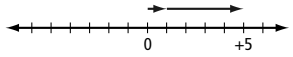
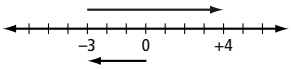
Answers

Get Ready, pages 238–239

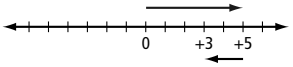
1. a) +5



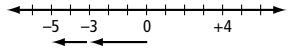
b) +4



c) +3



d) –5



2. a) (–2) + (+5) = +3 **b)** (–1) + (–2) = –3

3. a) +5 **b)** –4

4. a) +3 **b)** +4

5.

Expression	Numerical Coefficient	Variable	Constant
a) $2x - 7$	*2*	*x*	*–7*
b) $-3b + 5$	*–3*	*b*	*5*
c) $t - 4$	*1*	*t*	*–4*

6. a) $s - 5$ **b)** width = w; $2w$

Math Link

1. Answers may vary. Example:

Step	Example	Trick 1	Trick 2
Step 1: Think of a number.	15	*8*	*21*
Step 2: Double the number.	15 × 2 = 30	*8 × 2 = 16*	*21 × 2 = 42*
Step 3: Add 10.	*30* + 10 = *40*	*16 + 10 = 26*	*42 + 10 = 52*
Step 4: Divide by 2.	*40* ÷ 2 = *20*	*26* ÷ 2 = *13*	*52* ÷ 2 = *26*
Step 5: Subtract 5.	*20* – 5 = *15*	*13* – 5 = *8*	*26* – 5 = *21*

b) Answers may vary. Example: Multiplying by 2 then adding 10 is reversed when you take that answer and divide by 2 then subtract 5.

2. a)

Guess a Number	Example	Use Your Number
Step 1: Your partner picks a number.	33	*Answers may vary. Example: 5*
Step 2: Your partner rolls 2 dice. Do not look at the dice.	1, 4	*3, 5*
Step 3: Your partner adds the 2 numbers to the number picked in Step 1.	33 + 1 + 4 = *38*	*5 + 3 + 5 = 13*
Step 4: Your partner adds the 2 numbers from the bottom of the dice to the answer from Step 3.	38 + *6 + 3 = 47*	*13 + 4 + 2 = 19*
Step 5: Your partner tells you the answer.	Answer is *47*	*19*

b) Answers may vary. Example: The final answer minus 14 will give the original number because opposite sides of the die always add up to 7. Using 2 dice, we are adding two sevens which is 14.

5.1 Warm Up, page 241

1. $6 \times y$

2.

Expression	Base	Exponent	Repeated Multiplication
a) 3^2	3	*2*	*3 × 3*
b) x^2	*x*	2	*x × x*
c) y^2	*y*	*2*	*y × y*
d) t^1	*t*	*1*	*t*

3. a) $3x$ **b)** $-2x + 4$ **c)** $5x - 3$

4. a) *h* **b)** *x* and *y*

5. a) 2 **b)** –8

5.1 The Language of Mathematics, pages 242–250

Working Example 1: Show You Know

Expression	Number of Terms	Name
a) $5j^2$	*1*	*monomial*
b) $3 \quad -m^2$	*2*	*binomial*
c) $ab^2 \quad -ab \quad +1$	*3*	*trinomial*
d) $-4x^2 \quad +xy \quad -y^2 \quad +10$	*4*	*polynomial*
e) $2x^2 \quad +6x \quad -5$	*3*	*trinomial*

Working Example 2: Show You Know

Expression	Number of Terms	Degree of Each Term	Degree of Polynomial
a) $1 \quad -3x$	*2*	0, 1	*1*
b) $4x \quad -3xy \quad +7$	*3*	*1, 2, 0*	*2*
c) $-27b^2$	*1*	*2*	*2*
d) 99	*1*	*0*	*0*

Working Example 3: Show You Know

a)

b) $x^2 + 3x - 4$

Communicate the Ideas

1. Answers may vary. Example: $3y^2 - 4y + 9$

2. a) MYRON **b)** Answers will vary. Example: The white *x*-tile and 1-tiles are negative.

Practise

3.

Expression	Number of Terms	Type of Expression
a) $3x^2 - 5x - 7$	*3*	*trinomial*
b) 8	*1*	*monomial*
c) $c^2 + cf + df - f^2$	*4*	*polynomial*
d) $-11a$	*1*	*monomial*

4.

Expression	Number of Terms	Degree of First Term
a) 6	*1*	*0*
b) $3xy + 1$	*2*	*2*
c) $11k^2 + 7k - 5$	*3*	*2*
d) $4 - b$	*2*	*0*

Degree of Second Term	Degree of Third Term	Degree of Polynomial
		0
0		*2*
1	*0*	*2*
1		*1*

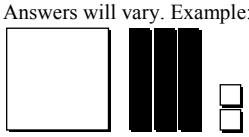
5. a) $3b^2$ **b)** $3b^2$, $4st + t - 1$, $2x^2 - y^2$ **c)** $2 + p$, $2x^2 - y^2$ **d)** $2 + p$, $4st + t - 1$ **e)** $4st + t - 1$

6. a) $2x - 3$ **b)** $x^2 - 2x + 1$ **c)** $-x^2 + 3x - 2$ **d)** 4

7. a)  **b)** 

Apply

8. Answers will vary. Example:

a)  **b)** $-x^2 + 3x - 2$ **c)** 3 **d)** trinomial

9. a) $\boxed{6x^2}$ $\boxed{-5}$ **b)** 2 **c)** binomial **d)** 2 **e)** –5

10. a) $6x$ **b)** $2x + 3$

11. a) $8 + n$ **b)** m = money; $m + 5$ **c)** w = width; $w + 4$ **d)** n = unknown number $5n + 2$

12. a) $2x$ **b)** $x + 3$ **c)** $P = 2l + 2w$ **d)** $2x + 2x + x + 3 + x + 3$

Math Link

a)

Item	Cost per Item	Number of Items	Total
mixer (m)	\$23	2	*\$46*
coffeemaker (c)	\$27	2	*\$54*
		Total	*\$100*

b)

Item	Cost per Item	Number of Items	Total
soccer ball (s)	\$13	4	*\$52*
drum (d)	\$40	1	\$40
books (b)	\$8	*1*	*\$8*
		Total	\$100

2. Answers will vary. Example: 3 books = \$24, 2 soccer balls = \$26, 1 mixer = \$23, and 1 coffeemaker = \$27.

3. $2m + 2c$; $4s + d + b$

4. NO. The total for one of each of the items is over \$100.

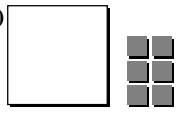
5.2 Warm Up, page 251

1. $-x^2 + 3x - 5$

2. 2

3. –7

4. a) $5 + 2$ **b)** $15 + 7 + (-7)$ **c)** $4 + 2 + (-5)$ **d)** $1 + 17 + (-5)$ **e)** $2 + 8 + (-8) + 7$

5. a)  **b)** 

6. a) 2 **b)** 1

5.2 Equivalent Expressions, pages 252–261

Working Example 1: Show You Know

Expression	Coefficient	Variable(s)	Exponents of the Variable(s)
a) $3c^2$	3	*c*	2
b) $-x$	*–1*	*x*	*1*
c) b	*1*	*b*	*1*
d) $7st^2$	*7*	*s and t*	*1, 2*

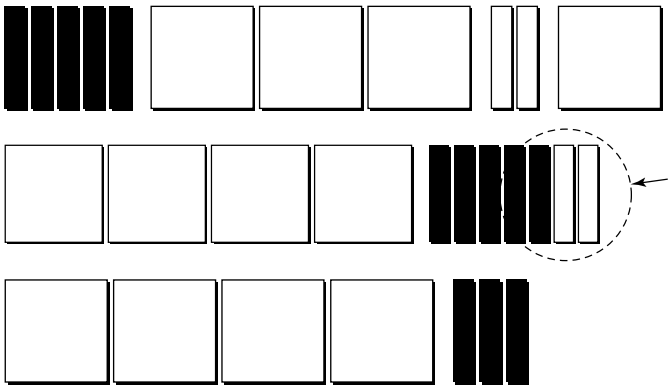
Working Example 2: Show You Know

a) Answers will vary. Example: $-3x$, $5x$; $2p^2q$, $-3p^2q$; 5, –13

b) $3s$, $-8s$

Working Example 3: Show You Know

a)



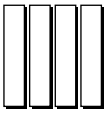
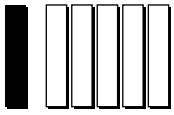
$-4x^2 + 3x$

b) $3k^2 - 2k - 1$

Communicate the Ideas

1. a) 3 erasers; 6 pencils; 9 pencil crayons; 5 highlighters; 5 pens

b) Answers may vary. Example: eraser = e, pencil = p, pencil crayon = t; pen = r; highlighter = h **c)** Answers may vary. Example: Multiply the number of each item by its variable. Then add all of the expressions together.

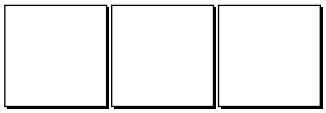
2. a)  **b)** 

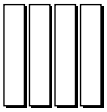
c) Answers will vary. Example: If you remove the zero pair in part b) you get $-4x$.

Practise

3.

Expression	Coefficient(s)	Number of Variable(s)	Variable(s)	Exponent(s) of the Variable(s)
a) $4d$	*4*	*1*	*d*	*1*
b) $-prt$	*–1*	*3*	*p, r, t*	*1, 1, 1*
c) $-8fg^2$	*–8*	*2*	*f, g*	*1, 2*
d) k	*1*	*1*	*k*	*1*

4. a) i)  **ii)** 

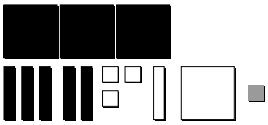
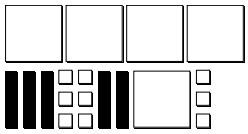
iii)  **iv)**  **v)**  **vi)** 

b) $-3x^2$; -5; $-4x$ and $2x$

5. a) $2a$ and $-7.1a$ **b)** -1.9 and 5; $6p^2$ and p^2; $-2p$ and $0.7p$

c) $3m$ and $\frac{4}{3}m$; $-2ab$ and $3ab$

6.

Model	Expression	Simplified Expression
a) 	$2x^2 + 3x + 1$	$2x^2 + 3x + 1$
b) 	$3x^2 + 5x - 3 - x - x^2 + 1$	$2x^2 + 4x - 2$
c) 	$-4x^2 + 3x - 6 + 2x - x^2 - 3$	$-5x^2 + 5x - 9$

7. a) $4x - 4x^2$ **b)** $-1 - 3n$

8. B, C

Apply

9. a) Addition **b)** $x + 3x + 7 + 2x - 5$ **c)** $6x + 2$

10. a) $4d - 5 + d + 7 + d + d + 3d + 1$ **b)** $10d + 3$

11. a) ②x⊖1 **b)** $-2x + 1$

Math Link

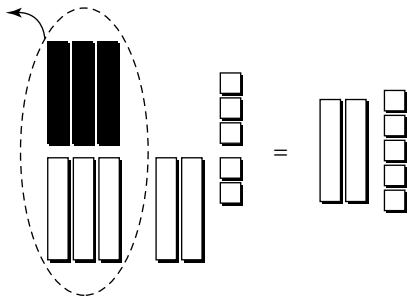
a)

Items	Expression for Cost
2 coffeemakers	$2c$
2 mixers	$2m$
2 coffeemakers and 2 mixers	$2c + 2m$
1 drum, 1 book, 4 soccer balls	$d + b + 4s$
4 watches and 4 books	$4w + 4b$

b) $c + 4d + e$ **c)** $d = 5b$; $d = c + s$ **d)** The total cost is \$154.

5.3 Warm Up, page 262

1. a) $-3x + 4$ **b)** binomial

2. 

3. $-x^2 + 4x - 10$

4.

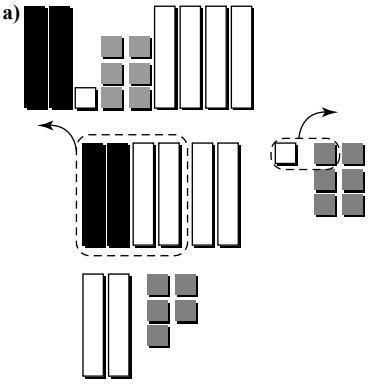
Monomial	Opposite	Sum of Monomial and Opposite
a) 5	*–5*	*0*
b) –3	*3*	*0*

5. a) –7 **b)** 19

6. a) 5; 5 **b)** –11; 4 + (–15) = –11

5.3 Adding and Subtracting Polynomials, pages 263–273

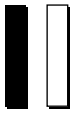
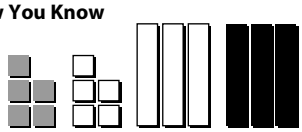
Working Example 1: Show You Know

a) 

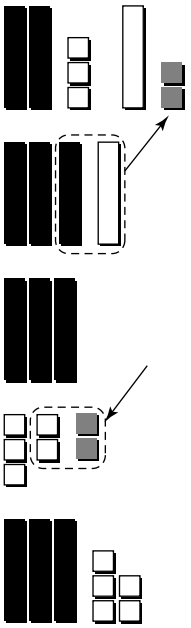
$-2a + 5$

b) $4t^2 - 3t + 1$

Working Example 2: Show You Know

a) $-x$  **b)** $-5 + 3x$ 

Working Example 3: Show You Know

a) 

b) $3x^2 + 2x + 5$

$3x - 5$

Communicate the Ideas

1. a) 

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

c) Answers will vary. Example: Diagrams because I only need to flip over the tiles to find the opposite.

2. a) $5x^2$ **b)** $-5x^2 - x + 12$

Practise

3. a) $-2x^2 + 3x$; $3x^2 - x$ **b)** $(-2x^2 + 3x) + (3x^2 - x) = x^2 + 2x$

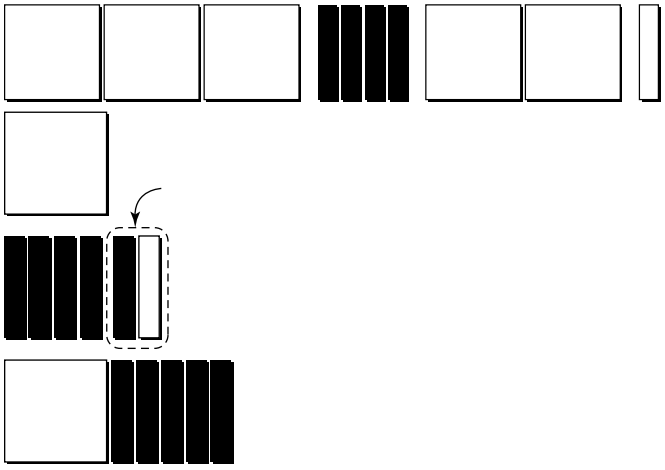
4. a) $3x + 4$ **b)** $-5a^2 - a + 2$ **c)** $2y^2 + 6y - 6$ **d)** $b^2 - 1$

5.

Diagram	Diagram of the Opposite Polynomial	Symbols for the Opposite Polynomial
a) 		$-3x + 1$
b) 		$x^2 - 2x - 3$

6. a) $9x$ **b)** $-5d - 6$ **c)** $2x^2 - 3x + 5$ **d)** $-y^2 - 8y + 1$

7.



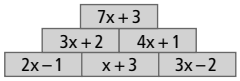
$-x^2 + 5x$

8. a) $-3x - 2$ **b)** $13c - 3$ **c)** $2y^2 - 7y$

9. a) $-4r^2 - 3r - 6$ **b)** $m - m^2$ **c)** $b^2 - 9b$ **d)** $8j^2 - 4j + 8$

Apply

10.



11. a) perimeter **b)** $6x$ **c)** 30 **d)** $6 \times 5 = 30$ **e)** Answers are both equal to 30. **f)** Answers will vary. Example: Simplify first because there is less calculating.

12. a) $8x + 4$ **b)** Add the two known sides together. Subtract the answer from the perimeter. **c)** $(12x + 6) - (8x + 4)$ **d)** $4x + 2$

Math Link

a)

Step	Arithmetic	Algebra
Step 1: Pick a number.	12	Choose a variable: n
Step 2: Add 5.	$12 + 5 = 17$	$n + 5$
Step 3: Double the sum.	$2 \times (12 + 5) = 34$	$2 \times (n + 5)$
Step 4: Subtract 10.	$2 \times (12 + 5) - 10 = 24$	$2 \times (n + 5) - 10$
Step 5: Find the original number.	$(2 \times (n + 5) - 10) \div 2 = 12$	$(2 \times (n + 5) - 10) \div 2$

b)

Step	Arithmetic	Algebra
1. Pick a number.	4	n
2. Double the number.	$2 \times 4 = 8$	$2n$
3. Add 9 to the product.	$2 \times 4 + 9 = 17$	$2n + 9$
4. Subtract 3.	$2 \times 4 + 9 - 3 = 14$	$(2n + 9) - 3$
5. Divide by 2.	$(2 \times 4 + 9 - 3) \div 2 = 7$	$\frac{2n + 9 - 3}{2}$
6. Subtract the original number.	$(2 \times 4 + 9 - 3) \div 2 - 4 = 3$	$\frac{2n + 9 - 3}{2} - n$

Graphic Organizer, page 274

Answers will vary. Example:

algebra
Definition: a type of math that uses symbols to show unknown numbers or amounts
Example: $6x + 18$

monomial
Definition: an expression with 1 term. It contains no addition or subtraction signs
Example: $5x^2$

polynomial
Definition: an expression made with 1 or more terms joined by addition or subtraction
Example: $3x^2 - 5y + 3x - 2$

binomial
Definition: an expression made up of 2 terms joined by addition or subtraction
Example: $12x + 6$

like terms
Definition: terms that have the same variable(s) and exponents; only the coefficients are different
Example using addition: $2x^2 + 3x^2 = 5x^2$
Example using subtraction: $4x - 2x = 2x$

degree of a polynomial
Definition: the degree of the term with the highest degree
Example: $2x^2 + 3xy + x + 6$. The degree of the polynomial is 2.

trinomial
Definition: an expression made up of 3 terms joined by addition or subtraction
Example: $2y^2 + 6y - 6$

Chapter 5 Review, pages 275–277

1. D **2.** E **3.** D **4.** A **5.** C **6.** B

7.

Expression	Degree	Number of Terms	Type of Polynomial
a) $5 - p + px - p^2$	*2*	*4*	*polynomial*
b) $3f - 6$	*1*	*2*	*binomial*
c) $-2a$	*1*	*1*	*monomial*
d) $3y^2 + 5xy - 27x^2 + 2$	*2*	*4*	*polynomial*

8. a) 2 **b)** Add the exponents on each variable in the term. **c)** Find the degree of each term. The degree of the polynomial equals the largest term degree.

9.

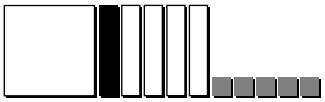
10. a) $x^2 - 3x + 2$ **b)** $-2x^2 + x$

11. a) number of videos bought **b)** number of books bought **c)** You would get $104.

12.

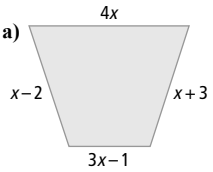
Expression	Coefficient	Variable(s)	Exponent(s) of the Variable(s)
a) $8xy^2$	*8*	*x, y*	*1, 2*
b) $-c^2$	*–1*	*c*	*2*

13. $-2x^2$ and x^2

14. a) 

b) $-x^2 - 3x + 5$

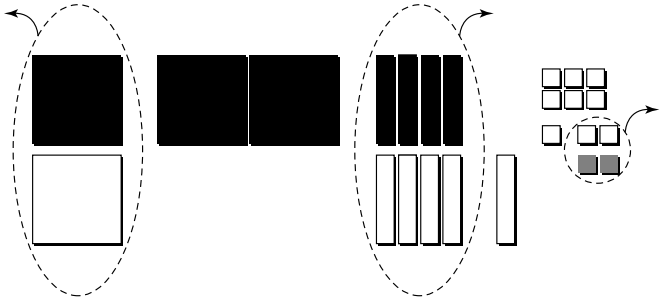
15. a) $3x + 4$ **b)** $7c + 2$

16. a) 

b) Perimeter = $9x$

17. a) $-7 + a$ **b)** $-x^2 + 2x - 4$

18. a)



$2x^2 - x - 7$

b) $2x^2 - x - 7$

19. a) $3p + 2$ **b)** $4a^2 - 7a - 7$

Key Word Builder, page 278

Across

3. polynomial **7.** coefficient **8.** trinomial **10.** zero **11.** exponent **14.** equivalent

Down

1. monomial **2.** combine **4.** opposite **5.** variable **6.** constant **8.** term **9.** like **12.** binomial **13.** degree

Chapter 5 Practice Test, pages 279–280

1. B **2.** D **3.** B **4.** C **5.** B **6.** C

7. –1

8. 

9. a) $x + 4x - 3 + 2x + 1$ **b)** $7x - 2$

10. a) $11x^2 - 4x$ **b)** $1 + 2w$

Math Link: Wrap It Up!, page 281

a) Answers may vary. Example:

Arithmetic 1	Symbols 1	Arithmetic 2	Symbols 2
326	*xyz*	*431*	*xyz*
632	*zyx*	*431*	*xyz*
236	*yxz*	*134*	*zyx*
632 – 236 = 396	*zyx – yxz = abc*	*431 – 134 = 297*	*xyz – zyx = abc*
96	*b* and *c*	*97*	*b* and *c*
9 – 6 = 3	*b – c = a*	*9 – 7 = 2*	*b – c = a*

b) Answers will vary. Example: The middle number is always 9 and it equals the sum of the other 2 digits.

c) Answers will vary. Example:

Step	Arithmetic	Symbols
Step 1: Pick a number.	*11*	*n*
Step 2: Double it.	*2 × 11 = 22*	*2n*
Step 3: Add 9.	*22 + 9 = 31*	*2n + 9*
Step 4: Add the number you started with.	*31 + 11 + 9 = 42*	*3n + 9*
Step 5: Divide by 3.	*42 ÷ 3 = 14*	*n + 3*
Step 6: Add 4.	*14 + 4 = 18*	*n + 7*
Step 7: Subtract the number you started with.	*18 – 11 = 7*	*7*

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1. $23

2. $23s$

3. You make $27 per day.

4. Answers may vary. Example: **a)** t represents the number of 2-person kayaks rented **b)** $27t$

5. $23s + 27t$

6. The maximum profit is $43 800 for renting all the kayaks every day for 60 days.