

MIXED FACTORISATIONS

Factorise completely:

1 $x^2 - 3x$

2 $2a^3 - 8a$

3 $x^2 - 9$

4 $x^2 - 8x - 9$

① $x^2 - 3x = x(x - 3)$

② $2a^3 - 8a = 2a[a^2 - 4] = 2a(a - 2)(a + 2)$

③ $x^2 - 9 = (x - 3)(x + 3)$

④ $x^2 - 8x - 9 =$

Factors of -9 :

1	-1	9	-9	3	-3
-9	9	-1	1	-3	3

$m + n = -8$

$m = 1 \quad n = -9$

So $x^2 - 8x - 9 = (x + 1)(x - 9)$

5 $3x^2y - 12y^3$

6 $5x^3y - 20xy^3$

7 $1 - (b + c)^2$

8 $10x^2 + 9x - 1$

⑤ $3x^2y - 12y^3 = 3y(x^2 - 4y^2) = 3y(x - 2y)(x + 2y)$

⑥ $5x^3y - 20xy^3 = 5xy(x^2 - 4y^2) = 5xy(x - 2y)(x + 2y)$

⑦ $1 - (b + c)^2 = [1 - (b + c)][1 + (b + c)]$

⑧ $10x^2 + 9x - 1$

$mn = -1$

Factors of -1 :

1	-1
-1	1

$ab = 10$

Factors of 10 :

10	1	-10	-1	2	-2	-5	-2
1	10	-1	-10	5	-5	-2	-5

$mb + na = 9$

$m = 1 \quad n = -1 \quad b = 10 \quad a = 1$

So $10x^2 + 9x - 1 = (x + 1)(10x - 1)$

MIXED FACTORISATIONS

13 $2x^3 + 14x^2 - 16x$

14 $3a^3 + 24a^2 + 21a$

15 $(x + 2y)^2 - 4$

16 $ab^2 + abc + abd$

(13) $2x^3 + 14x^2 - 16x = 2x [x^2 + 7x - 8] = 2x(x-1)(x+8)$

(14) $3a^3 + 24a^2 + 21a = 3a [a^2 + 8a + 7] = 3a(a+1)(a+7)$

(15) $(x+2y)^2 - 4 = [x+2y-2][x+2y+2]$

(16) $ab^2 + abc + abd = ab[b+c+d]$

4

21 $6y^3 + 3y^2 - 3y$

22 $6y^3 + 26y^2 + 8y$

23 $15a^2 - 60$

24 $9mn - 25m^3n^3$

(21) $6y^3 + 3y^2 - 3y = 3y [2y^2 + y - 1] = 3y[y+1][2y-1]$

(22) $6y^3 + 26y^2 + 8y = 2y [3y^2 + 13y + 4] = 2y[y+4][3y+1]$

(23) $15a^2 - 60 = 15(a^2 - 4) = 15(a-2)(a+2)$

(24) $9mn - 25m^3n^3 = mn[9 - 25m^2n^2] = mn[3^2 - (5mn)^2]$

— = $mn(3 - 5mn)(3 + 5mn)$

MIXED FACTORISATIONS

25 $5a^2x - 125x$

26 $(x+y)^2 - (x-y)^2$

27 $5t^3 + 5t^2 - 360t$

28 $m^2 - mn + 6m - 6n$

$$(25) \quad 5a^2x - 125x = 5x [a^2 - 25] = 5x(a-5)(a+5)$$

$$(26) \quad (x+y)^2 - (x-y)^2 = [(x+y) - (x-y)][(x+y) + (x-y)]$$

$$\underline{\hspace{2cm}} = 2y [2x] = 4xy.$$

$$(27) \quad 5t^3 + 5t^2 - 360t = 5t [t^2 + t - 72]$$

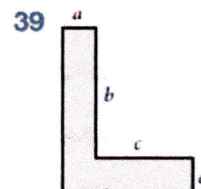
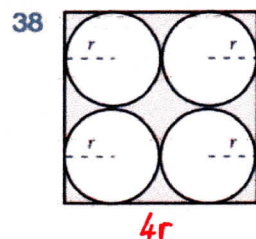
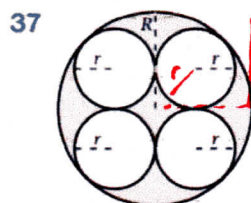
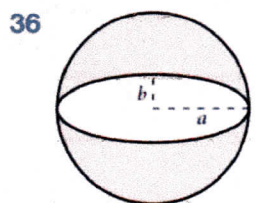
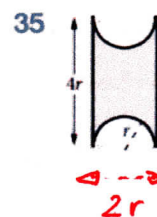
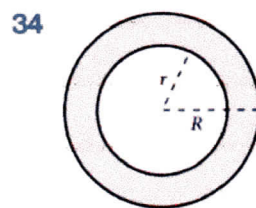
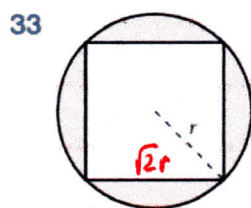
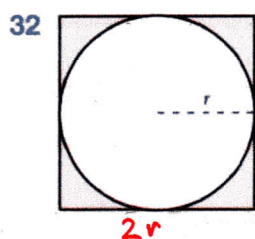
$$\underline{\hspace{2cm}} = 5t(t-8)(t+9)$$

$$(28) \quad m^2 - mn + 6m - 6n = m(m-n) + 6(m-n)$$

$$\underline{\hspace{2cm}} = (m-n)(m+6)$$

MIXED FACTORISATIONS

For questions 32 to 39, write an algebraic expression in factorised form for the shaded area in each of the figures.



$$(32) \quad S = (2r)^2 - \pi r^2 = r^2(4 - \pi)$$

$$(33) \quad S = \pi r^2 - (\sqrt{2}r)^2 = \pi r^2 - 2r^2 = (\pi - 2)r^2$$

$$(34) \quad S = \pi R^2 - \pi r^2 = \pi(R^2 - r^2) = \pi(R - r)(R + r)$$

$$(35) \quad S = 4r \times 2r - \pi r^2 = r^2(8 - \pi)$$

$$(36) \quad \text{Area of ellipse} = ab\pi \quad \text{so}$$

$$S = \pi a^2 - \pi ab = \pi a(a - b)$$

$$(37) \quad S = \pi R^2 - 4\pi r^2 = \pi(R^2 - 4r^2) = \pi(R - 2r)(R + 2r)$$

$$(38) \quad S = (4r)^2 - 4\pi r^2 = 16r^2 - 4\pi r^2 = 4r^2(4 - \pi)$$

$$(39) \quad S = ab + a \times a + c \times a$$

$$S = a[a + b + c]$$