

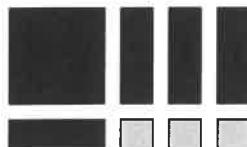
Section 5.1 Extra Practice

1. Multiply using algebra tiles.

a) $(x + 2)(x + 4)$

b) $(x + 1)(x - 2)$

2. a) What product does the algebra tile model show?



b) What are the dimensions of the model?

3. Multiply using the distributive property.

a) $(x - 3)(x - 6)$

b) $(y + 10)(y - 5)$

c) $(2x + 3)(x - 4)$

d) $(5 - 3a)(4 + a)$

e) $3(x - 2y)(x + y)$

4. Multiply using the distributive property.

a) $(x - 5)(x + 5)$

b) $(m + 10)(m - 10)$

c) $(2x + 3)(2x - 3)$

d) $(4 - 3a)(4 + 3a)$

e) $5(2x - y)(2x + y)$

5. Use the distributive property to determine each product.

a) $(x + 4)^2$

b) $(x - 7)^2$

c) $(6 + y)^2$

d) $(2x + 5y)^2$

e) $2(2a + 3b)^2$

6. Use the distributive property to determine each product.

a) $2x(x^2 + x - 1)$

b) $3a(a^2 + 3a - 5)$

c) $(x + 2)(x^2 - 2x + 5)$

d) $(2a - 3)(3a^2 + 5a - 2)$

e) $(x^2 + 2x - 1)(x^2 - 2x + 1)$

7. Multiply. Then, combine like terms.

a) $(x + 2)(x - 3) - (x - 4)$

b) $(x - 1)(x - 2) + (x + 1)(x + 2)$

c) $(a - 3)^2 + (a + 4)(2a - 3)$

d) $(y + 2z)(y + 10z) - (y - 5z)^2$

e) $(2x + 3) - 4x(x + 4)(3x - 1)$

8. Multiply.

a) $(x - 3y)^2(2x + y)$

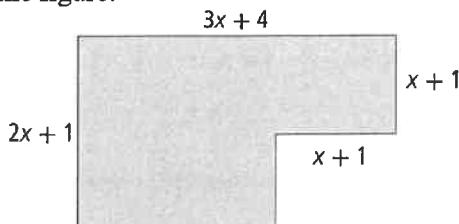
b) $(x + 3)^2(x - 3)$

c) $(x - 2)^2(x + 1)^2$

d) $(x - 3)^3$

e) $(y + 4)^3$

9. Write an expression to represent the area of the figure.



Section 5.2 Extra Practice

1. What is the greatest common factor (GCF) of each set of numbers?
 - 28 and 98
 - 243 and 162
 - 192 and 216
 - 90, 105, and 165
 - 48, 120, and 168

2. Determine the least common multiple (LCM) of each set of numbers.
 - 12 and 26
 - 9 and 36
 - 6 and 15
 - 4, 5, and 12
 - 16, 20, and 44

3. Determine the GCF of each set of terms.
 - $15x^4$ and $5x^2y$
 - $-24xy$ and $8xy$
 - ax^2 and $-bx$
 - $18y^4$, $-9y^3$, and $-27y^2$
 - $2\pi xr$, $-2\pi xr$, and $2\pi xh$

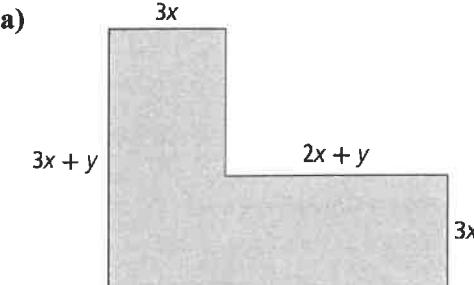
4. Factor each polynomial, if possible.
 - $5x + 35$
 - $4x + 23$
 - $14x - 8y$
 - $6x^2 + 24x$
 - $3x + 9xy + 6xz$

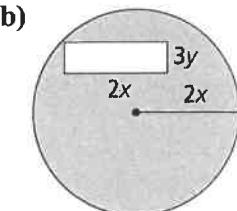
5. Identify each missing factor.
 - $3ax + 3ay = (\boxed{\quad})(x + y)$
 - $x^2 - xy = (x)(\boxed{\quad})$
 - $25ab - 10ab^2 = (5ab)(\boxed{\quad})$
 - $6x^2 - 3x^3 - 9x = (\boxed{\quad})(2x - x^2 - 3)$
 - $3x^3 - x^2y + 6xy^2 = (x)(\boxed{\quad})$

6. Factor each polynomial.
 - $8x^2 + 32y^3$
 - $10a + 5a^2 - 25a^3$
 - $24abc - 6ab + 8bc$
 - $-12x^2y^2 + 3xy^3 - 15x^3y$
 - $9\pi x^2 - 6xy + 12\pi xy^2$

7. Write each expression in factored form, if possible.
 - $x(y + 1) + 4(y + 1)$
 - $3x(a + b) - y(a + b)$
 - $4y(y + 3) + (y + 3)$
 - $5a(2x + 1) + 3(2x - 1)$
 - $3y(x - 5) - 4(5 - x)$

8. Factor by grouping.
 - $5x + 15y + mx + 3my$
 - $xy + 4x + 5y + 20$
 - $3ab - 3ac + 2b^2 - 2bc$
 - $-5y + 3 - 6x + 10xy$
 - $2x^2 + xz + 6xy + 3yz$

9. Write an expression in factored form to represent the area of each shaded region.
 - 

$$\text{Area} = 3x(3x+y) - 2x(2x+y)$$
 - 

$$\text{Area} = \frac{3y}{360} \cdot \pi(2x)^2$$

Section 5.3 Extra Practice

1. Identify two integers with the given product and sum.
 a) product = 12, sum = 13
 b) product = 34, sum = 19
 c) product = -33, sum = 8
 d) product = -20, sum = -1
 e) product = 54, sum = -15
2. Factor, if possible.
 a) $x^2 + 8x + 15$
 b) $x^2 + 5x + 6$
 c) $x^2 + 11x + 28$
 d) $m^2 + 7m + 10$
 e) $y^2 + 24y + 144$
3. Factor, if possible.
 a) $x^2 - 13x + 42$
 b) $x^2 - 18x + 81$
 c) $x^2 - x - 20$
 d) $x^2 + 5x - 6$
 e) $x^2 - x + 1$
4. Factor each trinomial.
 a) $x^2 + 9xy + 14y^2$
 b) $x^2 - 8xy + 16y^2$
 c) $x^2 - 8xy + 15y^2$
 d) $m^2 + 7mn - 8n^2$
 e) $a^2 - 6ab - 7b^2$
5. Factor each trinomial. First check for a GCF.
 a) $4x^2 + 24xy + 36y^2$
 b) $2x^2 - 26x + 72$
 c) $5x^2 - 5xy - 30y^2$
 d) $-3x^2 - 48x - 165$
 e) $3x^2 - 30x + 63$
6. Factor.
 a) $2x^2 + 13x + 15$
 b) $3x^2 + 11xy - 4y^2$
 c) $7a^2 - 47a + 30$
 d) $10y^2 + 9y + 2$
 e) $12x^2 - 8x - 15$
7. Factor. First check for a GCF.
 a) $12x^2 - 26x - 10$
 b) $18x^2 - 3x - 36$
 c) $75y^2 - 120y + 48$
 d) $12x - 15xy - 18xy^2$
 e) $40x^2y - 36xy^2 - 36y^3$
8. Determine two values of b so that each trinomial can be factored.
 a) $x^2 + bx + 10$
 b) $x^2 + bx + 8$
 c) $x^2 - bx + 12$
 d) $m^2 + 6m + b$
 e) $y^2 + 5y + b$
9. Determine two values of k so that each trinomial can be factored.
 a) $2x^2 + kx + 5$
 b) $3x^2 + kx + 2$
 c) $2x^2 + kx - 15$
 d) $20m^2 + 23m + k$
 e) $6y^2 + 17y + k$

Section 5.4 Extra Practice

1. Determine each product.

- a) $(x + 14)(x - 14)$
- b) $(2a - 7)(2a + 7)$
- c) $(11x + 1)(11x - 1)$
- d) $(5y - 9)(5y + 9)$
- e) $(x^2 + 3)(x^2 - 3)$

2. What is each product?

- a) $(y + 10)^2$
- b) $(8 - m)^2$
- c) $(2a - 5k)^2$
- d) $4(3x - y)^2$
- e) $(x^2 + 5)^2$

3. Determine the missing values.

- a) $4p^2 - 25 = (2p)^2 - (\square)^2$
- b) $16x^2 - 9 = (\square)^2 - (\square)^2$
- c) $y^2 - 144 = (y - \square)(y + \square)$
- d) $9n^2 - 1 = (3n + \square)(3n - \square)$
- e) $x^4 - 49 = (x^2 - 7)(\square)$

4. What are the missing values?

- a) $x^2 + 10x + 25 = (x + \square)^2$
- b) $225 + 30p + p^2 = (\square + p)^2$
- c) $y^2 - 8y + \square = (y - 4)^2$
- d) $x^2 + \square + 121 = (x - 11)^2$
- e) $\square - 20w + w^2 = (10 - w)^2$

5. Factor each binomial, if possible.

- a) $x^2 - 144$
- b) $a^2 - 9b^2$
- c) $25x^2 - y^2$
- d) $h^2 + 64$
- e) $36 - a^2b^2$

6. Factor each trinomial, if possible.

- a) $x^2 + 14x + 49$
- b) $y^2 - 40y + 400$
- c) $36 + 12a + a^2$
- d) $64a^2 - 48ab + 9b^2$
- e) $16x^2 - 56xy + 49y^2$

7. Factor completely.

- a) $16x^2 - 4y^2$
- b) $9x^3 - 36x$
- c) $27a^4 - 147$
- d) $100ab^2 - 25a$
- e) $x^4 - 81$

8. Factor completely.

- a) $y^4 - 10y^2 + 25$
- b) $x^4 - 2x^2 + 1$
- c) $100a^2 - 100ab + 25b^2$
- d) $2x^3 + 40x^2y + 200xy^2$
- e) $y^4 + 18y^2 + 81$

9. Factor completely.

- a) $(x + 4)^2 - 25$
- b) $(a - 5)^2 - 36$
- c) $100 - (p + 8)^2$
- d) $(x + 2)^2 - (x - 2)^2$
- e) $x^2 - (y + z)^2$

10. Identify two values of n so that each polynomial will be a perfect square trinomial. Then, factor.

- a) $x^2 + nx + 64$
- b) $y + ny + 144$
- c) $4a^2 + na + 25$
- d) $9x^2 + nxy + 16y^2$
- e) $25x^2 + nx + 121$

Chapter 5 BLM Answers

BLM 5-2 Chapter 5 Prerequisite Skills

1. a) 1 term, monomial b) 1 term, monomial
c) 3 terms, trinomial d) 3 terms, trinomial
 2. a) $3x - 3$ b) $x^2 + 4x$ c) $-3x^2 - x + 4$
 3. a) $-9x^2$ b) $6t^2$ c) $\frac{s^2}{8}$
 4. a) $5p$ b) $-4n$ c) $-4.2y$
 5. Since $x = 50$, the dimensions of the rectangle are 250 cm by 50 cm.
- 
5. x
 $5x$
6. $\frac{\text{square}}{\text{circle}} = \frac{4}{\pi}$ or $\frac{\text{circle}}{\text{square}} = \frac{\pi}{4}$
 7. a) $6x^2 - 2x$ b) $20k^2 - 5k$
c) $4x^2 - 12x$ d) $1.2p^2 - 0.4p$
 8. a) $5b - 4$ b) $-3m^2 + m$ c) $-4h + 1$
9. $3x^2 + 6x$ 10. $5v - 4$

BLM 5-3 Chapter 5 Warm-Up

Section 5.1

1. a) -5 b) -89
2. a) $3x^2 - 3xy + 15x$ b) $-10y^2 + 16y$
3. a) $4x^2 - 9$ b) $-3x^2 + 8xy - 7$
4. a) $26 - x$ b) $2y$ 5. $40x^2 - 23x$

Section 5.2

1. a) $(2)(2)(2)(3)(3)$ b) $(2)(2)(5)(5)$
2. a) 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72
b) 1, 2, 4, 5, 10, 20, 25, 50, 100
3. a) 72, 144, 216, 288, 360
b) 100, 200, 300, 400, 500
4. a) 1, 2, 3, 4, 6, 8, 12, 24
b) 1, 2, 4, 5, 8, 10, 20, 40 c) 8
5. a) $3x^2 - 17x + 10$ b) $6x^3 + 36x^2 - 66x$

Section 5.3

1. a) $3x^2 + 7x - 20$ b) $2x^2 + 3xy - 20y^2$
2. a) $3x(x + 3)$ b) $2y(4x - 3y)$
3. a) $(x + 2)(x - 5)$ b) $(2x + 5y)(x + 2y)$
4. a) $(1)(12); (2)(6); (3)(4); (-1)(-12); (-2)(-6); (-3)(-4)$ b) $(1)(7); (-1)(-7)$ c) $(1)(-7); (-1)(7)$
5. a) $(1)(-6); (-1)(6); (2)(-3); (-2)(3)$
b) 3 and -2 c) -6 and 1

Section 5.4

1. a) $x^2 - 25$ b) $x^2 - 16$
2. a) $x^2 + 10x + 25$ b) $x^2 - 8x + 16$
3. a) $4x^2 - 9$ b) $36x^2 - 49$
4. a) $4x^2 + 12x + 9$ b) $36x^2 - 84x + 49$

5. a) Example: It means rewriting an expression as a product of two binomials.

b) $(x + 3)(x + 3)$ or $(x + 3)^2$ c) by expanding

BLM 5-5 Section 5.1 Extra Practice

1. a) $x^2 + 6x + 8$ b) $x^2 - x - 2$
2. a) $(x + 3)(x + 1) = x^2 + 4x + 3$
b) length is $x + 3$; width is $x + 1$
3. a) $x^2 - 9x + 18$ b) $y^2 + 5y - 50$ c) $2x^2 - 5x - 12$
d) $20 - 7a - 3a^2$ e) $3x^2 - 3xy - 6y^2$
4. a) $x^2 - 25$ b) $m^2 - 100$ c) $4x^2 - 9$ d) $16 - 9a^2$
e) $20x^2 - 5y^2$
5. a) $x^2 + 8x + 16$ b) $x^2 - 14x + 49$ c) $36 + 12y + y^2$
d) $4x^2 + 20xy + 25y^2$ e) $8a^2 + 24ab + 18b^2$
6. a) $2x^3 + 2x^2 - 2x$ b) $3a^3 + 9a^2 - 15a$ c) $x^3 + x + 10$
d) $6a^3 + a^2 - 19a + 6$ e) $x^4 - 4x^2 + 4x - 1$
7. a) $x^2 - 2x - 2$ b) $2x^2 + 4$ c) $3a^2 - a - 3$
d) $22yz - 5z^2$ e) $-12x^3 - 44x^2 + 18x + 3$
8. a) $2x^3 - 11x^2y + 12xy^2 + 9y^3$ b) $x^3 + 3x^2 - 9x - 27$
c) $x^4 - 2x^3 - 3x^2 + 4x + 4$ d) $x^3 - 9x^2 + 27x - 27$
e) $y^3 + 12y^2 + 48y + 64$
9. $5x^2 + 10x + 4$

BLM 5-6 Section 5.2 Extra Practice

1. a) 14 b) 81 c) 24 d) 15 e) 24
2. a) 156 b) 36 c) 30 d) 60 e) 880
3. a) $5x^2$ b) $8xy$ c) x d) $9y^2$ e) $2\pi x$
4. a) $5(x + 7)$ b) not possible c) $2(7x - 4y)$
d) $6x(x + 4)$ e) $3x(1 + 3y + 2z)$
5. a) $\square = 3a$ b) $\square = x - y$ c) $\square = 5 - 2b$
d) $\square = 3x$ e) $\square = 3x^2 - xy + 6y^2$
6. a) $8(x^2 + 4y^3)$ b) $5a(2 + a - 5a^2)$
c) $2b(12ac - 3a + 4c)$ d) $3xy(-4xy + y^2 - 5x^2)$
e) $3x(3\pi x - 2y + 4\pi y^2)$
7. a) $(y + 1)(x + 4)$ b) $(a + b)(3x - y)$
c) $(y + 3)(4y + 1)$ d) not possible e) $(x - 5)(3y + 4)$
8. a) $(x + 3y)(5 + m)$ b) $(y + 4)(x + 5)$
c) $(b - c)(3a + 2b)$ d) $(5y - 3)(2x - 1)$
e) $(2x + z)(x + 3y)$
9. a) $3x(5x + 2y)$ b) $2x(2\pi x - 3y)$

BLM 5-7 Section 5.3 Extra Practice

1. a) 1, 12 b) 2, 17 c) 11, -3 d) -5, 4 e) -6, -9
2. a) $(x + 3)(x + 5)$ b) $(x + 3)(x + 2)$ c) $(x + 4)(x + 7)$
d) $(m + 2)(m + 5)$ e) $(y + 12)^2$
3. a) $(x - 6)(x - 7)$ b) $(x - 9)^2$ c) $(x + 4)(x - 5)$
d) $(x - 1)(x + 6)$ e) not possible
4. a) $(x + 2y)(x + 7y)$ b) $(x - 4y)^2$ c) $(x - 3y)(x - 5y)$
d) $(m + 8n)(m - n)$ e) $(a - 7b)(a + b)$
5. a) $4(x + 3y)^2$ b) $2(x - 4)(x - 9)$ c) $5(x - 3y)(x + 2y)$
d) $-3(x + 11)(x + 5)$ e) $3(x - 7)(x - 3)$
6. a) $(2x + 3)(x + 5)$ b) $(3x - y)(x + 4y)$

- c) $(7a - 5)(a - 6)$ d) $(2y + 1)(5y + 2)$
 e) $(2x - 3)(6x + 5)$
 7. a) $2(2x - 5)(3x + 1)$ b) $3(3x + 4)(2x - 3)$
 c) $3(5y - 4)^2$ d) $3x(4 + 3y)(1 - 2y)$
 e) $4y(5x + 3y)(2x - 3y)$
 8. Look for two values for each. a) 7, 11, -7, -11
 b) 6, 9, -6, -9 c) 7, 8, 13, -7, -8, -13 d) 5, 8, 9
 e) 4, 6
 9. Look for two values for each. a) 7, 11, -7, -11
 b) 5, 7, -5, -7 c) 1, 7, 13, 29, -1, -7, -13, -29
 d) 3, 6 e) 5, 7, 10, 11, 12

BLM 5-8 Section 5.4 Extra Practice

1. a) $x^2 - 196$ b) $4a^2 - 49$ c) $121x^2 - 1$
 d) $25y^2 - 81$ e) $x^4 - 9$
 2. a) $y^2 + 20y + 100$ b) $64 - 16m + m^2$
 c) $4a^2 - 20ak + 25k^2$ d) $36x^2 - 24xy + 4y^2$
 e) $x^4 + 10x^2 + 25$
 3. a) $\square = 5$ b) $(4x)^2 - (3)^2$ c) $(y - 12)(y + 12)$
 d) $(3n + 1)(3n - 1)$ e) $\square = x^2 + 7$
 4. a) $\square = 5$ b) $\square = 15$ c) $\square = 16$
 d) $\square = -22x$ e) $\square = 100$
 5. a) $(x - 12)(x + 12)$ b) $(a - 3b)(a + 3b)$
 c) $(5x - y)(5x + y)$ d) not possible
 e) $(6 - ab)(6 + ab)$
 6. a) $(x + 7)^2$ b) $(y - 20)^2$ c) $(6 + a)^2$
 d) $(8a - 3b)^2$ e) $(4x - 7y)^2$
 7. a) $4(2x - y)(2x + y)$ b) $9x(x - 2)(x + 2)$
 c) $3(3a^2 - 7)(3a^2 + 7)$ d) $25a(2b - 1)(2b + 1)$
 e) $(x - 3)(x + 3)(x^2 + 9)$
 8. a) $(y^2 - 5)^2$ b) $(x - 1)^2(x + 1)^2$ c) $25(2a - b)^2$
 d) $2x(x + 10y)^2$ e) $(y^2 + 9)^2$
 9. a) $(x - 1)(x + 9)$ b) $(a - 11)(a + 1)$
 c) $(2 - p)(18 + p)$ d) $8x$ e) $(x - y - z)(x + y + z)$
 10. a) Example: $n = 16$; $(x + 8)^2$ or $n = -16$; $(x - 8)^2$
 b) Example: $n = 24$; $(y + 12)^2$ or $n = -24$; $(y - 12)^2$
 c) Example: $n = 20$; $(2a + 5)^2$ or $n = -20$; $(2a - 5)^2$
 d) Example: $n = 24$; $(3x + 4y)^2$ or $n = -24$; $(3x - 4y)^2$
 e) Example: $n = 110$; $(5x + 11)^2$ or $n = -110$;
 $(5x - 11)^2$

BLM 5-9 Chapter 5 Test

1. A 2. B 3. C 4. D 5. B

6. a)

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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- b) $2x^2 - 5x - 3$
 7. a) $y^2 + 11y + 24$ b) $20c^2 - 41c + 9$
 c) $49a^2 - 84ay + 36y^2$ d) $3t^3 - 17t^2 + 27t - 28$

8. a) $8x^2$ b) $rs^2(r + 3)$
 9. a) $3ab(7a - ab + 8a^2b^2)$ b) $(x + 3)(x - 10)$
 c) $(x - 8y)^2$ d) $(x - 15)(x + 15)$

10. a) Look for one set of expressions:

- $3x$; $2x + 5$; $10x + 3$
 - x ; $6x + 15$; $10x + 3$
 - x ; $2x + 5$; $30x + 9$
- b) Example: $3x(2x + 5)(10x + 3) = 3x(20x^2 + 6x + 50x + 15) = 3x(20x^2 + 56x + 15) = 60x^2 + 168x + 45$
 c) 1242 cm^2

11. a) $(3x + 2)^2$ b) $9(x + 1)^2$ c) $9x + 9$