

Factoring

Factor each expression completely.

1) $n^2 + 9n + 14$

$$(n+7)(n+2)$$

2) $b^2 - b - 20$

$$(b-5)(b+4)$$

3) $x^2 - 7x + 12$

$$(x-4)(x-3)$$

4) $2n^2 - 15n - 27$ → $2n^2 - 18n + 3n - 27$

54 ← $\frac{54}{1} \quad \frac{27}{2} \quad \frac{-18}{-15}$

$$(2n+3)(n-9)$$

5) $5b^2 + 19b + 18$

90 ← $\frac{90}{1} \quad \frac{45}{2} \quad \frac{30}{3} \quad \frac{18}{5} \quad \frac{15}{6} \quad \frac{10}{9}$

$$5b^2 + 10b + 9b + 18$$

$$= (5b+9)(b+2)$$

6) $7m^2 + 15m + 8$ → $7m^2 + 8m + 7m + 8$

56 ← $\frac{56}{1} \quad \frac{28}{2} \quad \frac{14}{4} \quad \frac{8}{7}$

$$= (m+1)(7m+8)$$

7) $64a^3 + 125$

$$= (4a)^3 + (5)^3$$

$$= (4a+5)(16a^2 - 20a + 25)$$

8) $216 - m^3 = (6)^3 - (m)^3$

$$= (6-m)(36 + 6m + m^2)$$

9) $25n^2 - 10n + 1$

perfect square

$$(5n-1)(5n-1)$$

$$= (5n-1)^2$$

10) $4m^2 - 4m + 1$

perfect square

$$= (2m-1)(2m-1)$$

$$= (2m-1)^2$$

$$11) 9x^2 + 30x + 25 = (3x+5)(3x+5)$$

perfect square

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

$$12) 3k^3 - 6k^2 - 7k + 14$$

$$= (3k^2 - 7)(k - 2)$$

$$\text{OR } 3k^2(k-2) - 7(k-2)$$

$$= (k-2)(3k^2-7)$$

$$13) 2n^3 + 10n^2 - 7n - 35$$

$$= (2n^2 - 7)(n + 5)$$

$$\text{OR } 2n^2(n+5) - 7(n+5)$$

$$= (n+5)(2n^2-7)$$

$$14) 30x^3 - 25x^2 + 36x - 30$$

$$= (5x^2 + 6)(6x - 5)$$

$$\text{OR } 5x^2(6x-5) + 6(6x-5)$$

$$= (6x-5)(5x^2+6)$$

$$15) 4x^2 - 25$$

difference of squares

$$= (2x-5)(2x+5)$$

$$16) 16a^2 - 9$$

$$= (4a-3)(4a+3)$$

$$17) 20a^2 - 5$$

GCF: 5

$$5(4a^2 - 1)$$

← difference of squares

$$= 5(2a-1)(2a+1)$$

$$18) 4n^2 + 40n$$

GCF: 4n

$$= 4n(n+10)$$

$$19) 5n^3 + 70n^2 + 225n$$

GCF: 5n

$$= 5n(n^2 + 14n + 45)$$

$$= 5n(n+9)(n+5)$$

$$20) 6n^2 - 24n - 72$$

GCF: 6

$$= 6(n^2 - 4n - 12)$$

$$= 6(n-6)(n+2)$$