

Worksheet: Algebraic Expressions, Formulae, Substitution, Linear Equations, Inequalities, Direct Variation, Completing the Squares, Simultaneous Quadratic Equations.

1. (a) Solve $5 - v \leq 2v - 1$.
(b) Hence write down the three integers which satisfy the above inequality.

2. (a) Simplify $-3a^3b^2 \times 2ab^4$.
(b) Expand and simplify $(5x + 2)(x - 3)$.

3. (a) Evaluate the following expression if $m = 4$ and $n = -5$:

$$\frac{2m - n}{3m^2}$$

- (b) Express the statement as an algebraic expression;
“Six times the sum of the squares of two numbers p and q .”

4. (a) Given the formula:

$$W = 3\pi\sqrt{\frac{2a}{b}}$$

Find the value of W , correct to 2 decimal places, when $\pi = 3.14$, $a = 11.3$ and $b = 2.56$.

- (b) Solve:

$$\frac{2x}{3} + \frac{x-3}{4} = 5.$$

5. If y varies directly with x as shown in the table below, find the values of ‘ a ’ and ‘ b .’ :

| | | | |
|-----|----|-----|-----|
| x | 2 | a | 4 |
| y | -6 | 4.5 | b |

6. Solve the simultaneous quadratic equations for x and y :

$$2x + y = 3$$

$$3x^2 + y^2 = 13.$$

7. (a) Express $2x^2 + 8x - 5$ in the form $a(x + h)^2 + k$, where a , h and k are constants.

(b) Hence, or otherwise, state the minimum value of $2x^2 + 8x - 5$.