Empire State Mathematics March to May 2010 Supplement
Grade 7 Answer Key

Lesson 1 *Combining Like Terms* pp. 4–7

1. B [7.A.2]
2. A [7.A.3]
3. C [7.A.2]
4. D [7.A.2]
5. A [7.A.2]
6. D [7.A.3]
7. Short-response [7.A.3]
   A. no; *Explanations may vary but should say something like the following:* It has a variable in the denominator of a fraction. So it is not a polynomial.
   B. $\frac{5}{y} - 2x$
8. Extended-response [7.A.2]
   A. $-200m - 600n$*; Explanations may vary but should say something like the following:* I combined the like terms. $100m$ and $300m$ are like terms: $100m - 300m = -200m$. Also, $-200n$ and $400n$ are like terms: $-200n - 400n = -600n$. So the simplified form is $-200m - 600n$.
   B. −1,800

Lesson 2 *Solving Multi-Step Equations* pp. 8–11

1. D [7.A.4]
2. A [7.A.4]
3. D [7.A.4]
4. D [7.A.4]
5. C [7.A.4]
6. B [7.A.4]
7. Short-response [7.A.4]
   $n = 1$; $7n - 4 + 3n = n + 5$
   $10n - 4 = n + 5$
   $9n - 4 = 5$
   $9n = 9$
   $n = 1$
8. Extended-response [7.A.4]
   A. $x = 3$; $1 - 3x + 7 + 2x = 3x - 4$
   $8 - x = 3x - 4$
   $8 - 4x = -4$
   $-4x = -12$
   $x = 3$
   B. $1 - 3(3) + 7 + 2(3) = 3(3) - 4$
   $1 - 9 + 7 + 6 = 9 - 4$
   $5 = 5$

Lesson 3 *More Solving Multi-Step Equations* pp. 12–15

1. D [7.A.4]
2. A [7.A.4]
3. C [7.A.4]
4. C [7.A.4]
5. D [7.A.4]
6. C [7.A.4]
7. Short-response [7.A.4]
   $y = \frac{13}{16}$; $3(4y + 2) + 2(2y - 7) = 5$
   $12y + 6 + 4y - 14 = 5$
   $16y - 8 = 5$
   $16y = 13$
   $y = \frac{13}{16}$
8. Extended-response [7.A.4]
   A. $w = 4$; $6w + 3 - (w + 8) = 19 - w$
   $6w + 3 - w - 8 = 19 - w$
   $5w - 5 = 19 - w$
   $6w - 5 = 19$
   $6w = 24$
   $w = 4$
   B. $6(4) + 3 - (4 + 8) = 19 - 4$
   $24 + 3 - 12 = 15$
   $15 = 15$

Lesson 4 *Representing Patterns and Functions* pp. 16–19

1. C [7.A.8]
2. B [7.A.8]
3. Short-response [7.A.8]
   Tables will vary but should resemble the following:

x	*y*
0	−1
1	4
2	9
3	14

   Explanations may vary but should say something like the following: I picked small values for *x,* then substituted the values into the equation and solved for *y.*

4. Extended-response [7.A.8]
   A. **WATER USAGE VS. COST**

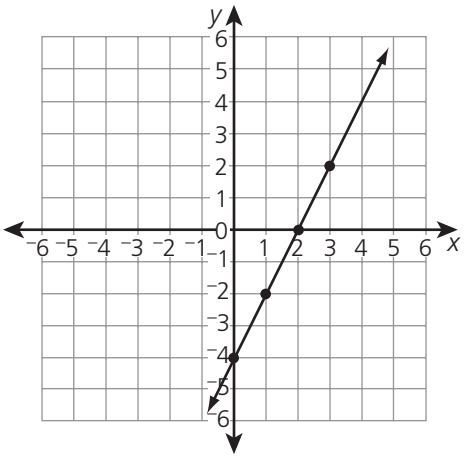
Gallons Used (in thousands)	Total Cost (in dollars)
0	20
1	23
2	26
3	29
4	32

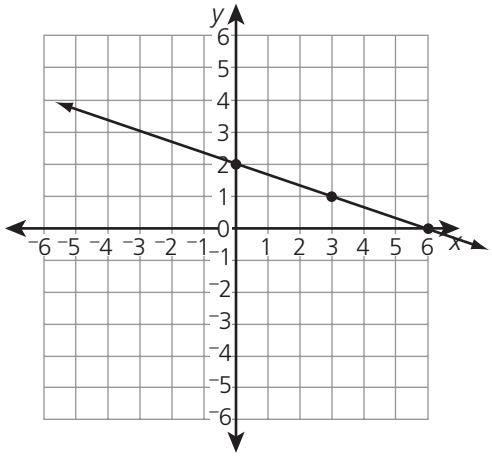
   Explanations may vary but should say something like the following: I substituted the values of x into the equation and solved for y.
   B. $50

Lesson 5 *Graphing Patterns and Functions* pp. 20–23

1. C [7.A.7]
2. D [7.A.7]
3. B [7.A.7]
4. C [7.A.7]
5. Short-response [7.A.7]
   A.

x	*y*
0	−4
1	−2
2	0
3	2

   B. 

6. Extended-response [7.A.7]
   A. 

   Explanations may vary but should say something like the following: I chose $x = 0$, $x = 3$, and $x = 6$, so that the y-values would be whole numbers. I substituted each x-value into the equation $y = -\frac{1}{3}x + 2$ and solved for the y-value. When $x = 0$, $y = -\frac{1}{3}(0) + 2 = 2$. When $x = 3$, $y = -\frac{1}{3}(3) + 2 = 1$. When $x = 6$, $y = -\frac{1}{3}(6) + 2 = 0$. So the points I plotted were (0, 2), (3, 1), and (6, 0).
   B. yes; *Explanations may vary but should say something like the following:* If $x = 15$, $y = -\frac{1}{3}(15) + 2 = -3$. So the point (15, −3) would be on this line.

Lesson 6 *Pythagorean Theorem* pp. 24–27

1. B [7.G.5]
2. C [7.G.5]
3. A [7.G.6]
4. C [7.G.6]
5. Short-response [7.G.6]
   $AB^2 + BC^2 = AC^2$; *Explanations may vary but should say something like the following:* The right angle in $\triangle ABC$ is $\angle B$, so the legs are $\overline{AB}$ and $\overline{BC}$, and the hypotenuse is $\overline{AC}$. According to the Pythagorean theorem, the sum of the squares of the legs equals the square of the hypotenuse, so the equation is $AB^2 + BC^2 = AC^2$.
6. Extended-response [7.G.5, 6]
   A. *legs:* $\overline{TU}$ and $\overline{UV}$; *hypotenuse:* $\overline{TV}$; *Explanations may vary but should say something like the following:* If the measure of $\angle U$ was 90°, then $\angle U$ was the right

angle in $\triangle TUV$. So the legs were the two line segments that contain point *U:* $\overline{TU}$ and $\overline{UV}$, and the hypotenuse is the line segment that does not contain point *U:* $\overline{TV}$.

B. $TU^2 + UV^2 = TV^2$

Lesson 7 *Applying the Pythagorean Theorem* pp. 28–31

1. A [7.G.8]
2. C [7.G.9]
3. D [7.G.8]
4. A [7.G.8]
5. C [7.G.8]
6. Short-response [7.G.8]
   21 feet; $x^2 + 20^2 = 29^2$
   $x^2 + 400 = 841$
   $x^2 = 441$
   $x = \sqrt{441} = 21$
7. Extended-response [7.G.8, 9]
   A. 17 centimeters; $8^2 + 15^2 = JL^2$
   $64 + 225 = JL^2$
   $289 = JL^2$
   $\sqrt{289} = \sqrt{JL^2}$
   $17 = JL$
   B. no; *Explanations may vary but should say something like the following:* I used the Pythagorean theorem to check if $\triangle JKL$ is a right triangle: $12^2 + 17^2 = 144 + 289 = 433$; $21^2 = 441$. So $12^2 + 17^2 \neq 21^2$, so $\triangle JKL$ is not a right triangle.