T&T2 2.1
Factorising…

Factors

Chapter **2**

21

Section 2.1 Factorising with common factors

$12 \rightarrow$ Factors of 12

$1, 2, 3, 4, 6, 12$

$3 \times 4 = 12$
$12 \times 1 = 12$
$2 \times 6 = 12$

Algebra factors

Factorize

Expression: $5xy + 15xz$

Method:
① Find the common factors with the numbers and the letters
② Take out the common values Leave outside bracket
③ Leave what is left inside the bracket.

HCF
$5x(y + 3z)$

$\dfrac{5xy}{5x}$ $\dfrac{^3 15xz}{5x}_1$

Exercise 2.1

1. Write down the highest common factor of each of these:

(i) 9 and 12

(ii) 12 and 18

(iii) 14 and 21

(iv) 21 and 35

$1, 3, 9$

$1, 2, 3, 4, 6, 12$

$12: 1, 2, 3, 4, 6, 12$

$18: 1, 2, 3, 6, 9, 18$

$14: 1, 2, 7, 14$

$21, 1, 3, 7, 21$

$21: 1, 3, 7, 21$

$35: 1, 5, 7, 35$

2. Write down the highest common factor of each of these:

(i) $4x$ and $12x$

$4x$

(ii) $3n$ and $9n$

$3n$

(iii) $10x$ and $15x$

$5x$

10: 1, 2, **5**, 10
15: 1, 3, **5**, 15

(iv) $3a^2$ and $6a$

$3aa$ $6a$

$= 3a$

(v) $3xy$ and $12x^2$

$3xy$ $12xx$

$= 3x$

(vi) $2a^2b$ and $6ab$

$2aab$ $6ab$

$= 2ab$

3. Copy and complete each of these:

(i) $7x + 14y = 7(\ x + 2y\ )$

$\dfrac{^2 \cancel{14}y}{\cancel{7}_1}$

(ii) $16a + 24b = 8(\ 2a + 3b\ )$

$\dfrac{^2 \cancel{16}a}{\cancel{8}_1}$ $\dfrac{^3 \cancel{24}b}{\cancel{8}_1}$

(iii) $ab + bc = b(\ a + c\ )$

(iv) $3a^2 + 6a = 3a(\ a + 2\ )$

(v) $5x^2 - 15xy = 5x(\ x - 3y\ )$

(vi) $12xy - 18yz = 6y(\ 2x - 3z\ )$

(vii) $15x^3 + 10x^2y = 5x^2(\ 3x + 2y\ )$

$\dfrac{^3 \cancel{15}xxx}{\cancel{5}xx}$ $\dfrac{^2 \cancel{10}xxy}{\cancel{5}xx}$

(viii) $6a^2b - 8ab^2 + 4ab = 2ab(\ 3a - 4b + 2\ )$

$\dfrac{^3 \cancel{6}aab}{2ab}$ $\dfrac{^{-4} -\cancel{8}abb}{2ab}$ $\dfrac{^{+2} +\cancel{4}ab}{2ab}$

Factorise each of the following:

4. $6x + 18y$

$6(x+3y)$

5. $3ab + 3bc$

$3b(a+c)$

6. $6ax - 12ay$

$6a(x-2y)$

Factorise each of the following:

7. $6a^2 - 12a$

8. $7x^2 - 28x$

9. $15x^2 + 25xy$

Factorise each of the following:

10. $3x^2 - 6x^2y$

11. $3ab^2 - 6ab$

12. $3p^2 - 6pq$

Factorise each of the following:

13. $2x^2y - 6x^2z$

14. $6y^2z + 10y^2$

15. $10p^2q + 5pq^2$

Factorise each of the following:

16. $2a^3 - 4a^2 + 8a$ **17.** $4x^2 - 6xy + 8xz$ **18.** $5xy^2 - 20x^2y$

Factorise each of the following:

19. $4x^2y^2 - 8xy$ **20.** $5x^3 - 10x^2 + 15x$ **21.** $2a^2b - 4ab^2 + 12abc$

22.

E	H	P	S	O	A	I	L	G	R	T	U	N
5	$2a$	$3a$	$2b$	$7b$	a^2	ab	$3b^2$	$a+b$	$a-5b$	$2a-b$	$ab+1$	$2a+3b$

Fully factorise each expression below as the product of two factors.
Use the code above to find a letter for each factor.
Rearrange each set of letters to spell a bird.

(i) $3a^2 - 15ab$ $2a^3 - a^2b$ $7ab - 35b^2$

(ii) $4a^2 - 2ab$ $2a^2b + 2a$ $2ab - 10b^2$

(iii) $7ab + 7b^2$ $5a - 25b$ $2ab^2 + 2b$

(iv) $4ab - 2b^2$ $3b^2a + 3b^3$ $a^3 - 5a^2b$ $2a^2b + 3ab^2$

Answers

Exercise 2.1

1. (i) 3   (ii) 6
    (iii) 7   (iv) 7

2. (i) $4x$ (ii) $3n$
    (iii) $5x$ (iv) $3a$
    (v) $3x$ (vi) $2ab$

3. (i) $(x + 2y)$ (ii) $(2a + 3b)$
    (iii) $(a + c)$ (iv) $(a + 2)$
    (v) $(x - 3y)$ (vi) $(2x - 3z)$
    (vii) $(3x + 2y)$ (viii) $(3a - 4b + 2)$

4. $6(x + 3y)$ **5.** $3b(a + c)$

6. $6a(x - 2y)$ **7.** $6a(a - 2)$

8. $7x(x - 4)$ **9.** $5x(3x + 5y)$

10. $3x^2(1 - 2y)$ **11.** $3ab(b - 2)$

12. $3p(p - 2q)$ **13.** $2x^2(y - 3z)$

14. $2y^2(3z + 5)$ **15.** $5pq(2p + q)$

16. $2a(a^2 - 2a + 4)$ **17.** $2x(2x - 3y + 4z)$

Answers

18. $5xy(y - 4x)$ **19.** $4xy(xy - 2)$

20. $5x(x^2 - 2x + 3)$ **21.** $2ab(a - 2b + 6c)$

22.   (i) PARROT   (ii) THRUSH

        (iii) GROUSE   (iv) STARLING