97. *Verbal model:* Unknown num- + Reciprocal of number = $\frac{37}{6}$

Labels: Unknown number $= x$

Reciprocal $= \frac{1}{x}$

Equation: $x + \frac{1}{x} = \frac{37}{6}$

99. *Verbal model:* Area of triangle − Area of triangle = Area of shaded region

Labels: Area of rectangle $= x(6)$ or $6x$ (square inches)

Area of triangle $\frac{1}{2}(x)(6)$ or $3x$ (square inches)

Shaded area $= 24$ (square inches)

Equation: $6x - \frac{1}{2}(x)(6) = 24$ or $6x - 3x = 24$

This equation could also be simplified to $3x = 24$.

Note: The area of a rectangle is the product of its length and width ($A = lw$). The area of a triangle is one-half the product of its base and height $\left(A = \frac{1}{2}bh\right)$.

Chapter Test for Chapter 2

1. Terms $2x^2, -7xy, 3y^3$

Coefficients: $2, -7, 3$

2. $x \cdot (x + y) \cdot x \cdot (x + y) \cdot x = x^3(x + y)^2$

3. Associative Property of Multiplication

4. Commutative Property of Addition

5. Additive Inverse Property

6. Multiplicative Identity Property

7. $3(x + 8) = 3x + 24$

8. $-y(3 - 2y) = -3y + 2y^2$

9. $(c^2)^4 = c^{2 \cdot 4}$
$= c^8$

10. $-5uv(2u^3) = -5 \cdot 2 \cdot u \cdot u^3 \cdot v$
$= -10u^{1+3}v$
$= -10u^4v$

11. $3b - 2a + a - 10b = (-2 + 1)a + (3 - 10)b$
$= -a - 7b$

12. $15(u - v) - 7(u - v) = (15 - 7)(u - v)$
$= 8(u - v)$
$= 8u - 8v$

13. $3z - (4 - z) = 3z - 4 + z$
$= 3z + z - 4$
$= 4z - 4$

Note: This problem can also be worked as follows.

$15(u - v) - 7(u - v) = 15u - 15v - 7u + 7v$
$= (15 - 7)u + (-15 + 7)u$
$= 8u - 8v$

14. $2[10 - (t + 1)] = 2[10 - t - 1]$
$= 2[10 - 1 - t]$
$= 2[9 - t]$
$= 18 - 2t$

15. (a) When $x = 3$, the value of $x^3 - 2$ is $3^3 - 2 = 27 - 2 = 25$.

(b) When $x = 3$ and $y = -12$, the value of $x^2 + 4(y + 2)$ is $3^2 + 4(-12 + 2) = 9 + 4(-10) = 9 - 40 = -31$.

16. When $a = 2$ and $b = 6$, the value of $(a + 2b)/(3a - b)$ is undefined because

$$\frac{2 + 2(6)}{3(2) - 6} = \frac{2 + 12}{6 - 6} = \frac{14}{0}$$

and division by zero is undefined.

17. $\frac{1}{5}n + 2$ or $\frac{n}{5} + 2$

18. (a) The perimeter of a rectangle is twice the length plus twice the width.

Perimeter: $2(2w - 4) + 2(w)$

The area of a rectangle is the product of the length and the width.

Area: $(2w - 4)w$

(b) Perimeter: $2(2w - 4) + 2w = 4w - 8 - 2w = 6w - 8$

Area: $(2w - 4)w = 2w^2 - 4w$

(c) The perimeter is measured in units of length, such as feet, meters, inches, etc. The area is measured in square units, such as square centimeters, square inches, square yards, etc.

(d) When $w = 12$ feet, the perimeter $6w - 8 = 6(12) - 8$
$= 72 - 8$
$= 64$ feet.

When $w = 12$ feet, the area $2w^2 - 4w = 2(12)^2 - 4(12)$
$= 2(144) - 48$
$= 288 - 48$
$= 240$ square feet.

19. The concert income is a sum of products.

Verbal description: [Price of adult's ticket] · [Number of adults] + [Price of child's ticket] · [Number of children]

Labels: Price of adults ticket = 3 (dollars)
Number of adults = n
Price of child's ticket = 2 (dollars)
Number of children = m

Algebraic expression: $3n + 2m$ (dollars)

20. (a) $6(3 - (-2)) - 5(2(-2) - 1) \stackrel{?}{=} 7$
$6(3 + 2) - 5(-4 - 1) \stackrel{?}{=} 7$
$6(5) - 5(-5) \stackrel{?}{=} 7$
$30 + 25 \stackrel{?}{=} 7$
$55 \neq 7$

-2 is *not* a solution.

(b) $6(3 - 1) - 5(2 \cdot 1 - 1) \stackrel{?}{=} 7$
$6(2) - 5(2 - 1) \stackrel{?}{=} 7$
$12 - 5(1) \stackrel{?}{=} 7$
$12 - 5 \stackrel{?}{=} 7$
$7 = 7$

1 *is* a solution.