



## CHAPTER

**Algebraic Reasoning****1****Multiple Choice Test A, continued**

11. Which expression is equal to 4?  
A  $t - 5$  for  $t = 10$   
B  $2t + 1$  for  $t = 2$   
C  $2 + t$  for  $t = 4$   
D  $t \div 4$  for  $t = 16$
12. Evaluate  $4x^2 + 4x$  for  $x = 3$ .  
A 26                      C 24  
B 36                      D 48
13. Evaluate  $5a - 2 \times a$  for  $a = 6$ .  
A 18                      C 168  
B 120                      D 28
14. Evaluate  $\frac{18}{n} - 3m$  for  $n = 2$  and  $m = 3$ .  
A 0                      C 27  
B 18                      D 9
15. Evaluate  $4 + 3p^2 - c$  for  $p = 2$  and  $c = 8$ .  
A 2                      C 16  
B 8                      D 24
16. Which phrase represents  $n \div 12$ ?  
A the quotient of a number and 12  
B the product of a number and 12
17. Which expression is equal to "nine less than the product of 7 and  $b$ "?  
A  $9 - 7b$                       C  $7b \times 9$   
B  $9b - 7$                       D  $7b - 9$
18. Which expression is equal to "three less than a number multiplied by six"?  
A  $6(x - 3)$                       C  $3 - 6x$   
B  $6x - 3$                       D  $6 - 3x$
19. Which phrase represents the expression  $3x + 9$ ?  
A three times nine plus a number  
B a number multiplied by three then added to nine
20. Which expression is equal to  $3a + 6b - a - 3b$ ?  
A  $2a + 3b$   
B  $4a + 9b$
21. Which expression is equivalent to  $4x + x^2 - 4x$ ?  
A  $8x - x^2$   
B  $x^2$
22. Simplify  $n^2 - n + 3n^2 + 17 - n$ .  
A  $4n^2 - 2n + 17$                       C  $3n^2 - 2n + 17$   
B  $3n + 17$                       D  $3n^2 + 17$
23. The side length of an equilateral triangle is  $3x - 2$ . Which expression represents the perimeter of the triangle?  
A  $3x - 2$                       C  $9x - 6$   
B  $9x - 8$                       D  $6x - 5$







**CHAPTER**

**Algebraic Reasoning**

**1**

**Multiple Choice Test C, continued**

11. Evaluate  $8m^2 \div 3m$  for  $m = 3$ .  
 A 72                                      C 64  
 B 24                                        D 8
12. Evaluate  $10q + 6 \times q$  for  $q = 4$ .  
 F 64                                        H 400  
 G 184                                      J 200
13. Evaluate  $48x \div 12y$  for  $x = 3$  and  $y = 4$ .  
 A 4                                         C 3  
 B 18                                        D 12
14. Which expression is equal to 81?  
 F  $t + 19$  for  $t = 100$   
 G  $3t + 1$  for  $t = 27$   
 H  $46 + t$  for  $t = 35$   
 J  $t \div 5$  for  $t = 455$
15. Evaluate  $15 + 3p^3 - 7c$  for  $p = 2$  and  $c = 5$ .  
 A 74                                        C 35  
 B 39                                        D 4
16. Which phrase represents  $3x - 2$ ?  
 F the difference between 3 times a number and 2  
 G 3 times the difference between a number and 2  
 H 3 times the quotient of a number and 2  
 J the quotient of 3 times a number and 2
17. Which expression is equal to “8 less than the product of  $y$  and 9”?  
 A  $9 + y - 8$                               C  $9y - 8$   
 B  $8 - y \div 9$                               D  $8 - 9y$
18. Which expression is equal to “seven more than a number multiplied by 9”?  
 F  $9(x + 7)$                               H  $7 + 9x$   
 G  $9x - 7$                                  J  $9 + 7x$
19. Which phrase represents the expression  $14x - 19$ ?  
 A fourteen times nineteen plus a number  
 B fourteen times nineteen minus a number  
 C nineteen less than a number multiplied by fourteen  
 D a number multiplied by fourteen then added to nineteen
20. Which expression is equivalent to  $14m + 4 + 3m - 3 - 2m$ ?  
 F  $16m$                                       H  $15m$   
 G  $15m + 1$                                 J  $15m + 7$
21. Simplify  $5x^2 - 2y + 6 - 2x^2 + 8y$ .  
 A  $9x^2 + 6y$   
 B  $3x^2 - 6y + 6$
22. Which expression is equivalent to  $11x + 2x^3 - 7x$ ?  
 F  $2x^3 + 4x$                               H  $18x - 2x^3$   
 G  $4x - 2x^3$                                 J  $2x^3 - 4x$
23. The side length of an equilateral triangle is  $13x - 16$ . Which expression represents the perimeter of the triangle?  
 F  $13x - 16$                               H  $39x - 48$   
 G  $52x - 64$                                 J  $39x - 16$

CHAPTER

1

# Algebraic Reasoning

## Free Response Test A

1. Simplify the expression  
 $46 - 12 \div 4 \times 3 + 20$ .

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2. Simplify the expression  
 $(23 - 2) \times 3 + 5$ .

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3. Simplify the expression  
 $(4 \div 4) \times 4 + (4^2 - 4)$ .

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4. Simplify the expression  
 $10 + (5 \times 4 - 12) \times 2^2$ .

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5. Write an expression with two operations that simplifies to 1.

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6. The expression  $7 \times 4 = 4 \times 7$ , is an example of which property?

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7.  $3 \times (2 + 5) = (3 \times 2) + (3 \times 5)$  is an example of which property?

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8.  $(p \times q) \times r = p \times (q \times r)$  is an example of which property?

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9.  $42 \times 1 = 42$  is an example of which property?

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10.  $299 + 0 = 299$  is an example of which property?

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**CHAPTER**

**Algebraic Reasoning**

**1**

**Free Response Test A, continued**

11. Evaluate  $6z^2 \div 3z$  for  $z = 5$ .

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12. Evaluate  $9p + 11$  for  $p = 3$ .

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13. Evaluate  $4t^2 \div t$  for  $t = 10$ .

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14. Evaluate  $12t - 9z + 1$  for  $t = 6$  and  $z = 5$ .

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15. Evaluate  $8 + p^2 - 3c$  for  $p = 4$  and  $c = 2$ .

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16. Write an expression equal to “four more than a number multiplied by 3”.

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17. How would you write a phrase that represents the expression  $2x + 4$ ?

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18. How would you write a phrase that represents the expression  $3(n + 9)$ ?

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19. Write an expression equivalent to “the quotient of a number and 5 plus 2”.

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20. Simplify the expression  $x + x^2 - x$ .

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21. Simplify  $14b^2 + a - 2b^2$ .

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22. Simplify  $5p^3 + 12q + 6 - 2p^3 + 3q$ .

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23. The side length of an equilateral triangle is  $x + 3$ . Write an expression for the perimeter of the triangle.

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**CHAPTER**

**Algebraic Reasoning**

**1**

**Free Response Test B**

1. Simplify the expression  
 $12 - 4 \div 2 \times 5 + 6$ .

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2. Simplify the expression  
 $(45 - 4) \times 2 + 17$ .

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3. Simplify the expression  
 $(3 \div 3) \times 3 + (3^2 + 3)$ .

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4. Simplify the expression  
 $28 + (9 \times 6 - 23) \times 2$ .

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5. Write an expression with three operations that simplifies to 20.

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6. The expression  $54 \times 7 = 7 \times 54$ , is an example of which property?

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7.  $8 \times (7 + 6) = (8 \times 7) + (8 \times 6)$  is an example of which property?

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8.  $7(4 + 3) = 7 \times 4 + 7 \times 3$  is an example of which property?

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9.  $888 + 0 = 888$  is an example of which property?

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10.  $(2a \times b) \times c = 2a \times (b \times c)$  is an example of which property?

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11. Evaluate  $3x + 5$  for  $x = 6$ .

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12. Evaluate  $3t^3 - t$  for  $t = 3$ .

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13. Evaluate  $34t - 4z + 7$  for  $t = 2$  and  $z = 4$ .

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14. Evaluate  $\frac{96}{m} \div 3n$  for  $m = 2$  and  $n = 8$ .

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15. Evaluate  $14 + 3p^2 - 5c$  for  $p = 5$  and  $c = 10$ .

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CHAPTER

# Algebraic Reasoning

1

## Free Response Test B, continued

16. Write an expression equal to “eight more than a number divided by 5”.

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17. How would you write a phrase that represents the expression  $6x + 9$ ?

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18. Write an expression equal to “5 less than the product of 64 and a number”.

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19. How would you write a phrase that represents the expression  $7(n - 12)$ ?

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20. Simplify the expression  $3x + 7x^3 - 2x$ .

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21. Simplify  $13q + 3q - 4q$ .

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22. Simplify  $3m^3 + 7n + 3 - m^3 + 2n$ .

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23. The side length of an equilateral triangle is  $6x - 12$ . Write an expression for the perimeter of the triangle.

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**CHAPTER**

**Algebraic Reasoning**

**1**

**Free Response Test C**

1. Simplify the expression  $66 - 6 \div 3 \times 2 + 8$ .  
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2. Simplify the expression  $(16 - 5) \times 7 + 9$ .  
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3. Simplify the expression  $(4 \div 2) \times 4 + (2^2 + 4)$ .  
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4. Simplify the expression  $58 + (13 \times 5 - 42) \times 3^2$ .  
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5. Write an expression with four operations and parentheses that simplifies to 24.  
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6. The expression  $103 \times 82 = 82 \times 103$  is an example of which property?  
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7.  $22 \times (5 + 8) = (22 \times 5) + (22 \times 8)$  is an example of which property?  
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8.  $1,776 \times 1 = 1,776$  is an example of which property?  
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9.  $14 \times 7 + 14 \times 5 = 14(7 + 5)$  is an example of which property?  
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10.  $\frac{p}{2} + \frac{q}{2} = \frac{q}{2} + \frac{p}{2}$  is an example of which property?  
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11. Evaluate  $9r^2 \div r$  for  $r = 3$ .  
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12. Evaluate  $54t - 3z + 6$  for  $t = 3$  and  $z = 8$ .  
\_\_\_\_\_
13. Evaluate  $75 + 5p^2 - 9c$  for  $p = 7$  and  $c = 12$ .  
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14. Evaluate  $4x^2 - 5xy + 21y^2$  for  $x = 5$  and  $y = 2$ .  
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15. Evaluate  $8a^2 \div 3ab$  for  $a = 4$  and  $b = 6$ .  
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16. Write an expression equal to “eleven less than a number divided by fourteen”.  
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CHAPTER

# Algebraic Reasoning

1

## Free Response Test C, continued

17. How would you write a phrase that represents the expression  $24x + 19$ ?

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18 Write an expression equal to “8 less than the product of 33 and a number”?

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19. How would you write a phrase that represents the expression  $21(x - 7)$ ?

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20. Simplify  $37a^2 + 2b - 7a^2$ .

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21. Simplify  $14m^3 + 8n + 15 - 5m^3 + 3n$ .

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22. Simplify the expression  $8x + 5x^2 - 3x + 2x^2$ .

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23. The side length of a regular pentagon is  $8x - 25$ . Write an expression for the perimeter of the pentagon.

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# Algebraic Reasoning

## Answers

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### Section A Quiz

1. C
2. F
3. D
4. G
5. C
6. F
7. B
8. H
9. C
10. H

### Section B Quiz

1. B
2. H
3. B
4. J
5. A
6. F
7. B
8. J
9. D
10. G

### Multiple Choice Test A

1. C
2. C
3. D
4. A
5. A
6. D
7. B
8. C
9. C
10. C
11. D

12. D
13. A
14. A
15. B
16. A
17. D
18. B
19. B
20. A
21. B
22. A
23. C

### Multiple Choice Test B

1. C
2. J
3. A
4. G
5. D
6. G
7. D
8. H
9. C
10. H
11. A
12. F
13. A
14. F
15. C
16. G
17. D
18. J
19. D
20. G
21. B

- 22. G
- 23. C

**Multiple Choice Test C**

- 1. B
- 2. F
- 3. A
- 4. H
- 5. D
- 6. G
- 7. C
- 8. H
- 9. D
- 10. H
- 11. D
- 12. F
- 13. C
- 14. H
- 15. D
- 16. F
- 17. C
- 18. H
- 19. C
- 20. G
- 21. B
- 22. F
- 23. C

**Free Response Test A**

- 1. 57
- 2. 68
- 3. 16
- 4. 42
- 5. answers will vary; Possible answer:  
 $3 \times 5 - 14$
- 6. commutative property of multiplication
- 7. distributive property
- 8. associative property

- 9. identity property
- 10. identity property
- 11. 10
- 12. 38
- 13. 40
- 14. 28
- 15. 18
- 16.  $3x + 4$
- 17. Possible answer: four added to a number multiplied by two
- 18. Possible answer: 3 times the sum of a number plus 9
- 19.  $\frac{n}{5} + 2$
- 20.  $x^2$
- 21.  $2b^2 + a$
- 22.  $3p^3 + 15q + 6$
- 23.  $3x + 9$

**Free Response Test B**

- 1. 8
- 2. 99
- 3. 15
- 4. 59
- 5. answers will vary; Possible answer:  
 $3^2 \times 4 - 16$
- 6. commutative property of multiplication
- 7. distributive property
- 8. distributive property
- 9. identity property
- 10. associative property
- 11. 23
- 12. 78
- 13. 59
- 14. 2
- 15. 39
- 16.  $\frac{x}{5} + 8$
- 17. Possible answer: 9 more than a number multiplied by 6

18.  $64n - 5$
19. Possible answer: 7 times the difference between a number and 12
20.  $x + 7x^3$
21.  $12q$
22.  $2m^3 + 9n + 3$
23.  $18x - 36$

### Free Response Test C

1. 70
2. 86
3. 16
4. 265
5. answers will vary; Possible answer:  
 $2 \times (20 - 3) - 2 \times 5$
6. commutative property of multiplication
7. distributive property
8. identity property
9. distributive property
10. commutative property
11. 27
12. 144
13. 212
14. 134
15.  $16/9$
16.  $\frac{x}{14} - 11$
17. Possible answer: nineteen more than twenty-four times a number
18.  $33n - 8$
19. Possible answer: 21 times the difference between a number and 7
20.  $30a^2 + 2b$
21.  $9m^3 + 11n + 15$
22.  $5x + 7x^2$
23.  $40x - 125$

### Performance Assessment

1.  $2a + 2b$  or  $2(a + b)$
2.  $66x + 12$  or  $6(11x + 2)$

3.  $2(22x + 4) - 3$
4. distributive property
5.  $\frac{12x}{4}$  or  $12x \div 4$

### Cumulative Test

1. B
2. F
3. B
4. F
5. B
6. H
7. B
8. F
9. C
10. G
11. D
12. G
13. C
14. J
15. C
16. H
17. D
18. H
19. C
20. J
21. D
22. J
23. A
24. F
25. B
26. J
27. A
28. F
29. C
30. J
31. A
32. F