

Solving Equations in 3 Unknowns

Exercise 4K

- ① (i) Solve, by eliminating z :
 $2x + 3y + z = 12$
 $3x + 2y + z = 13$
 $4x - 5y + z = 8$
- (ii) Solve, by eliminating y :
 $3x + y - 2z = 4$
 $5x - y + 3z = 22$
 $2x + y + 4z = 13$
- (iii) Solve, by eliminating x :
 $2x - 3y + 4z = -7$
 $2x + 2y - 3z = 19$
 $2x - 5y + 2z = -3$

- ② (i) Solve $x + 2y + 3z = 13$
 $2x + 3y - z = -7$
 $3x - y + 2z = 18$
- (ii) Solve $2x - y + 2z = 16$
 $3x + 2y - z = 5$
 $x + 4y - 3z = -13$
- (iii) Solve $4x + 2y - z = 29$
 $-x + 3y + 2z = -16$
 $2x + y - 3z = 22$
- (iv) Solve $5x + 3y + 2z = 8$
 $7x - 4y + 4z = 20$
 $3x + 2y - 2z = 3$

- ③ (i) Solve $2a - 5b + 2c = -36$, $3a + 4b - 3c = 10$ and
 $4a - 3b + 4c = -44$
- (ii) Solve $3p + 5q - 2r = 13$, $4p - 2q + 5r = -25$ and
 $-2p + 3q - 7r = 25$
- (iii) Solve $2\alpha + 3\beta + 2\gamma = 1$, $4\alpha - 2\beta - 5\gamma = 15$ and
 $-5\alpha + 4\beta + \gamma = -42$

- ④ (i) Solve $x + 3y = 2z - 23$, $2y = 3x - 4z + 2$ and
 $5z - 2x = 3y + 37$
- (ii) Solve $2x = y + z + 13$, $5y - x = 2z - 16$ and $3z + 2y = 11 - x$.
- (iii) Solve $y + 5 = 3x$, $2x - z = 7$ and $4y = 3z + 13$

- PS** ⑤ $x = 3$, $y = 5$, $z = 1$ is the solution to the simultaneous equations
 $ax + by + cz = 28$
 $az - cy = 2bx + 10$
 $bz = ax + 3cy + 26$

Work out the values of a , b and c .

PS ⑥ 7, 9, 13 are the first three terms of a sequence with n th term $= an^2 + bn + c$.

(i) By substituting $n = 1, 2$ and 3 set up three simultaneous equations in a, b and c .

(ii) Solve your simultaneous equations and hence write down an expression for the n th term.

PS ⑦ 9, 16 and 42 are the 2nd, 3rd and 5th terms of a quadratic sequence. Work out the n th term of the sequence.

PS ⑧ If (x, y, z) are the general coordinates of a point in a 3-dimensional coordinate system, then each of the equations

$$5x - 2y + z = 3$$

$$z = x + y$$

$$2x + 6y = 5z$$

represents a plane. Solve the equations and hence write down the coordinates of the point at which the three planes meet.

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