

Dear Parents / Students

Due to the unprecedented situation, Knowledgeplus Training center is mobilized and will keep accompanying and supporting our students through this difficult time. Our Staff will be continuously, sending notes and exercises on a weekly basis through what's app and email. Students are requested to copy the notes and do the exercises on their copybooks. The answers to the questions below will be made available on our website on knowledgeplus.mu/support.php. Please note that these are extra work and notes that we are providing our students and all classes will be replaced during the winter vacation. We thank you for your trust and are convinced that, together, we will overcome these troubled times.

Knowledgeplus Training Center

Mathematics

Grade 9

Week 4

Notes and Exercise

Note:(All the Notes, Examples and Exercise are on the photos and Note:(Please copy all the Notes, Examples and Exercises on your copy book).

Mathematics Grade 9 week 4

Quadratic

(1) Factorisation of $ax^2 + bx$ ($c = 0$)

Example

Factorise

(a) $2x^2 + 3x$ (b) $3x^2 - 6x$ (c) $14x - 7x^2$

Solution

(a) $2x^2 + 3x = x(2x + 3)$ Always remove common numbers or common Alphabets. In this case x is common.

(b) $3x^2 - 6x = 3x(x - 2x)$ In this case $3x$ is common.

(c) $14x - 7x^2 = 7x(2 - x)$ In this case $7x$ is common.

Factorisation - Put in brackets

Exercise 1

$2(x+1)$

$2x+2$

Expansion - Remove brackets

Exercise 1

(a) $x^2 + 5x$ (b) $x^2 - 6x$ (c) $5x - 13x^2$

(d) $2x^2 + 8x$ (e) $3x^2 - 12x$ (f) $-6x^2 + 3x$

(g) $-4 - 10x^2$ (h) $2x$ $27x^2 - 18x$

Factorisation of $x^2 - k^2$

$$x^2 - y^2 = (x+y)(x-y)$$

Example

Factorise

(a) $x^2 - 25$ (b) $49 - x^2$ (c) $2x^2 - 18$

$$\begin{aligned} \text{(a)} \quad x^2 - 25 &= x^2 - 5^2 \\ &= (x+5)(x-5) \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 49 - x^2 &= 7^2 - x^2 \\ &= (7+x)(7-x) \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 2x^2 - 18 &= \cancel{2x^2} - 2(x^2 - 9) \\ &= 2(x+3)(x-3) \end{aligned}$$

Exercise

Factorise

(a) $x^2 - 49$ (b) $y^2 - 1$ (c) $36 - x^2$

(d) $y^2 - \frac{1}{9}$ (e) $x^2 - \frac{16}{25}$ (f) $4x^2 - 81$

(g) $2x^2 - 50$ (h) $27 - 3x^2$ (i) $x^2 - 2\frac{1}{4}$

(j) $(x+2)^2 - 36$ (k) $(2x-3)^2 - 1$

Factorisation of $ax^2 + bx + c$

Recall that

$$\begin{aligned} (x+2)(x+3) &= x(x+3) + 2(x+3) \\ &= x^2 + 3x + 2x + 6 \\ &= x^2 + 5x + 6 \end{aligned}$$

Thus, the factorisation of $x^2 + 5x + 6$ is $(x+2)(x+3)$

Example

(a) $x^2 + 9x + 20$ (b) $x^2 - 7x + 10$

Solution

$$\begin{aligned} x^2 + 9x + 20 &= x^2 + 4x + 5x + 20 & P = ac = 1 \times 20 = 20 \\ &= x(x+4) + 5(x+4) & S = b = 9 \\ &= (x+4)(x+5) & F = 4, 5 \end{aligned}$$

$$\begin{aligned} (b) \quad x^2 - 7x + 10 &= x^2 - 2x - 5x + 10 & P = 10 \\ &= x(x-2) - 5(x-2) & S = -7 \\ &= (x-2)(x-5) & F = -2, -5 \end{aligned}$$

P = Product of a and c

S = Sum = b

$ax + bx + c$

Sum

F = Factor: The factor it must be the factor when that you multiply you get the product and the factor that you add (sum) you get the sum.

Exercise: Factorise

(a) $x^2 + 4x + 3$ (b) $x^2 + 8x + 15$ (c) $x^2 + 10x + 16$

(d) $2x^2 - 7x + 12$ (e) $x^2 - 73x + 30$

(f) $x^2 - 2x + 1$

(3)

Complete factorisation of ax^2+bx+c

Example

Factorise completely

(a) $2x^2+6x+4$ (b) $3x^2-15x+18$

Solution

$$\begin{aligned} \text{(a)} \quad 2x^2+6x+4 &= 2x^2+2x+4x+4 & P &= 2 \times 4 = 8 \\ &= 2x(x+1)+4(x+1) & S &= 6 \\ &= (x+1)(2x+4) & F &= 2, 4 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 3x^2-15x+18 &= 3x^2-6x-9x+18 & P &= 3 \times 18 = 54 \\ &= 3x(x-2)-9(x-2) & S &= -15 \\ &= (x-2)(3x-9) & F &= -3, 6, -9 \end{aligned}$$

Exercise

Factorise completely

(a) $2x^2+10x+12$ (b) $3x^2-18x+24$

(c) $-5x^2+40x-45$ (d) $4x^2-12x-40$

(e) $6x^2-42x+72$ (f) $7x^2-14x-105$

(g) $3x^2-3x-60$ (h) $4x^2+4x-120$

(i) $5x^2-20x-60$