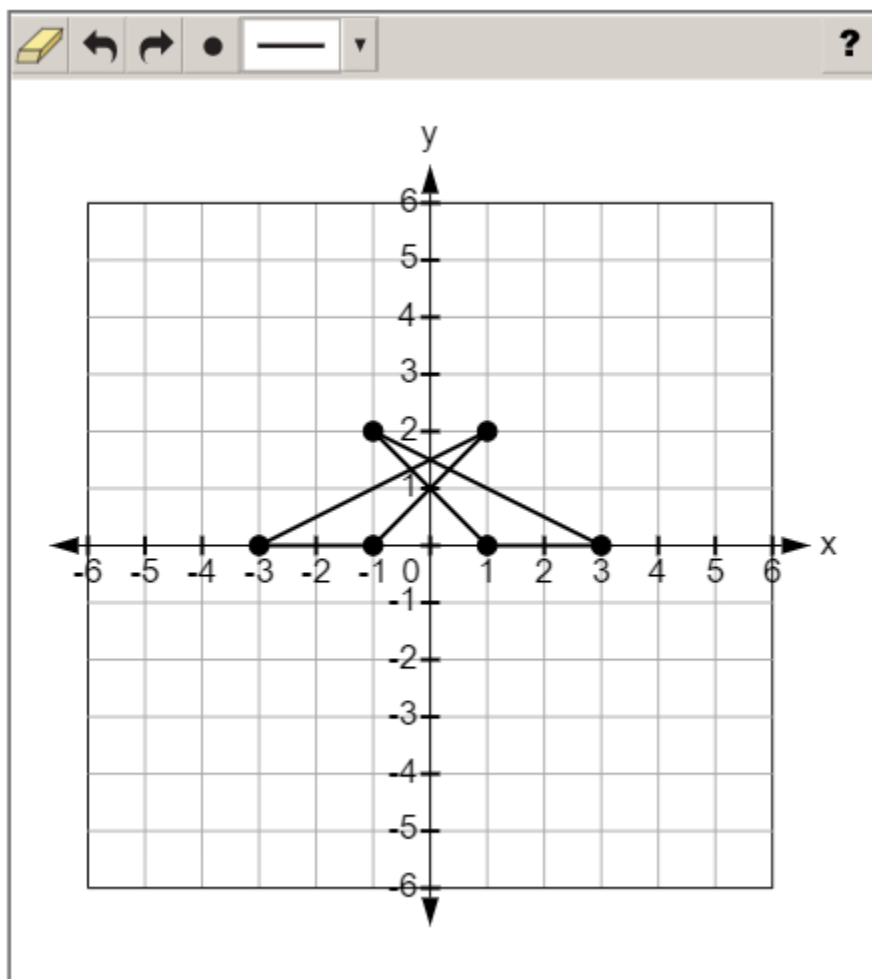
Item 5

Scoring Rubric

Points	Description
2	The student correctly graphs the image of the triangle.
1	The student correctly graphs one or two vertices of the triangle.
0	The student does not correctly graph at least one vertex of the triangle.

Exemplar Response

The correct response is shown below.



A rotation of 180° about the origin can be modeled by the rule $(x, y) \rightarrow (-x, -y)$. Following a 180° rotation about the origin with a reflection across the x-axis can be modeled by the rule $(-x, -y) \rightarrow (-x, y)$. Applying this rule to the coordinates of the original triangle yields the results $(1, 0)$, $(3, 0)$, and $(-1, 2)$ for the vertices of the image of the triangle.

Item 7

Scoring Rubric

Points	Description
1	The student correctly completes the ratio.
0	The student does not correctly complete the ratio.

Exemplar Response

The correct response is shown below.

$$\tan G = \frac{HF}{GH}$$

FG *GH* *HF*

This is the correct response because the tangent of an angle is the ratio of the opposite side length to the adjacent side length. In this triangle, the side opposite angle G is side HF and the side adjacent to angle G is side GH .

Item 11

Scoring Rubric

Points	Description
2	The student correctly places all five expressions.
1	The student correctly places three or four of the five expressions.
0	The student does not correctly place at least three expressions.

Exemplar Response

The correct response is shown below.

Equivalent to $3\sqrt{6}$	Equivalent to $6\sqrt{3}$	Equivalent to $6\sqrt{6}$
$3\sqrt{2} \cdot \sqrt{3}$ $\sqrt{18} \cdot \sqrt{3}$	$\sqrt{3} \cdot \sqrt{6} \cdot \sqrt{6}$ $3\sqrt{3} + 3\sqrt{3}$	$2\sqrt{54}$

Radical expressions are simplified the same way as variable expressions. If the expressions have like terms, such as “ $3\sqrt{3} + 3\sqrt{3}$ ” in the second column, the expression can be simplified by adding the coefficients, so $3\sqrt{3} + 3\sqrt{3} = 6\sqrt{3}$. If the expression is a product, then the values under the radicals can be multiplied together, and if there are perfect square factors in the value under the radical, those can be separated out and calculated. The expression “ $\sqrt{3} \cdot \sqrt{6} \cdot \sqrt{6}$ ” in the second column can be simplified to $\sqrt{3} \cdot \sqrt{36}$, which equals $6\sqrt{3}$. Similarly, in the first column, the expression “ $3\sqrt{2} \cdot \sqrt{3}$ ” equals $3\sqrt{6}$ and the expression “ $\sqrt{18} \cdot \sqrt{3}$ ” can be rewritten as $\sqrt{9} \cdot \sqrt{2} \cdot \sqrt{3}$, which equals $3\sqrt{6}$. It is also possible to separate out perfect square factors from a larger radical to simplify, such as in the third column response, “ $2\sqrt{54}$,” which can be separated into $2\sqrt{9} \cdot \sqrt{6}$ and simplified to $2 \cdot 3 \cdot \sqrt{6}$, which equals $6\sqrt{6}$.

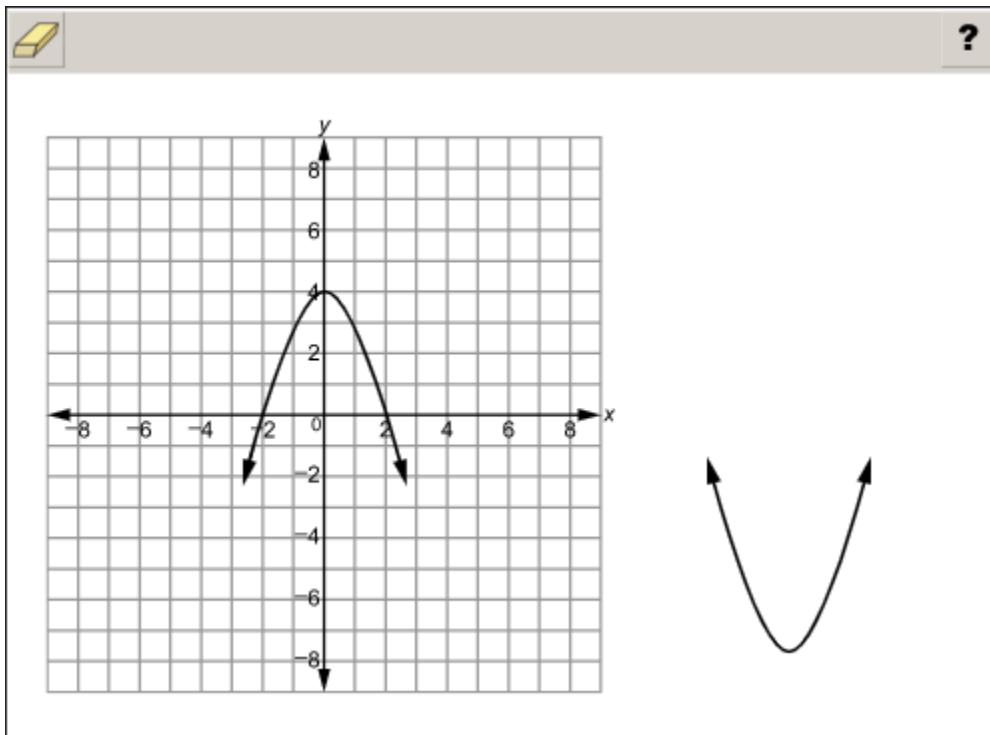
Item 15

Scoring Rubric

Points	Description
1	The student chooses the correct graph and correctly places it on the grid.
0	The student does not choose the correct graph and/or does not correctly place the graph on the grid.

Exemplar Response

The correct response is shown below.



This is the correct response because the coefficient of the x^2 term being negative indicates that the parabola opens downward. When $x = 0$, then $y = 4$; when $x = -2$ or $x = 2$, then $y = 0$.

Item 19**Scoring Rubric**

Points	Description
2	The student correctly selects the response to all of the drop-down menus.
1	The student correctly selects the response to one of the drop-down menus.
0	The student does not correctly select the response to any of the drop-down menus.

Exemplar Response

The two correct responses are shown below.

The graph of $f(x)$ has a minimum value of and has zeros at and .

The graph of $f(x)$ has a minimum value of and has zeros at and .

This is the correct response because the vertex of the function is at $(3, -36)$ and the function crosses the x -axis at $(-3, 0)$ and $(9, 0)$.

Item 20

Scoring Rubric

Points	Description
2	The student correctly completes both paragraphs.
1	The student correctly completes either the first paragraph or the second paragraph.
0	The student does not correctly complete either paragraph.

Exemplar Response

The correct response is shown below.

The expression $\frac{P(A \text{ and } C)}{P(C)}$ describes the of .

The independent events are . This is demonstrated by the fact that the conditional probability of is .

“Conditional probability” and “A given C” correctly complete the first paragraph because the expression is the definition of conditional probability. The conditional probability of A given B can be found by using the formula in the first paragraph and replacing C with B. The events are independent because the conditional probability is equal to the probability of A.

Item 21

Scoring Rubric

Points	Description
2	The student correctly places all three of the shapes needed.
1	The student correctly places two of the shapes needed.
0	The student does not correctly place at least two of the shapes needed.

Exemplar Response

The correct response is shown below.

?

Sphere: $r = 1\frac{5}{16}$

Cylinder: $h = 1, r = 1\frac{5}{16}$

Cylinder: $h = 2\frac{3}{16}, r = \frac{3}{4}$

Cone: $h = 3\frac{3}{16}, r = 2\frac{5}{8}$

Cone: $h = 3\frac{3}{16}, r = 1\frac{5}{16}$

Cylinder: $h = 2\frac{3}{16}, r = 1\frac{1}{2}$

Cylinder: $h = 1, r = 2\frac{5}{8}$

Sphere: $r = 2\frac{5}{8}$

The shape of the scoop of ice cream on top is approximately a sphere whose diameter is $2\frac{5}{8}$ inches, so the radius is $1\frac{5}{16}$ inches. The top of the serving container is close to a cylinder with a radius equal to the radius of the sphere ($1\frac{5}{16}$ inches) and a height of 1 inch. The bottom of the serving container is close to a cylinder with a diameter of $1\frac{1}{2}$ inches, which would be a radius of $\frac{3}{4}$ inch, and a height of $2\frac{3}{16}$ inches.

Item 22

Scoring Rubric

Points	Description
1	The student correctly completes the equation.
0	The student does not correctly complete the equation.

Exemplar Response

The two correct responses are shown below.

$$3x^2 - 2x - 5 = (3x - 5)(x + 1)$$

$(x + 5)$ $(3x - 1)$
 $(3x + 5)$ $(x - 1)$

$$3x^2 - 2x - 5 = (x + 1)(3x - 5)$$

$(x + 5)$ $(3x - 1)$
 $(3x + 5)$ $(x - 1)$

To factor the expression $3x^2 - 2x - 5$, the leading coefficient of the x terms will be 3 and 1 because $3x^2$ has a leading coefficient that is prime. The constant term in the factors will be +1 and -5 because the constant term of the original expression is a negative prime number, and since the middle term is negative, the 5 must also be negative. That leads to the solution “ $(3x - 5)$ ” and “ $(x + 1)$.”

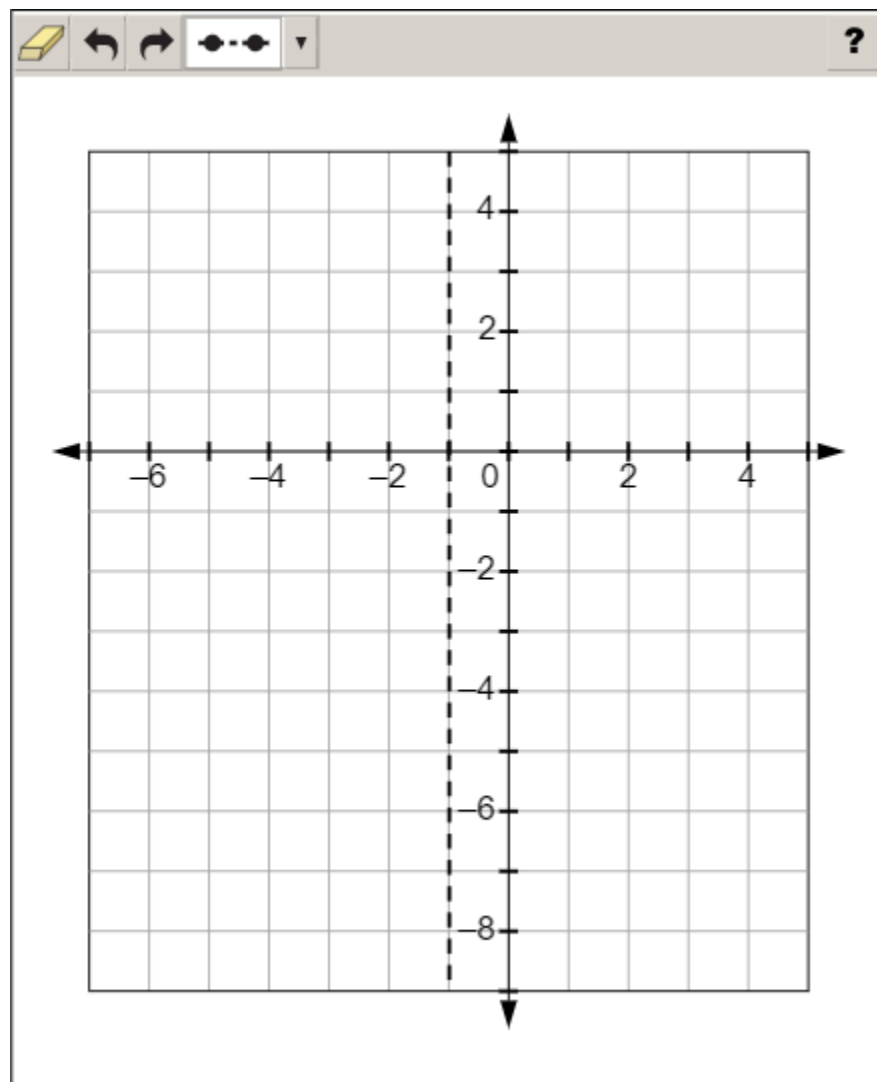
Item 26

Scoring Rubric

Points	Description
1	The student correctly graphs the line of symmetry.
0	The student does not correctly graph the line of symmetry.

Exemplar Response

The correct response is shown below.



This is the correct response because the function is a quadratic function with zeros at -5 and 3 . All quadratic functions have a vertical line of symmetry half way between their zeros.