

Algebra

Problem Set 3

1. Factorise using the Difference of Two Squares

(a) $x^2 - 81$

(b) $4x^2 - 81$

(c) $9x^2 - 16y^2$

(d) $x^3 - 100x$

(e) $1 - 9x^2$

(f) $a^2 - \frac{4}{9}$

2. Factorise using the Perfect Square Rules

(a) $x^2 + 12x + 36$

(b) $x^2 - 8x + 16$

(c) $4x^2 + 4x + 1$

(d) $x^2 - 4x + 4$

(e) $25 - 10x - x^2$

(f) $x^2 + 6xy + 9y^2$

3. Factorise using the Laws on Squares and Cubes.

(a) $x^3 - x$

(b) $a^4 - b^4$

(c) $2x^4 + 16x$

(d) $x^6 - y^6$

(e) $w^5z^2 + z^5w^2$

4. I invest \$1000 in a term deposit. each year it increases its value by 5.2%.

(a) Find a formula to express the total amount I will have in my account after n years.

(b) How much money will I have after 10 years?

5. Factorise

(a) $x^2 + 8x + 7$

(b) $x^2 - 15x + 50$

(c) $4x^2 + 11x + 6$

(d) $3x^2 - 7x - 10$

(e) $t^2 + 6t - 27$

(f) $t^4 - 3t^2 - 4$

6. Simplify the following algebraic fractions

(a) $\frac{x^2 + 6x + 9}{x + 3}$

(b) $\frac{x + y}{x^2 - 4y^2} \times \frac{6y - 3x}{2x + 2y}$

(c) $\frac{x^2 - y^2}{\frac{1}{x} + \frac{1}{y}}$

(d) $\frac{4x^2 - 1}{2x^2 - 9x + 4} \div \frac{6x + 3}{4 - x}$

(e) $\frac{2}{x^2 - 1} - \frac{1}{x^2 - x} + \frac{5}{x^2 + x}$

(f) $\frac{x}{x - y} - \frac{y}{x + y} - \frac{2xy}{x^2 - y^2}$

7. All odd numbers can be written in the form $2k - 1$, for some integer k . Prove that the product of two odd numbers must be an odd number.

8. Solve the following equations.

(a) $x^2 + 5x + 4 = 0$

(b) $9x^3 = 4x$

(c) $x^3 - 8x^2 + 16x = 0$

(d) $x^2 + \frac{2}{3}x + \frac{1}{9} = 0$

9. Solve the following quadratic equations using the quadratic formula

(a) $x^2 + 5x + 3 = 0$

(c) $2x^2 - x + 1 = 0$

(b) $x^2 - 2x + 1 = 0$

(d) $2x^2 - 5x + 1 = 0$

10. We have covered a lot of algebra over the last 2 weeks. Make a summary of this topic.

Ans: 1a) $(x+9)(x-9)$, b) $(2x+9)(2x-9)$, c) $(3x-4y)(3x+4y)$, d) $x(x+10)(x-10)$, e) $(1-3x)(1+3x)$,
f) $(a + \frac{2}{3})(a - \frac{2}{3})$, 2a) $(x+6)^2$, b) $(x-4)^2$, c) $(2x+1)^2$, d) $(x-2)^2$, e) $(5-x)^2$, f) $(x+3y)^2$.