Answers to Unit 5

SECTION 1

Pages 167–168

Example 2

$$\begin{array}{r} 2x^2 + 4x - 3 \\ +\ 5x^2 - 6x \\ \hline 7x^2 - 2x - 3 \end{array}$$

Example 4

$$(-3x^2 + 2y^2) + (-8x^2 + 9xy)$$
$$-11x^2 + 9xy + 2y^2$$

Example 6

$$\begin{array}{r} 8y^2 - 4xy + x^2 \\ -\ 2y^2 - xy + 5x^2 \\ \hline \end{array} =$$

$$\begin{array}{r} 8y^2 - 4xy + x^2 \\ +\ -2y^2 + xy - 5x^2 \\ \hline 6y^2 - 3xy - 4x^2 \end{array}$$

Example 8

$$(-3a^2 - 4a + 2) - (5a^3 + 2a - 6)$$
$$(-3a^2 - 4a + 2) + (-5a^3 - 2a + 6)$$
$$-5a^3 - 3a^2 - 6a + 8$$

Pages 169–170

1. $-2x^2 + 3x$ **3.** $y^2 - 8$ **5.** $5x^2 + 7x + 20$ **7.** $x^3 + 2x^2 - 6x - 6$ **9.** $2a^3 - 3a^2 - 11a + 2$
11. $5x^2 + 8x$ **13.** $7x^2 + xy - 4y^2$ **15.** $3a^2 - 3a + 17$ **17.** $5x^3 + 10x^2 - x - 4$ **19.** $3r^3 + 2r^2 - 11r + 7$
21. $-2x^3 + 3x^2 + 10x + 11$ **23.** $4x$ **25.** $3y^2 - 4y - 2$ **27.** $-7x - 7$ **29.** $4x^3 + 3x^2 + 3x + 1$
31. $y^3 - y^2 + 6y - 6$ **33.** $-y^2 - 13xy$ **35.** $2x^2 - 3x - 1$ **37.** $-2x^3 + x^2 + 2$ **39.** $3a^3 - 2$
41. $4y^3 - 2y^2 + 2y - 4$

SECTION 2

Pages 171–172

Example 2

$$(3x^2)(6x^3) = (3 \cdot 6)(x^2 \cdot x^3) =$$
$$18x^5$$

Example 4

$$(-3xy^2)(-4x^2y^3) =$$
$$[(-3)(-4)](x \cdot x^2)(y^2 \cdot y^3) =$$
$$12x^3y^5$$

Example 6

$$(3x)(2x^2y)^3 =$$
$$(3x)(2^3x^6y^3) = (3x)(8x^6y^3) =$$
$$(3 \cdot 8)(x \cdot x^6)y^3 = 24x^7y^3$$

Example 8

$$(3x^2)^2(-2xy^2)^3 =$$
$$(3^2x^4)[(-2)^3x^3y^6] =$$
$$(9x^4)(-8x^3y^6) =$$
$$[9(-8)](x^4 \cdot x^3)y^6 =$$
$$-72x^7y^6$$

Pages 173–174

1. $2x^2$ **3.** $12x^2$ **5.** $6a^7$ **7.** x^3y^5 **9.** $-10x^9y$ **11.** x^7y^8 **13.** $-6x^3y^5$ **15.** x^4y^5z **17.** $a^3b^5c^4$
19. $-a^5b^8$ **21.** $-6a^5b$ **23.** $40y^{10}z^6$ **25.** $-20a^2b^3$ **27.** $x^3y^5z^3$ **29.** $-12a^{10}b^7$ **31.** $-36a^3b^2c^3$
33. 81 **35.** -27 **37.** -512 **39.** y^8 **41.** y^{15} **43.** $-x^6$ **45.** $27y^3$ **47.** $9y^6$ **49.** $x^{15}y^{20}$
51. $16a^4b^{12}$ **53.** $16a^{12}b^2$ **55.** $-54y^{13}$ **57.** a^6b^4 **59.** $x^{13}y^5$ **61.** $192x^6y^{10}$ **63.** $24x^6y^4$ **65.** $9a^4b^{10}$
67. $-24a^3b^8$ **69.** $729a^9b^6$

SECTION 3 Pages 175–178

Example 2 $(-2y + 3)(-4y) = 8y^2 - 12y$

Example 4 $-a^2(3a^2 + 2a - 7) = -3a^4 - 2a^3 + 7a^2$

Example 6

$$\begin{array}{r} 2y^3 + 2y^2 - 3 \\ \times\ 3y - 1 \\ \hline -2y^3 - 2y^2 + 3 \\ 6y^4 + 6y^3 - 9y \\ \hline 6y^4 + 4y^3 - 2y^2 - 9y + 3 \end{array}$$

Example 8 $(4y - 5)(2y - 3) = 8y^2 - 12y - 10y + 15 = 8y^2 - 22y + 15$

Example 10 $(3b + 2)(3b - 5) = 9b^2 - 15b + 6b - 10 = 9b^2 - 9b - 10$

Example 12 $(2a + 5c)(2a - 5c) = 4a^2 - 25c^2$

Example 14 $(3x + 2y)^2 = 9x^2 + 12xy + 4y^2$

Example 16

Strategy To find the area, replace the variable r in the equation $A = \pi r^2$ by the given value and solve for A.

Solution
$A = \pi r^2$
$A = 3.14(x - 4)^2$
$A = 3.14(x^2 - 8x + 16)$
$A = 3.14x^2 - 25.12x + 50.24$
The area is $3.14x^2 - 25.12x + 50.24$.

Pages 179–182

1. $x^2 - 2x$ **3.** $-x^2 - 7x$ **5.** $3a^3 - 6a^2$ **7.** $-5x^4 + 5x^3$ **9.** $-3x^5 + 7x^3$ **11.** $12x^3 - 6x^2$
13. $6x^2 - 12x$ **15.** $3x^2 + 4x$ **17.** $-x^3y + xy^3$ **19.** $2x^4 - 3x^2 + 2x$ **21.** $2a^3 + 3a^2 + 2a$
23. $3x^6 - 3x^4 - 2x^2$ **25.** $-6y^4 - 12y^3 + 14y^2$ **27.** $-2a^3 - 6a^2 + 8a$ **29.** $6y^4 - 3y^3 + 6y^2$
31. $x^3y - 3x^2y^2 + xy^3$ **33.** $x^3 + 4x^2 + 5x + 2$ **35.** $a^3 - 6a^2 + 13a - 12$ **37.** $-2b^3 + 7b^2 + 19b - 20$
39. $-6x^3 + 31x^2 - 41x + 10$ **41.** $x^3 - 3x^2 + 5x - 15$ **43.** $x^4 - 4x^3 - 3x^2 + 14x - 8$
45. $15y^3 - 16y^2 - 70y + 16$ **47.** $5a^4 - 20a^3 - 5a^2 + 22a - 8$ **49.** $y^4 + 4y^3 + y^2 - 5y + 2$
51. $x^2 + 4x + 3$ **53.** $a^2 + a - 12$ **55.** $y^2 - 5y - 24$ **57.** $y^2 - 10y + 21$ **59.** $2x^2 + 15x + 7$
61. $3x^2 + 11x - 4$ **63.** $4x^2 - 31x + 21$ **65.** $3y^2 - 2y - 16$ **67.** $9x^2 + 54x + 77$ **69.** $21a^2 - 83a + 80$
71. $15b^2 + 47b - 78$ **73.** $2a^2 + 7ab + 3b^2$ **75.** $6a^2 + ab - 2b^2$ **77.** $2x^2 - 3xy - 2y^2$
79. $10x^2 + 29xy + 21y^2$ **81.** $6a^2 - 25ab + 14b^2$ **83.** $2a^2 - 11ab - 63b^2$ **85.** $100a^2 - 100ab + 21b^2$
87. $15x^2 + 56xy + 48y^2$ **89.** $14x^2 - 97xy - 60y^2$ **91.** $56x^2 - 61xy + 15y^2$ **93.** $y^2 - 25$ **95.** $4x^2 - 9$
97. $x^2 + 2x + 1$ **99.** $9a^2 - 30a + 25$ **101.** $9x^2 - 49$ **103.** $4a^2 + 4ab + b^2$ **105.** $x^2 - 4xy + 4y^2$
107. $16 - 9y^2$ **109.** $25x^2 + 20xy + 4y^2$

Page 182

1. The area is $8x^2 - 12x$. **3.** The area is $x^2 + 4x + 4$. **5.** The area is $3.14x^2 + 18.84x + 28.26$.

SECTION 4 Pages 183–186

Example 2 $\dfrac{42y^{12}}{-14y^{17}} = -\dfrac{\overset{1}{\cancel{2}}\cdot 3\cdot \overset{1}{\cancel{7}}y^{12}}{\underset{1}{\cancel{2}}\cdot \underset{1}{\cancel{7}}y^{17}} = -\dfrac{3}{y^5}$

Example 4 $\dfrac{12r^4s^2}{-8r^3s} = -\dfrac{\overset{1}{\cancel{2}}\cdot\overset{1}{\cancel{2}}\cdot 3r^4s^2}{\underset{1}{\cancel{2}}\cdot\underset{1}{\cancel{2}}\cdot 2r^3s} = -\dfrac{3rs}{2}$

Example 6 $\dfrac{(2x^2y)^3}{-4xy^5} = -\dfrac{2^3x^6y^3}{4xy^5} =$

$-\dfrac{\overset{1}{\cancel{2}}\cdot\overset{1}{\cancel{2}}\cdot 2x^6y^3}{\underset{1}{\cancel{2}}\cdot\underset{1}{\cancel{2}}xy^5} = -\dfrac{2x^5}{y^2}$

Example 8 $\dfrac{4x^3y + 8x^2y^2 - 4xy^3}{2xy} =$

$\dfrac{4x^3y}{2xy} + \dfrac{8x^2y^2}{2xy} - \dfrac{4xy^3}{2xy} =$

$2x^2 + 4xy - 2y^2$

Example 10 $\dfrac{24x^2y^2 - 18xy + 6y}{6xy} =$

$\dfrac{24x^2y^2}{6xy} - \dfrac{18xy}{6xy} + \dfrac{6y}{6xy} =$

$4xy - 3 + \dfrac{1}{x}$

Example 12

$$\begin{array}{r} x^2 + 2x - 1 \\ 2x - 3\overline{)\,2x^3 + x^2 - 8x - 3} \\ \underline{2x^3 - 3x^2} \\ 4x^2 - 8x \\ \underline{4x^2 - 6x} \\ -2x - 3 \\ \underline{-2x + 3} \\ -6 \end{array}$$

$(2x^3 + x^2 - 8x - 3) \div (2x - 3) =$

$x^2 + 2x - 1 - \dfrac{6}{2x - 3}$

Pages 187–190

1. $3x$ **3.** $-x$ **5.** $4x^3$ **7.** $-\dfrac{4}{x^2}$ **9.** $\dfrac{a}{b^4}$ **11.** y^3 **13.** $\dfrac{3}{5}$ **15.** $\dfrac{24}{b}$ **17.** $-\dfrac{3}{5ab^2}$ **19.** $-\dfrac{4b}{9}$ **21.** $-\dfrac{2x^2y^2}{11z^5}$

23. $-8a^3b^4$ **25.** $\dfrac{4a^2}{9b^3}$ **27.** $\dfrac{x^2y^2}{z^3}$ **29.** $\dfrac{a^2}{b}$ **31.** $-\dfrac{a^2}{c^2}$ **33.** y^4 **35.** $y + 1$ **37.** $2b - 5$ **39.** $6y + 4$

41. $12x - 7$ **43.** $5y - 3$ **45.** $-y + 9$ **47.** $a^2 - 5a + 7$ **49.** $a^6 - 5a^3 - 3a$ **51.** $xy - 3$

53. $-2x^2 + 3$ **55.** $8y + 2 - \dfrac{3}{y}$ **57.** $2y - 6 + \dfrac{9}{y}$ **59.** $2a + 1 - 3b$ **61.** $a - 3 + 6b$ **63.** $x + 5$

65. $b - 7$ **67.** $y - 5$ **69.** $2y - 7$ **71.** $2y + 6 + \dfrac{25}{y - 3}$ **73.** $x - 2 + \dfrac{8}{x + 2}$ **75.** $3y - 5 + \dfrac{20}{2y + 4}$

77. $6x - 12 + \dfrac{19}{x + 2}$ **79.** $b - 5 - \dfrac{24}{b - 3}$ **81.** $3x + 17 + \dfrac{64}{x - 4}$ **83.** $5y + 3 + \dfrac{1}{2y + 3}$ **85.** $4a + 1$

87. $2a + 9 + \dfrac{33}{3a - 1}$ **89.** $x^2 - 5x + 2$ **91.** $2a^2 + a + 1 + \dfrac{6}{2a + 3}$ **93.** $2b^2 - 3b + 4 - \dfrac{17}{2b + 3}$

95. $5x^2 + 3x + 3 + \dfrac{6}{x - 2}$ **97.** $x^2 + 5$

SECTION 5 Pages 191–192

Example 2 $\dfrac{2^{-2}}{2^3} = 2^{-5} = \dfrac{1}{2^5} = \dfrac{1}{32}$

Example 4 $(-2x^2)(x^{-3}y^{-4})^{-2} =$

$(-2x^2)(x^6y^8) = -2x^8y^8$

Example 6 $\dfrac{(3x^{-2}y)^3}{9xy^0} = \dfrac{3^3x^{-6}y^3}{9xy^0} =$

$\dfrac{\overset{1}{\cancel{3}}\cdot\overset{1}{\cancel{3}}\cdot 3x^{-6}y^3}{\underset{1}{\cancel{3}}\cdot\underset{1}{\cancel{3}}xy^0} = 3x^{-7}y^3 = \dfrac{3y^3}{x^7}$

Pages 193–194

1. $\frac{1}{5^2} = \frac{1}{25}$ **3.** $\frac{1}{7^1} = \frac{1}{7}$ **5.** $\frac{1}{3^3} = \frac{1}{27}$ **7.** $\frac{1}{2^6} = \frac{1}{64}$ **9.** $\frac{1}{x^2}$ **11.** $\frac{1}{a^6}$ **13.** $\frac{x^2}{y^3}$ **15.** $\frac{1}{xy^2}$ **17.** x
19. $\frac{1}{a^7}$ **21.** $\frac{1}{x^4}$ **23.** $\frac{1}{a^8}$ **25.** $\frac{y}{x^3}$ **27.** $\frac{b}{a^2}$ **29.** $\frac{1}{a^4}$ **31.** $\frac{1}{a^6}$ **33.** x^6 **35.** a^{18} **37.** 1 **39.** $\frac{y^4}{x^4}$
41. $\frac{x}{y^5}$ **43.** $\frac{1}{x^4y^3}$ **45.** $\frac{y^2}{x^4}$ **47.** x^9y^9 **49.** $-\frac{8x^3}{y^6}$ **51.** $\frac{16x^4}{y^6}$ **53.** $\frac{9}{x^2y^4}$ **55.** $\frac{2}{x^4}$ **57.** $-\frac{5}{a^8}$ **59.** $-\frac{a^5}{8b^4}$
61. $\frac{10y^3}{x^4}$ **63.** $\frac{1}{a^5b^6}$ **65.** $\frac{1}{4x^3}$ **67.** $\frac{16}{3a^5}$ **69.** $\frac{2y}{x^3}$ **71.** $\frac{1}{x^3}$ **73.** $\frac{1}{x^{12}y^{12}}$

REVIEW / TESTS
Pages 195–196

1.1 $3x^3 + 6x^2 - 8x + 3$ **1.2** $-5a^3 + 3a^2 - 4a + 3$ **2.1a** a^4b^7 **2.1b** $-6x^3y^6$ **2.2a** x^8y^{12} **2.2b** $-8a^6b^3$
3.1a $4x^3 - 6x^2$ **3.1b** $6y^4 - 9y^3 + 18y^2$ **3.2a** $x^3 - 7x^2 + 17x - 15$ **3.2b** $-4x^4 + 8x^3 - 3x^2 - 14x + 21$
3.3a $a^2 + 3ab - 10b^2$ **3.3b** $10x^2 - 43xy + 28y^2$ **3.4a** $16y^2 - 9$ **3.4b** $4x^2 - 20x + 25$ **3.5** The area is $3.14x^2 - 31.4x + 78.5$. **4.1a** $-\frac{4}{x^6}$ **4.1b** $\frac{9y^6}{x}$ **4.2a** $4x^4 - 2x^2 + 5$ **4.2b** $4x - 1 + \frac{3}{x^2}$ **4.3a** $x + 7$
4.3b $2x + 3 + \frac{2}{2x - 3}$ **5.1a** $\frac{a^4}{b^6}$ **5.1b** $-\frac{6b}{a}$

Pages 197–198

1.1 b **1.2** b **2.1a** c **2.1b** c **2.2a** a **2.2b** d **3.1a** c **3.1b** a **3.2a** a **3.2b** c **3.3a** d
3.3b c **3.4a** b **3.4b** b **3.5** d **4.1a** d **4.1b** a **4.2a** d **4.2b** b **4.3a** d **4.3b** c **5.1a** c
5.1b d