Evaluating Algebraic Expressions

1. Find the value of each expression if $a = -2$ and $b = 3$.

a) $a + b$

$= (2) + (3)$

$= 5$

b) $a - 2b$

$= (2) - 2(3)$

$= 2 - 6$

$= -4$

c) $\frac{1}{2}a - \frac{1}{3}b$

$= \frac{1}{2}\frac{(2)}{1} - \frac{1}{3}\frac{(3)}{1}$

$= \frac{2}{2} - \frac{3}{3}$

$= 1 - 1$

$= 0$

2. **Simplify**.

a) $(2x - 5) + (8x + 13)$

$= 2x - 5 + 8x + 13$

$= 2x + 8x - 5 + 13$

$= 10x + 8$

b) $(5a - 7ab) + (6b + 4a) - (9ab - 3a + 3b)$

$= 5a - 7ab + 6b + 4a - 9ab + 3a - 3b$

$= 5a + 4a + 3a - 7ab - 9ab + 6b - 3b$

$= 12a - 16ab + 3b$

c) $-2(4x + 5y) + 4(8x - 7y)$

$= -8x - 10y + 32x - 28y$

$= -8x + 32x - 10y - 28y$

$= 24x - 38y$

d) $-7(x^2 + 6x + 9) - 5(2x^2 - 3x + 4)$

$= -7x^2 - 42x - 63 - 10x^2 + 15x - 20$

$= -7x^2 - 10x^2 - 42x + 15x - 63 - 20$

$= -17x^2 - 27x - 83$

Solving Equations

3. **Solve**.

a) $3y + 5 = 11$

$-5 \quad -5$

$\frac{3y}{3} = \frac{6}{3}$

$y = 2$

b) $4x - 3 = -11$

$+3 \quad +3$

$\frac{4x}{4} = \frac{-8}{4}$

$x = -2$

c) $17 = 4c - 3$

$+3 \quad +3$

$\frac{20}{4} = \frac{4c}{4}$

$c = 5$

d) $6x + 8 = 4x - 10$

$-4x \quad -4x$

$2x + 8 = -10$

$-8 \quad -8$

$\frac{2x}{2} = \frac{-18}{2}$

$x = -9$

e) $9p - 10 = 6 + p$

$-p \quad -p$

$8p - 10 = 6$

$+10 \quad +10$

$\frac{8p}{8} = \frac{16}{8}$

$p = 2$

f) $2m + 6.1 = 16.5$

$-6.1 \quad -6.1$

$\frac{2m}{2} = \frac{10.4}{2}$

$m = 5.2$

g) $\frac{x}{2} = \frac{4}{1}$ Cross mult.

$1 \cdot x = 4 \cdot 2$

$x = 8$

h) $\frac{3x}{5} = \frac{-9}{1}$

$3x \cdot 1 = -9 \cdot 5$

$\frac{3x}{3} = \frac{-45}{3}$

$x = -15$

i) $\frac{6}{1} = \frac{m}{4}$

$6 \cdot 4 = m \cdot 1$

$m = 24$

j) $2\frac{x}{-7} = 6$

$\frac{2x}{-7} = \frac{6}{1}$

$\frac{2x}{2} = \frac{-42}{2}$

$x = -21$

k) $3 = \frac{3}{2}x - 3$

$+3 \quad +3$

$\frac{6}{1} = \frac{3x}{2}$

$\frac{12}{3} = \frac{3x}{3}$

$x = 4$

l) $\frac{1}{4}x - 3 = 5$

$+3 \quad +3$

$\frac{x}{4} = \frac{8}{1}$

$1 \cdot x = 8 \cdot 4$

$x = 32$