

Factorization

MCQ Test, Set 06

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

- There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
- Each correct answer carries 1 mark. There is no negative marking.
- The key sheet and worked solutions are at the end of this test.

1. Factorize $256 - m^4$.

A. $(-m + 4)(-m^2 + 16)(m + 4)$

B. $(-m + 4)^2(m^2 + 16)$

C. $(16 + m^2)(4 + m)(4 - m)$

D. $(m + 4)^2(m^2 + 16)$

2. The factors of $y^2 + 4y + 4$ are

A. $(y + 2)(y - 2)$

B. $(2y + 1)^2$

C. $(y - 2)^2$

D. $(y + 2)^2$

3. The factors of $36z^2 + 84z + 49$ are

A. $(6z + 7)(6z - 7)$

B. $(7z + 6)^2$

C. $(6z + 7)^2$

D. $(6z - 7)^2$

4. The factors of $25m^2 - 80m + 64$ are

A. $(5m - 8)^2$

B. $(5m + 8)^2$

C. $(5m + 8)(5m - 8)$

D. $(8m - 5)^2$

5. $25n^2 - 40n + 16 =$

A. $(5n + 4)^2$

B. $(5n - 4)^2$

C. $(5n + 4)(5n - 4)$

D. $(4n - 5)^2$

6. Factorize $p^2 + 2p + 1 - 36q^2$.

A. $(p + 1 + 6q)(p - 1 - 6q)$

B. $(p - 1 + 6q)(p - 1 - 6q)$

C. $(p + 1 + 6q)(p + 1 - 6q)$

D. $(p + 1 - 6q)^2$

7. The factors of $5b^2 + 19b + 18$ are

A. $(5b + 2)(b + 9)$

B. $(5b - 9)(b - 2)$

C. $(5b - 9)(b + 2)$

D. $(5b + 9)(b + 2)$

8. To factorize $3p^2 - 22p + 24$ by splitting the middle term, we need two numbers whose product is 3×24 and whose sum is -22 . They are

A. 4 and 18

B. -4 and -18

C. -12 and -6

D. -9 and -8

9. To factorize $5t^2 - 26t - 24$ by splitting the middle term, we need two numbers whose product is $5 \times (-24)$ and whose sum is -26 . They are

A. 4 and -30

B. -40 and 3

C. -4 and 30

D. -24 and 5

10. Factorize $29x^2 + 28x - 60$.

A. $(29x + 2)(x - 30)$

B. $(29x + 30)(x - 2)$

C. $(29x - 30)(x + 2)$

D. $(29x + 30)(x + 2)$

11. $11n - 9 - 2n^2 =$
A. $(2n + 9)(n + 1)$ **B.** $(2n - 9)(n - 1)$ **C.** $(-2n - 9)(1 - n)$ **D.** $(9 - 2n)(n - 1)$
-
12. Factorize $13t + 30 - 3t^2$.
A. $(3t - 5)(t + 6)$ **B.** $(3t + 5)(6 - t)$ **C.** $(5 - 3t)(6 - t)$ **D.** $(3t + 5)(t - 6)$
-
13. Factorize $(m - 2n)^2 - 5(m - 2n) - 14$.
A. $(m - 2n + 2)(m - 2n + 7)$ **B.** $(m - 2n + 7)(m - 2n - 2)$ **C.** $(m - 2n + 2)(m - 2n - 7)$ **D.** $(m - 2n - 2)(m - 2n - 7)$
-
14. On factorizing, $2m^2 - 11mn - 6n^2 =$
A. $(2m - n)(m + 6n)$ **B.** $(2m + n)(m - 6n)$ **C.** $(2m - 6n)(m + n)$ **D.** $(2m + n)(m + 6n)$
-
15. On factorizing, $a^2 - \sqrt{5}a - 30 =$
A. $(a + 2\sqrt{5})(a - 3\sqrt{5})$ **B.** $(a + 3\sqrt{5})(a - 2\sqrt{5})$
C. $(a + 2\sqrt{5})(a + 3\sqrt{5})$ **D.** $(a - 2\sqrt{5})(a - 3\sqrt{5})$
-
16. The factors of $11m^2 + 8m + \frac{16}{11}$ are
A. $(11m - 4)(m + \frac{4}{11})$ **B.** $(11m + 4)(m + 4)$
C. $(11m + 4)(m + \frac{4}{11})$ **D.** $(11m - 4)(m - \frac{4}{11})$
-
17. On factorizing, $5(a + 1)^2 + 16(a + 1)(b - 3) + 3(b - 3)^2 =$
A. $(5a + b + 2)(a + 3b + 8)$ **B.** $(5a + b - 2)(a + 3b - 2)$ **C.** $(5a + b - 2)(a + 3b - 8)$ **D.** $(5a + b + 2)(a + 3b - 8)$
-
18. The factors of $4p^2 + 4q^2 + 9r^2 - 8pq - 12qr + 12rp$ are
A. $(2p + 2q - 3r)^2$ **B.** $(2p - 2q + 3r)^2$ **C.** $(4p - 4q + 9r)^2$ **D.** $(2p + 2q + 3r)^2$
-
19. On factorizing, $8x^3 + 12x^2y + 6xy^2 + y^3 =$
A. $(2x + y)^3$ **B.** $(2x + y)(4x^2 - 2xy + y^2)$
C. $(2x - y)^3$ **D.** $(2x + y)^2(2x - y)$
-
20. The factors of $8a^3 + 36a^2c + 54ac^2 - 37c^3$ are
A. $(2a - c)(4a^2 + 12ac + 25c^2)$ **B.** $(2a + 7c)(4a^2 + 4ac + 13c^2)$
C. $(2a - c)(4a^2 + 4ac + 13c^2)$ **D.** $(2a - c)(4a^2 + 20ac + 37c^2)$
-
21. $8 + 27y^3z^3 =$
A. $(3yz + 2)(9y^2z^2 - 6yz + 4)$ **B.** $(3yz + 2)(9y^2z^2 + 6yz + 4)$
C. $(3yz + 2)(9y^2z^2 - 12yz + 4)$ **D.** $(2 - 3yz)(9y^2z^2 + 6yz + 4)$
-
22. Which of the following is a factor of $x^3 - 13x - 12$?
A. $x + 2$ **B.** $x - 1$ **C.** $x - 2$ **D.** $x + 3$
-

23. On factorizing, $(5a - b)^3 + (b - 2)^3 + (2 - 5a)^3 =$

A. $-3(5a - b)(b - 2)(2 - 5a)$

B. 0

C. $3(5a - b)(b - 2)(2 - 5a)$

D. $(5a - b)(b - 2)(2 - 5a)$

24. $5a^5b - 5ab^5 =$

A. $5ab(a - b)^2(a^2 + b^2)$

B. $5ab(a + b)(a - b)(a^2 + b^2)$

C. $5ab(a + b)^2(a^2 + b^2)$

D. $5ab(a + b)^2(a - b)^2$

25. The factors of $5a^2 + (a^2 + 3)a + 15$ are

A. $(a + 5)(a^2 + 3)$

B. $(a + 5)(a^2 - 3)$

C. $(a - 5)(a^2 + 3)$

D. $(a + 3)(a^2 + 5)$

Key sheet

1. C	2. D	3. C	4. A	5. B
6. C	7. D	8. B	9. A	10. C
11. D	12. B	13. C	14. B	15. A
16. C	17. D	18. B	19. A	20. D
21. A	22. D	23. C	24. B	25. A

Solutions

1. Factorize $256 - m^4$.

$$\begin{aligned}256 - m^4 &= 16^2 - (m^2)^2 \\&= (16 + m^2)(16 - m^2) \\&= (16 + m^2)[4^2 - m^2] \\&= (16 + m^2)(4 + m)(4 - m)\end{aligned}$$

Ans: (C) $(16 + m^2)(4 + m)(4 - m)$

2. The factors of $y^2 + 4y + 4$ are

$$\begin{aligned}y^2 + 4y + 4 &= y^2 + 2^2 + 2(y)(2) \\&= (y + 2)^2 \\&= (y + 2)(y + 2) \\&\text{using } a^2 + b^2 + 2ab = (a + b)^2\end{aligned}$$

Ans: (D) $(y + 2)^2$

3. The factors of $36z^2 + 84z + 49$ are

$$\begin{aligned}36z^2 + 84z + 49 &= (6z)^2 + 7^2 + 2(6z)(7) \\&= (6z + 7)^2 \\&= (6z + 7)(6z + 7) \\&\text{using } a^2 + b^2 + 2ab = (a + b)^2\end{aligned}$$

Ans: (C) $(6z + 7)^2$

4. The factors of $25m^2 - 80m + 64$ are

$$\begin{aligned}25m^2 - 80m + 64 &= (5m)^2 + 8^2 - 2(5m)(8) \\&= (5m - 8)^2 \\&= (5m - 8)(5m - 8) \\&\text{using } a^2 + b^2 - 2ab = (a - b)^2\end{aligned}$$

Ans: (A) $(5m - 8)^2$

5. $25n^2 - 40n + 16 =$

$$\begin{aligned}25n^2 - 40n + 16 &= (5n)^2 + 4^2 - 2(5n)(4) \\&= (5n - 4)^2 \\&= (5n - 4)(5n - 4) \\&\text{using } a^2 + b^2 - 2ab = (a - b)^2\end{aligned}$$

Ans: (B) $(5n - 4)^2$

6. Factorize $p^2 + 2p + 1 - 36q^2$.

$$\begin{aligned}p^2 + 2p + 1 - 36q^2 &= (p + 1)^2 - (6q)^2 \\&= (p + 1 + 6q)(p + 1 - 6q) \\&\text{using } a^2 + 2ab + b^2 = (a + b)^2 \text{ and } a^2 - b^2 = (a + b)(a - b)\end{aligned}$$

Ans: (C) $(p + 1 + 6q)(p + 1 - 6q)$

7. The factors of $5b^2 + 19b + 18$ are

$$\begin{aligned}5 \times 18 &= 90: 9 \times 10 = 90 \text{ and } 9 + 10 = 19 \\&= 5b^2 + 9b + 10b + 18 \\&= b(5b + 9) + 2(5b + 9) \\&= (5b + 9)(b + 2)\end{aligned}$$

Ans: (D) $(5b + 9)(b + 2)$

8. To factorize $3p^2 - 22p + 24$ by splitting the middle term, we need two numbers whose product is 3×24 and whose sum is -22 . They are

$$\begin{aligned}3 \times 24 &= 72 \\(-4) \times (-18) &= 72 \text{ and } -4 - 18 = -22 \\ \text{So the numbers are } &-4 \text{ and } -18.\end{aligned}$$

Ans: (B) -4 and -18

9. To factorize $5t^2 - 26t - 24$ by splitting the middle term, we need two numbers whose product is $5 \times (-24)$ and whose sum is -26 . They are

$$\begin{aligned}5 \times (-24) &= -120 \\4 \times (-30) &= -120 \text{ and } 4 - 30 = -26 \\ \text{So the numbers are } &4 \text{ and } -30.\end{aligned}$$

Ans: (A) 4 and -30

10. Factorize $29x^2 + 28x - 60$.

$$\begin{aligned}29 \times (-60) &= -1740 \\1740 &= 2 \times 2 \times 3 \times 5 \times 29 = 30 \times 58, \text{ and } -30 + 58 = 28 \\&= 29x^2 - 30x + 58x - 60 \\&= x(29x - 30) + 2(29x - 30) \\&= (29x - 30)(x + 2)\end{aligned}$$

Ans: (C) $(29x - 30)(x + 2)$

11. $11n - 9 - 2n^2 =$

$$\begin{aligned}\text{Writing the terms in order: } &-2n^2 + 11n - 9 \\(-2) \times (-9) &= 18: 2 \times 9 = 18 \text{ and } 2 + 9 = 11 \\&= -2n^2 + 2n + 9n - 9 \\&= -2n(n - 1) + 9(n - 1) \\&= (n - 1)(9 - 2n)\end{aligned}$$

Ans: (D) $(9 - 2n)(n - 1)$

12. Factorize $13t + 30 - 3t^2$.

Writing the terms in order: $-3t^2 + 13t + 30$

$(-3) \times 30 = -90$; $(-5) \times 18 = -90$ and $-5 + 18 = 13$

$$= -3t^2 - 5t + 18t + 30$$

$$= -t(3t + 5) + 6(3t + 5)$$

$$= (3t + 5)(6 - t)$$

Ans: (B) $(3t + 5)(6 - t)$

13. Factorize $(m - 2n)^2 - 5(m - 2n) - 14$.

Let $m - 2n = p$

$$(m - 2n)^2 - 5(m - 2n) - 14 = p^2 - 5p - 14$$

$1 \times (-14) = -14$; $2 \times (-7) = -14$ and $2 - 7 = -5$

$$= p^2 + 2p - 7p - 14$$

$$= p(p + 2) - 7(p + 2)$$

$$= (p + 2)(p - 7)$$

$$= [(m - 2n) + 2][(m - 2n) - 7]$$

$$= (m - 2n + 2)(m - 2n - 7)$$

Ans: (C) $(m - 2n + 2)(m - 2n - 7)$

14. On factorizing, $2m^2 - 11mn - 6n^2 =$

$2 \times (-6) = -12$; $1 \times (-12) = -12$ and $1 - 12 = -11$

$$= 2m^2 + mn - 12mn - 6n^2$$

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

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

Ans: (B) $(2m + n)(m - 6n)$

15. On factorizing, $a^2 - \sqrt{5}a - 30 =$

Product = -30 , sum = $-\sqrt{5}$; $2\sqrt{5} \times (-3\sqrt{5}) = -30$ and $2\sqrt{5} + (-3\sqrt{5}) = -\sqrt{5}$

$$= a^2 + 2\sqrt{5}a - 3\sqrt{5}a - 30$$

$$= a(a + 2\sqrt{5}) - 3\sqrt{5}(a + 2\sqrt{5})$$

$$= (a + 2\sqrt{5})(a - 3\sqrt{5})$$

Ans: (A) $(a + 2\sqrt{5})(a - 3\sqrt{5})$

16. The factors of $11m^2 + 8m + \frac{16}{11}$ are

$$11m^2 + 8m + \frac{16}{11} = \frac{121m^2 + 88m + 16}{11}$$

$$= \frac{1}{11}(121m^2 + 88m + 16)$$

$$= \frac{1}{11}[(11m)^2 + 4^2 + 2(11m)(4)]$$

$$= \frac{1}{11}(11m + 4)^2$$

$$= \left(m + \frac{4}{11}\right)(11m + 4)$$

Ans: (C) $(11m + 4)\left(m + \frac{4}{11}\right)$

17. On factorizing, $5(a+1)^2 + 16(a+1)(b-3) + 3(b-3)^2 =$

Let $a+1 = x$ and $b-3 = y$

$$5(a+1)^2 + 16(a+1)(b-3) + 3(b-3)^2 = 5x^2 + 16xy + 3y^2$$

$$5 \times 3 = 15: 1 \times 15 = 15 \text{ and } 1 + 15 = 16$$

$$= 5x^2 + xy + 15xy + 3y^2$$

$$= x(5x + y) + 3y(5x + y)$$

$$= (5x + y)(x + 3y)$$

$$= [5(a+1) + (b-3)][(a+1) + 3(b-3)]$$

$$= (5a + 5 + b - 3)(a + 1 + 3b - 9)$$

$$= (5a + b + 2)(a + 3b - 8)$$

Ans: (D) $(5a + b + 2)(a + 3b - 8)$

18. The factors of $4p^2 + 4q^2 + 9r^2 - 8pq - 12qr + 12rp$ are

$$4p^2 + 4q^2 + 9r^2 - 8pq - 12qr + 12rp = (2p)^2 + (2q)^2 + (3r)^2 - 2(2p)(2q) - 2(2q)(3r) + 2(3r)(2p)$$

$$= (2p - 2q + 3r)^2$$

$$\text{using } a^2 + b^2 + c^2 - 2ab - 2bc + 2ca = (a - b + c)^2$$

Ans: (B) $(2p - 2q + 3r)^2$

19. On factorizing, $8x^3 + 12x^2y + 6xy^2 + y^3 =$

$$8x^3 + 12x^2y + 6xy^2 + y^3 = (2x)^3 + y^3 + 3(2x)^2(y) + 3(2x)(y)^2$$

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

$$\text{using } (a + b)^3 = a^3 + b^3 + 3ab(a + b)$$

Ans: (A) $(2x + y)^3$

20. The factors of $8a^3 + 36a^2c + 54ac^2 - 37c^3$ are

$$8a^3 + 36a^2c + 54ac^2 - 37c^3 = (2a)^3 + 3(2a)^2(3c) + 3(2a)(3c)^2 + (3c)^3 - 64c^3$$

$$= (2a + 3c)^3 - (4c)^3$$

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

$$= (2a - c)[4a^2 + 12ac + 9c^2 + 8ac + 12c^2 + 16c^2]$$

$$= (2a - c)(4a^2 + 20ac + 37c^2)$$

$$\text{using } a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Ans: (D) $(2a - c)(4a^2 + 20ac + 37c^2)$

21. $8 + 27y^3z^3 =$

$$8 + 27y^3z^3 = 2^3 + (3yz)^3$$

$$= (2 + 3yz)[2^2 - (2)(3yz) + (3yz)^2]$$

$$= (3yz + 2)(9y^2z^2 - 6yz + 4)$$

$$\text{using } a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Ans: (A) $(3yz + 2)(9y^2z^2 - 6yz + 4)$

22. Which of the following is a factor of $x^3 - 13x - 12$?

$$x^3 - 13x - 12 = x^3 - x - 12x - 12$$

$$= x(x^2 - 1) - 12(x + 1)$$

$$= (x + 1)(x^2 - x - 12)$$

$$= (x + 1)(x + 3)(x - 4)$$

So $x + 3$ is a factor.

Ans: (D) $x + 3$

23. On factorizing, $(5a - b)^3 + (b - 2)^3 + (2 - 5a)^3 =$

$$\text{Here } (5a - b) + (b - 2) + (2 - 5a) = 0$$

$$\text{If } a + b + c = 0, \text{ then } a^3 + b^3 + c^3 = 3abc$$

$$\therefore (5a - b)^3 + (b - 2)^3 + (2 - 5a)^3 = 3(5a - b)(b - 2)(2 - 5a)$$

Ans: (C) $3(5a - b)(b - 2)(2 - 5a)$

24. $5a^5b - 5ab^5 =$

$$5a^5b - 5ab^5 = 5ab(a^4 - b^4)$$

$$= 5ab[(a^2)^2 - (b^2)^2]$$

$$= 5ab(a^2 + b^2)(a^2 - b^2)$$

$$= 5ab(a^2 + b^2)(a + b)(a - b)$$

Ans: (B) $5ab(a + b)(a - b)(a^2 + b^2)$

25. The factors of $5a^2 + (a^2 + 3)a + 15$ are

$$5a^2 + (a^2 + 3)a + 15 = 5a^2 + a^3 + 3a + 15$$

$$= a^3 + 5a^2 + 3a + 15$$

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

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

Ans: (A) $(a + 5)(a^2 + 3)$
