

Algebraic expressions & Absolute value

Algebraic expressions

1. Write an algebraic expression for each word phrase.

- (a) 12 more than m machines
- (b) the total number of seashells s divided by 10
- (c) six times the daily amount of fiber f in your diet
- (d) your aunt's age a minus 25

2. Write a word phrase for each algebraic expression.

- (a) $n + 16$
- (b) $4m$
- (c) $\frac{n}{15}$
- (d) $15 + 3k$

3. For each algebraic expression, identify the number of terms. Then list the coefficients and any constant terms.

Expression	$7x^2 - y$	$5k - 1$	$0.2x - y - z$	$0.5n$
Number of terms				
Coefficients				
Constans				

4. Factorize the following algebraic expressions

- (a) $6x + 24$
- (b) $8x^2 - 4x$
- (c) $6x^3 - 8x^2 + 4x$
- (d) $24xyz^2 - 16xy^2x + 8x^2yz$
- (e) $acd - bcd + acd - gcd$

5. For the following expressions, factorize the first pair, them the second pair:

- (a) $8m^2 - 12m + 10m - 15$
- (b) $x^2 + 5x + 2x + 10$
- (c) $m^2 - 4m + 3m - 12$
- (d) $2t^2 - 4t + t - 2$
- (e) $6y^2 - 15y + 4y - 10$

6. Using formulas of difference of two squares, sqaure of a difference or sqaure of a sum, factorize the following expressions.

- (a) $x^2 - 49$
- (b) $x^4 - 9$
- (c) $x^2 + 24x + 144$
- (d) $x^2 - 8x + 16$
- (e) $t - 4\sqrt{t} + 4$
- (f) $x^2 + 4x - 32$

- (g) $x^2 - 10x + 9$
- (h) $x^2 - 12x + 16$
- (i) $4x^2 + 4x - 8$

7. Remove irrationality from a denominator:

- (a) $\frac{2-\sqrt{2}}{2+\sqrt{2}}$
- (b) $\frac{3}{1+\sqrt{3}}$
- (c) $\frac{3+\sqrt{3}}{\sqrt{2}-1}$
- (d) $\frac{\sqrt{6}}{\sqrt{5}-2}$

Absolute value

8. Calculate:

- (a) $|\sqrt{3} - 4| - |2 + \sqrt{3}|$
- (b) $|\sqrt{2} - 1| \cdot |2\sqrt{2} - 1|$
- (c) $\frac{|\sqrt{3}+2|}{|\sqrt{2}-\sqrt{3}|}$

9. Solve equations:

- (a) $|4x - 2| = 3$
- (b) $x^2 + 6x = 8$
- (c) $\sqrt{x^2 + 3x + \frac{9}{4}} - 7 = 0$
- (d) $\sqrt{x^2 - 4x + 4} = \sqrt{8 + 4\sqrt{3}}$
- (e) $\sqrt{16x^2 - 8x + 1} = \sqrt{4x^2 + 4x + 1}$
- (f) $|4x - 1| = 2|x - \frac{1}{4}| + \frac{1}{2}$

10. Solve inequalities:

- (a) $|x - 3| < 3$
- (b) $|2x + 3| \geq 4$
- (c) $\sqrt{x^2 + 6x + 9} \leq 5$
- (d) $2|x - 1| + \sqrt{x^2 - 2x + 1} > 6 - |3x - 3|$
- (e) $\sqrt{9x^2 - 6x + 1} \leq \sqrt{3 - 2\sqrt{2}}$
- (f) $\sqrt{x^2 + 14x + 49} - 2 < 2|x + 7| + 6$