

Polynomial Operations Lesson #7: Practice Test

1. Which of the following could not be classified as a monomial?

- A. $9x^4$ B. $x + 1$ C. 7 D. $-6x$

2. The degree of the polynomial $a^3b + 2c^2$ is

- A. 3 B. 4 C. 5 D. 6

3. Which of the following is a polynomial of degree 5?

- I $5x$ II $3x^5 - 2x^6$ III $2x^4 - 3x^{-2} + 5x^5$ IV $3x^2y^3$

- A. IV only B. III and IV only C. I, II, III, and IV
D. some other combination of I, II, III, and IV

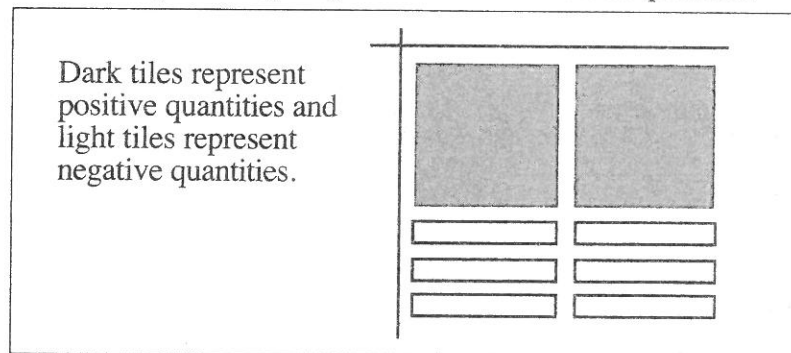
**Numerical
Response**

1. The polynomial $2x^3 - 9 + 8x^4$ has leading coefficient P , degree Q , and constant term R . The value of $P - Q - R$ is _____.

(Record your answer in the numerical response box from left to right)

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Use the following diagram to answer the next question.



4. The algebra tile diagram represents the expansion of

- A. $2x^2(x^2 - 3x)$
B. $x^2(x - 3)$
C. $2x(x - 3)$
D. $2x(x + 3)$

5. When $(x + y)(x - y)$ is expanded, how many terms are in the simplified product?

- A. 1 B. 2
C. 3 D. 4

6. The area (in mm^2) of a rectangle with length $6 - a$ mm and width $8 - a$ mm is

- A. $48 + a^2$
B. $48 - 14a - a^2$
C. $48 - 2a + a^2$
D. $48 - 14a + a^2$

7. Which of the following expansions is correct?

- A. $-2x^2(3x^3 + 5) = -6x^6 - 10x^2$
B. $-7x(2 - 3x) = -14x - 21x^2$
C. $-5x^3(4 + x) = -20x^3 - 5x^3$
D. $-9x^2(1 - x) = -9x^2 + 9x^3$

Numerical
Response

2. The expression $6x(4 - 3x) - 5x(x - 4) - (9x + 2)$ can be written in the form $ax^2 + bx + c$. The value of abc is _____.

(Record your answer in the numerical response box from left to right)

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8. Triangle PQR is isosceles and right angled at Q . Side PQ measures $2x + 8$ cm. If the area of the triangle can be expressed in the form $ax^2 + bx + c \text{ cm}^2$, then the value of b is

- A. 32
B. 16
C. 8
D. 6

Numerical
Response

3. If $(x - a)^2 + a = x^2 - 12x + c$, then the value of c is _____.

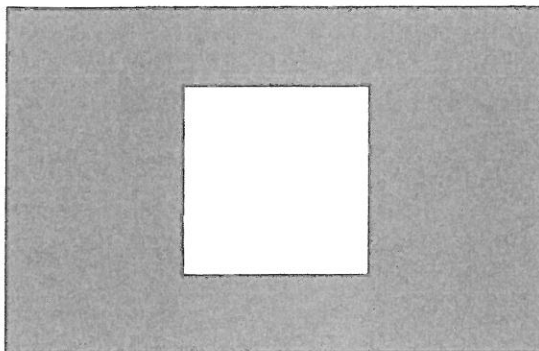
(Record your answer in the numerical response box from left to right)

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Use the following information to answer the next question.

The rectangle has length $4x + 3$ mm
and width $2x + 4$ mm.

The square has side length $x + 3$ mm.



9. The area, in mm^2 , of the shaded region is

- A. $7x^2 + 22x + 21$
- B. $7x^2 + 28x + 21$
- C. $7x^2 + 16x + 3$
- D. $7x^2 + 22x + 3$

10. The expansion $(6t - 1)(2t^2 - 7t - 1)$ is

- A. $12t^3 - 44t^2 + t + 1$
- B. $12t^3 - 40t^2 - 13t + 1$
- C. $12t^3 - 44t^2 - t + 1$
- D. $12t^3 - 44t^2 - 13t - 1$

11. Subtracting the product of $(2x - 3)$ and $(3x + 2)$ from the sum of $(3x^2 + 3x - 2)$ and $(3x^2 + 2x - 4)$ results in a polynomial of the form $px^2 + qx + r$. How many of the parameters p, q, r are equal to zero?
- A. 0
B. 1
C. 2
D. 3
12. Expand $(a + 3)(a - 6)(2a + 1)$
- A. $2a^3 - 5a^2 - 39a - 18$
B. $2a^3 + 7a^2 - 33a - 18$
C. $2a^3 + a^2 - 45a - 18$
D. $2a^3 - 18$

In questions #13 and #14 four responses are given.

Answer A if response 1 and response 2 only are correct

B if response 1 and response 3 only are correct

C if response 2 and response 4 only are correct

D if some other response or combination of the responses is correct.

13. Which of the following are binomials of degree 6?

Response 1: $x^6 + x$

Response 2: $6x^3 + 6y^3$

Response 3: $4a^2b^4 + 2a^3$

Response 4: y^5z

14. Which of the following polynomial products contains a term of degree one?

Response 1 $(x - 3)(x - 2)$

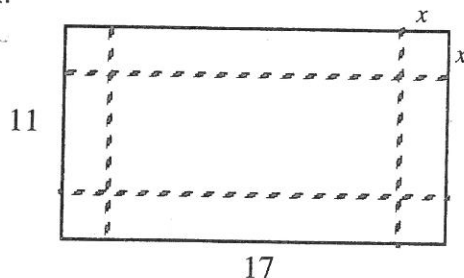
Response 2 $(x - 3)(x - 3)$

Response 3 $(x - 3)(x + 3)$

Response 4 $(x - 3)(x - 6)(x + 2)$

Use the following information to answer questions #15 and Numerical Response #5.

A sheet of paper measures 17 cm by 11 cm. Squares of side x cm are cut out from each corner as shown. The paper is folded along the dotted lines to form a rectangular prism.



15. The length and width (in cm) of the rectangular prism are respectively
- $17 - x$ and $11 - x$
 - $17 - 2x$ and $11 - 2x$
 - $17 + x$ and $11 + x$
 - $17 + 2x$ and $11 + 2x$

Numerical
Response

4. The volume of the rectangular prism can be written as the polynomial expression $ax^3 + bx^2 + cx$ where a , b , and c are integers. The value of $a + c$, to the nearest whole number, is _____.

(Record your answer in the numerical response box from left to right)

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Numerical
Response

5. The trinomial $x^2 - 14x + 52$ can be expressed in the form $(x - p)^2 + q$.

Write the value of p in the first box.

Write the value of q in the second box.

(Record your answer in the numerical response box from left to right)

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Written Response - 5 marks

Use the following information to answer the next question.

1.

Three students, Wendy, Cooper and Sahil, are attempting to expand the polynomial $5(3y - 1)^2$.
Their work is shown below.

	Wendy	Cooper	Sahil
	$5(3y - 1)^2$	$5(3y - 1)^2$	$5(3y - 1)^2$
Line 1	$(15y - 5)^2$	$5(6y^2 - 6y + 1)$	$5(9y^2 - 3y + 1)$
Line 2	$225y^2 - 150y + 25$	$30y^2 - 30y + 5$	$45y^2 - 15y + 5$

- Wendy's work contains one mathematical error. Describe in detail the error she made.
- Cooper's work contains one mathematical error. Describe in detail the error he made.
- Sahil's work contains one mathematical error. Describe in detail the error he made.
- Determine the correct expansion of $5(3y - 1)^2$.
- Verify the expansion by substituting $x = -4$ in the original expression and in your expansion and confirming the same numerical value.

Answer Key

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. B | 3. A | 4. C | 5. B |
| 6. D | 7. D | 8. B | 9. C | 10. A |
| 11. C | 12. A | 13. B | 14. A | 15. B |

Numerical Response

- | | | | | | | | | | | | | | | |
|--|---|---|---|--|---|---|---|---|---|---|---|---|--|--|
| 1. <table border="1" style="display: inline-table;"><tr><td>1</td><td>3</td><td></td><td></td></tr></table> | 1 | 3 | | | 2. <table border="1" style="display: inline-table;"><tr><td>1</td><td>6</td><td>1</td><td>0</td></tr></table> | 1 | 6 | 1 | 0 | 3. <table border="1" style="display: inline-table;"><tr><td>4</td><td>2</td><td></td><td></td></tr></table> | 4 | 2 | | |
| 1 | 3 | | | | | | | | | | | | | |
| 1 | 6 | 1 | 0 | | | | | | | | | | | |
| 4 | 2 | | | | | | | | | | | | | |
| 4. <table border="1" style="display: inline-table;"><tr><td>1</td><td>9</td><td>1</td><td></td></tr></table> | 1 | 9 | 1 | | 5. <table border="1" style="display: inline-table;"><tr><td>7</td><td>3</td><td></td><td></td></tr></table> | 7 | 3 | | | | | | | |
| 1 | 9 | 1 | | | | | | | | | | | | |
| 7 | 3 | | | | | | | | | | | | | |

Written response

- In line 1 Wendy distributed the 5 before squaring. BEDMAS tells us to do exponents before multiplication.
- In line 1 Cooper expanded $(3y - 1)^2$ incorrectly. The first term should be $(3y)(3y) = 9y^2$.
- In line 1 Sahil also expanded $(3y - 1)^2$ incorrectly. The middle term should be $(3y)(-1)(2) = -6y$.
- $5(3y - 1)^2 = 5(9y^2 - 6y + 1) = 45y^2 - 30y + 5$
- $LS = 5[3(-4) - 1]^2 = 5[-12 - 1]^2 = 5(-13)^2 = 5(169) = 845$

$$RS = 45(-4)^2 - 30(-4) + 5 = 45(16) + 120 + 5 = 720 + 120 + 5 = 845$$

$LS = RS$ so the expansion is verified.

Polynomial Operations Lesson #7: Practice Test

1. Which of the following could not be classified as a monomial?

- A. $9x^4$ **(B.)** $x + 1$ C. 7 D. $-6x$

2. The degree of the polynomial $a^3b + 2c^2$ is

- A. 3 **(B.)** 4 C. 5 D. 6
- $3+1=4$

3. Which of the following is a polynomial of degree 5?

- I $5x$ II $3x^5 - 2x^6$ III $2x^4 - 3x^{-2} + 5x^5$ IV $3x^2y^3$
 degree 1 degree 6 not a polynomial degree $2+3=5$
- (A.)** IV only B. III and IV only C. I, II, III, and IV
 D. some other combination of I, II, III, and IV

**Numerical
Response**

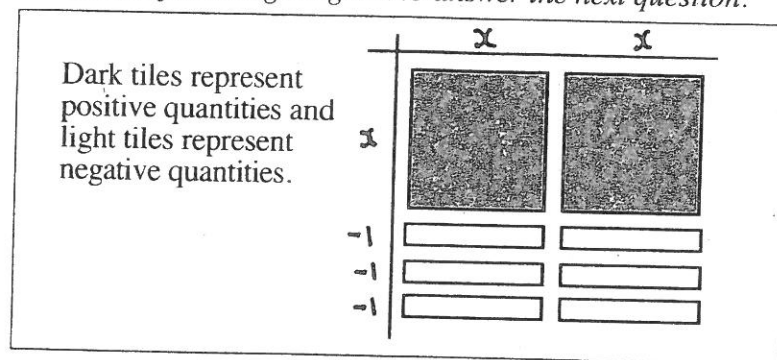
1. The polynomial $2x^3 - 9 + 8x^4$ has leading coefficient P , degree Q , and constant term R . The value of $P - Q - R$ is _____.

(Record your answer in the numerical response box from left to right)

$$\begin{aligned} P &= 8 \\ Q &= 4 \\ R &= -9 \\ P - Q - R &= 8 - 4 - (-9) = 13 \end{aligned}$$

1	3		
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Use the following diagram to answer the next question.



4. The algebra tile diagram represents the expansion of

- A. $2x^2(x^2 - 3x)$
 B. $x^2(x - 3)$
(C.) $2x(x - 3)$
 D. $2x(x + 3)$

5. When $(x+y)(x-y)$ is expanded, how many terms are in the simplified product?

A. 1

B. 2

C. 3

D. 4

$$\begin{aligned} x^2 - xy + xy - y^2 \\ = x^2 - y^2 \end{aligned}$$

6. The area (in mm^2) of a rectangle with length $6-a$ mm and width $8-a$ mm is

A. $48 + a^2$

B. $48 - 14a - a^2$

C. $48 - 2a + a^2$

D. $48 - 14a + a^2$

$$\begin{aligned} A &= (6-a)(8-a) \\ &= 48 - 6a - 8a + a^2 \\ &= 48 - 14a + a^2 \end{aligned}$$

7. Which of the following expansions is correct?

A. $-2x^2(3x^3 + 5) = -6x^6 - 10x^2$

B. $-7x(2 - 3x) = -14x - 21x^2$

C. $-5x^3(4 + x) = -20x^3 - 5x^3$

D. $-9x^2(1 - x) = -9x^2 + 9x^3$

$-6x^5 - 10x^2$ ✗

$-14x + 21x^2$ ✗

$-20x^3 - 5x^4$ ✗

$-9x^2 + 9x^3$ ✓

Numerical Response

2. The expression $6x(4-3x) - 5x(x-4) - (9x+2)$ can be written in the form $ax^2 + bx + c$. The value of abc is _____.

(Record your answer in the numerical response box from left to right)

1	6	1	0
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$$6x(4-3x) - 5x(x-4) - (9x+2)$$

$$= 24x - 18x^2 - 5x^2 + 20x - 9x - 2$$

$$= -23x^2 + 35x - 2$$

$$a = -23 \quad b = 35 \quad c = -2$$

$$abc = (-23)(35)(-2)$$

$$= 1610$$

8. Triangle PQR is isosceles and right angled at Q . Side PQ measures $2x+8$ cm.

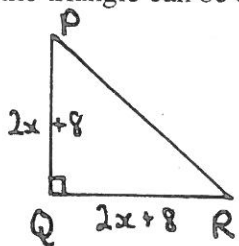
If the area of the triangle can be expressed in the form $ax^2 + bx + c$ cm^2 , then the value of b is

A. 32

B. 16

C. 8

D. 6



$$A = \frac{1}{2}bh = \frac{1}{2}(2x+8)(2x+8)$$

$$= \frac{1}{2}(4x^2 + 16x + 16x + 64)$$

$$= \frac{1}{2}(4x^2 + 32x + 64)$$

$$= 2x^2 + 16x + 32$$

$$b = 16$$

Numerical
Response

3. If $(x - a)^2 + a = x^2 - 12x + c$, then the value of c is _____.

(Record your answer in the numerical response box from left to right)

4	2		
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$$x^2 - 2ax + a^2 + a = x^2 - 12x + c$$

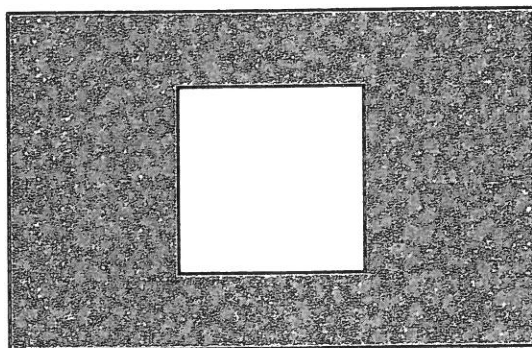
compare coefficients of x : $-2a = -12$ $a = 6$

compare constant terms : $a^2 + a = c$ $c = 6^2 + 6 = 42$

Use the following information to answer the next question.

The rectangle has length $4x + 3$ mm
and width $2x + 4$ mm.

The square has side length $x + 3$ mm.



9. The area, in mm^2 , of the shaded region is

A. $7x^2 + 22x + 21$

B. $7x^2 + 28x + 21$

☒ C. $7x^2 + 16x + 3$

D. $7x^2 + 22x + 3$

$$\begin{aligned} \text{area} &= (4x + 3)(2x + 4) - (x + 3)^2 \\ &= 8x^2 + 16x + 6x + 12 - (x^2 + 6x + 9) \\ &= 8x^2 + 22x + 12 - x^2 - 6x - 9 \\ &= 7x^2 + 16x + 3 \end{aligned}$$

10. The expansion $(6t - 1)(2t^2 - 7t - 1)$ is

☒ A. $12t^3 - 44t^2 + t + 1$

B. $12t^3 - 40t^2 - 13t + 1$

C. $12t^3 - 44t^2 - t + 1$

D. $12t^3 - 44t^2 - 13t - 1$

$$\begin{aligned} &6t(2t^2 - 7t - 1) - 1(2t^2 - 7t - 1) \\ &= 12t^3 - 42t^2 - 6t - 2t^2 + 7t + 1 \\ &= 12t^3 - 44t^2 + t + 1 \end{aligned}$$

11. Subtracting the product of $(2x - 3)$ and $(3x + 2)$ from the sum of $(3x^2 + 3x - 2)$ and $(3x^2 + 2x - 4)$ results in a polynomial of the form $px^2 + qx + r$. How many of the parameters p, q, r are equal to zero?

A. 0
 B. 1
 C. 2
 D. 3

$$\begin{aligned} & (3x^2 + 3x - 2) + (3x^2 + 2x - 4) - (2x - 3)(3x + 2) \\ &= 6x^2 + 5x - 6 - (6x^2 + 4x - 9x - 6) \\ &= 6x^2 + 5x - 6 - 6x^2 - 4x + 9x + 6 \\ &= 10x \end{aligned}$$

$p = 0 \quad q = 10 \quad r = 0$

12. Expand $(a + 3)(a - 6)(2a + 1)$

A. $2a^3 - 5a^2 - 39a - 18$
 B. $2a^3 + 7a^2 - 33a - 18$
 C. $2a^3 + a^2 - 45a - 18$
 D. $2a^3 - 18$

$$\begin{aligned} & (a + 3)(2a^2 + a - 12a - 6) \\ &= (a + 3)(2a^2 - 11a - 6) \\ &= a(2a^2 - 11a - 6) + 3(2a^2 - 11a - 6) \\ &= 2a^3 - 11a^2 - 6a + 6a^2 - 33a - 18 \\ &= 2a^3 - 5a^2 - 39a - 18 \end{aligned}$$

In questions #13 and #14 four responses are given.

Answer A if response 1 and response 2 only are correct

B if response 1 and response 3 only are correct

C if response 2 and response 4 only are correct

D if some other response or combination of the responses is correct.

13. Which of the following are binomials of degree 6?

Response 1: $x^6 + x$ ✓
 Response 2: $6x^3 + 6y^3$ degree 3
 Response 3: $4a^2b^4 + 2a^3$ $2+4=6$ ✓
 Response 4: y^5z $5+1=6$ but not a binomial

B

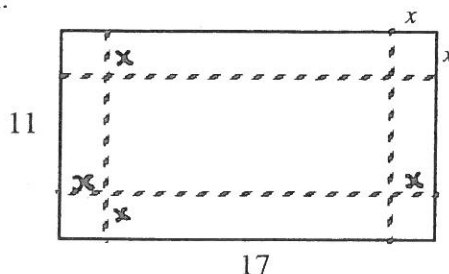
14. Which of the following polynomial products contains a term of degree one?

Response 1: $(x - 3)(x - 2) = x^2 - 2x - 3x + 6 = x^2 - 5x + 6$ ✓
 Response 2: $(x - 3)(x - 3) = x^2 - 3x - 3x + 9 = x^2 - 6x + 9$ ✓
 Response 3: $(x - 3)(x + 3) = x^2 + 3x - 3x - 9 = x^2 - 9$ ✗
 Response 4: $(x - 3)(x - 6)(x + 2) = (x - 3)(x^2 + 2x - 6x - 12) = (x - 3)(x^2 - 4x - 12)$ ✗
 $= x(x^2 - 4x - 12) - 3(x^2 - 4x - 12) = x^3 - 4x^2 - 12x - 3x^2 + 12x + 36 = x^3 - 7x^2 + 36$

A

Use the following information to answer questions #15 and Numerical Response #5.

A sheet of paper measures 17 cm by 11 cm. Squares of side x cm are cut out from each corner as shown. The paper is folded along the dotted lines to form a rectangular prism.



15. The length and width (in cm) of the rectangular prism are respectively

A. $17 - x$ and $11 - x$
 B. $17 - 2x$ and $11 - 2x$
 C. $17 + x$ and $11 + x$
 D. $17 + 2x$ and $11 + 2x$

Numerical
Response

4. The volume of the rectangular prism can be written as the polynomial expression $ax^3 + bx^2 + cx$ where a , b , and c are integers. The value of $a + c$, to the nearest whole number, is _____.

(Record your answer in the numerical response box from left to right)

1	9	1	
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$$\begin{aligned} \text{Volume} &= x(17-2x)(11-2x) = x(187 - 34x - 22x + 4x^2) \\ &= x(187 - 56x + 4x^2) = 187x - 56x^2 + 4x^3 \\ &= 4x^3 - 56x^2 + 187x \end{aligned}$$

$$a = 4 \quad b = -56 \quad c = 187$$

$$\begin{aligned} a + c &= 4 + 187 \\ &= 191 \end{aligned}$$

Numerical
Response

5. The trinomial $x^2 - 14x + 52$ can be expressed in the form $(x - p)^2 + q$.

Write the value of p in the first box.

Write the value of q in the second box.

(Record your answer in the numerical response box from left to right)

7	3		
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$$(x - p)^2 + q = x^2 - 14x + 52$$

$$x^2 - 2px + p^2 + q = x^2 - 14x + 52$$

$$-2p = -14$$

$$p = 7$$

$$p^2 + q = 52$$

$$7^2 + q = 52 \quad q = 3$$

Written Response - 5 marks

Use the following information to answer the next question.

1.

Three students, Wendy, Cooper and Sahil, are attempting to expand the polynomial $5(3y - 1)^2$.

Their work is shown below.

	Wendy	Cooper	Sahil
Line 1	$5(3y - 1)^2$ $(15y - 5)^2$	$5(3y - 1)^2$ $5(6y^2 - 6y + 1)$	$5(3y - 1)^2$ $5(9y^2 - 3y + 1)$
Line 2	$225y^2 - 150y + 25$	$30y^2 - 30y + 5$	$45y^2 - 15y + 5$

- Wendy's work contains one mathematical error. Describe in detail the error she made.

In line 1 Wendy distributed the 5 before squaring.

BEDMAS tells us to do exponents before multiplication.

- Cooper's work contains one mathematical error. Describe in detail the error he made.

In line 1 Cooper expanded $(3y - 1)^2$ incorrectly.

The first term should be $(3y)(3y) = 9y^2$

- Sahil's work contains one mathematical error. Describe in detail the error he made.

In line 1 Sahil also expanded $(3y - 1)^2$ incorrectly.

The middle term should be $(3y)(-1)(2) = -6y$

- Determine the correct expansion of $5(3y - 1)^2$.

$$5(3y - 1)^2$$

$$= 5(9y^2 - 6y + 1) = 45y^2 - 30y + 5$$

- Verify the expansion by substituting $y = -4$ in the original expression and in your expansion and confirming the same numerical value.

$$LS = 5(3(-4) - 1)^2 = 5(-12 - 1)^2 = 5(-13)^2 = 5(169) = 845$$

$$RS = 45(-4)^2 - 30(-4) + 5 = 45(16) + 120 + 5 = 720 + 120 + 5 = 845$$

LS = RS so the expansion is verified.

Answer Key

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. B | 3. A | 4. C | 5. B |
| 6. D | 7. D | 8. B | 9. C | 10. A |
| 11. C | 12. A | 13. B | 14. A | 15. B |

Numerical Response

1.

1	3		
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2.

1	6	1	0
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3.

4	2		
---	---	--	--

4.

1	9	1	
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5.

7	3		
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Written response

- In line 1 Wendy distributed the 5 before squaring. BEDMAS tells us to do exponents before multiplication.
- In line 1 Cooper expanded $(3y - 1)^2$ incorrectly. The first term should be $(3y)(3y) = 9y^2$.
- In line 1 Sahil also expanded $(3y - 1)^2$ incorrectly. The middle term should be $(3y)(-1)(2) = -6y$.
- $5(3y - 1)^2 = 5(9y^2 - 6y + 1) = 45y^2 - 30y + 5$
- $LS = 5[3(-4) - 1]^2 = 5[-12 - 1]^2 = 5(-13)^2 = 5(169) = 845$

$$RS = 45(-4)^2 - 30(-4) + 5 = 45(16) + 120 + 5 = 720 + 120 + 5 = 845$$

$LS = RS$ so the expansion is verified.