Name: _____   Date: _____

Chapter 3 Review

3.1 Build Algebraic Models Using Concrete Materials, pages 104–109

1. Use algebra tiles. Model each algebraic expression.
   a) $4x + 2$ b) $2x^2$
   c) $x^2 + 2x$ d) $2x^2 + x + 4$

2. One face of a cube has area 36 cm^2.
   a) What is the side length of the cube?
   b) Find the volume of the cube.

3.2 Work With Exponents, pages 110–118

3. Evaluate.
   a) 5^3 b) 2^8
   c) -3^4 d) $(-2)^4$
   e) $(-1)^{10}$ f) $\left(\dfrac{2}{3}\right)^3$

4. Evaluate. Use the correct order of operations.
   a) $3^4 + 4^2$ b) $7^2 - 7$
   c) $9^2 \div 3^2$ d) $5 \times \left(\dfrac{2}{5}\right)^3$
   e) $(3^2 + 4^2)$ f) $(3 + 4)^2$

5. A scientist studying a type of bacteria notices that the population doubles every 30 minutes. The initial population is 500.
   a) Copy and complete the table.

Time (min)	Population
0	500
30	1000
60	
90	
120	

   b) Construct a graph of population versus time. Connect the points with a smooth curve.

3.3 Discover the Exponent Laws, pages 119–129

6. Write as a single power. Then, evaluate.
   a) $8^5 \times 8^4 \div 8^7$
   b) $6^7 \div 6^5 \div 6$
   c) $(3^3)^4 \div 3^9$
   d) $\dfrac{\left(5^3\right)^4 \times 5^2}{5^{10}}$
   e) $2^7 \times 2^5 \div (2^2)^4$
   f) $[(-6)^3]^3 \div [(-6)^2]^4$

7. Simplify.
   a) $b^6 \times b^3$ b) $g^2 \times g^8 \div g^7$
   c) $(a^5)^3 \div (a^4)^2$ d) $m^5 n \times m^2 n^4$
   e) $p^7 q^4 \div p^3 q^4$ f) $\dfrac{8b^3 d \times 4bd^2}{2(2bd)^2}$

3.4 Communicate With Algebra, pages 130–139

8. Identify the coefficient and the variable for each term.
   a) $7m$ b) $-3x^5$
   c) $\dfrac{3}{7} m^2 n$ d) gh

9. Classify each expression as a monomial, binomial, trinomial, or polynomial.
   a) $a^2 - 2a + 1$
   b) $2 - 3x^4 - 5x^2 + 4x$
   c) $6m^2 n^5$
   d) $h^3 + 6$
   e) $12x$
   f) $4x^2 - 3y^2 + 8$

10. State the degree of each term.

a) $-8b^4$

b) $-x^4y^3$

c) $\dfrac{3}{4}mn^2$

d) $6r^6s$

11. What is the degree of each polynomial?

a) $5a^4 + b^3$

b) $7b^6$

c) $2x^2 + 3x - 1$

d) $8m^4 - m^2 + 2m$

3.5 Collect Like Terms, pages 144–153

12. Classify each pair of terms as like or unlike.

a) $4a^2$ and $4a$

b) $6x^3$ and $-x^3$

c) $12p^4$ and $-p^4$

d) $4a^2b^3$ and $6a^3b^2$

13. Simplify each expression.

a) $2b + 7g - 5b - 8g$

b) $3x + y^2 + 5y^2 - 7x$

c) $6q + u + 4u + q + u + 4u - u$

d) $10 - m^2 - 7 - m^2 + 4m^2$

e) $-3v + 2v + 6 - 3v - 9 - v$

f) $7 + h + h - 5 + 6h + 2 + 3h$

3.6 Add and Subtract Polynomials, pages 154–159

14. Simplify.

a) $(6k - 4) + (2k + 4)$

b) $(2a + 1) - (4a + 2)$

c) $(b - 6) - (2 - 5b) + (b + 4)$

d) $(g + 12) + (g - 7) - (2 - 3g)$

e) $(x^2 + 2x + 1) + (2x^2 + 4)$

f) $(2m^2 + m + 12) - (3m^2 + 4m - 6)$

15. The length of the Cheungs' back yard is double its width.

a) Write an expression for the perimeter of their back yard.

b) The width of their back yard is 9 m. What is its perimeter?

3.7 The Distributive Property, pages 160–169

16. Expand.

a) $5(x + 3)$ **b)** $4(b + 2)$

c) $w(2w + 1)$ **d)** $q(q + 4)$

e) $3c(6 - 4c)$ **f)** $-p(2p - 1)$

g) $-5(a^2 - 4a - 2)$ **h)** $2d(d^2 - 3d - 1)$

17. Expand and simplify.

a) $3(x + 3) + 2(x + 1)$

b) $-4(m + 2) + 3(m - 7)$

c) $-(d - 3) - 5(d + 2)$

d) $5[b + 2(b + 1)]$

e) $-2[3(a + 3) - 4]$

f) $4[-2(4 - t) + 3t]$