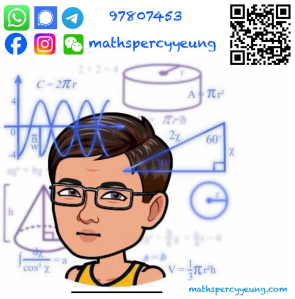
Chapter 4 Identities and Factorization

Multiple Choice Questions



1. If $-4x^2+4x+1 \equiv Ax^2+Bx+1$, Find the value of A and B.

A. $A = -4, B = -4$ B. $A = 4, B = -4$

C. $A = -4, B = 4$ D. $A = 4, B = 4$

2. Which of the following is an identity ?

A. $a = 6$ B. $2a - a = 3$ C. $a = 2a - 1$ D. $a - 2a = -a$

3. Which of the following is an identity ?

A. $(x - 2)(x + 2) = x^2 - 4$

B. $(x - 2)(x + 2) = x^2 + 4$

C. $(x + 2)(x + 2) = x^2 - 4$

D. $(x + 2)(x + 2) = x^2 + 4$

4. Which of the following is identical to $5x - 2(1 - x)$?

A. $3x - 2$ B. $3x + 2$ C. $7x - 2$ D. $7x + 2$

5. If $(x + 5)(x - 6) \equiv x^2 + Ax - B$, find the value of A and B.

A. $A = 1, B = 30$ B. $A = 1, B = -30$

C. $A = -1, B = 30$ D. $A = -1, B = -30$

6. If $6(x - 2)^2 \equiv Ax^2 + Bx + C$, find the value of A, B and C.

A. $A = 1, B = 4, C = 4$

B. $A = 1, B = -4, C = 4$

C. $A = 6, B = 24, C = 24$

D. $A = 6, B = -24, C = 24$

7. If $(6x - 1)(4x^2 + 3) \equiv Px^3 + Qx^2 + Rx - S$, find the value of P, Q, R and S.

A. $P = 24, Q = -4, R = 18, S = 3$

B. $P = 24, Q = 4, R = 18, S = -3$

C. $P = -24, Q = 4, R = 18, S = 2$

D. $P = 24, Q = 4, R = -18, S = 3$

8. Determine which of the following is/ are identity/identities.

I. $(2x - 3)(2x + 3) = 4x^2 - 9$

II. $x - 4 = 5x - 4(x + 1)$

A. I and II are both identities.

B. I is not an identity, II is an identity.

C. I is an identity，II is not an identity.

D. I and II are not identities.

9. Expand $(2x + 5)(2x - 5)$。

A. $2x^2 - 25$ B. $2x^2 + 25$ C. $4x^2 - 25$ D. $4x^2 + 25$

10. Expand $4(2a - b)(2a + b)$。

A. $4b^2 - 16a^2$ B. $16a^2 - 4b^2$ C. $16a^2 + 4b^2$ D. $-16a^2 - 4b^2$

11. Expand $-3(x + by)(by - x)$。

A. $x^2 - 3b^2y^2$ B. $3x^2 + 3b^2y^2$ C. $3x^2 - 3b^2y^2$ D. $x^2 - 3by^2$

12. Expand $(a + 3b)^2$。

A. $a^2 + 3b^2$ B. $a^2 + 9b^2$ C. $a^2 + 6ab + 3b^2$ D. $a^2 + 6ab + 9b^2$

13. Expand $-3(5a - 3b)^2$。

A. $75a^2 - 90ab + 27b^2$ B. $-75a^2 + 90ab - 27b^2$

C. $-75a^2 - 30ab + 9b^2$ D. $-75a^2 - 90ab - 9b^2$

14. Expand $(-ab - c)^2$。

A. $ab + 2abc + c^2$ B. $ab^2 + 2abc + c^2$

C. $a^2b^2 - 2abc + c^2$ D. $a^2b^2 + 2abc + c^2$

15. Expand $(x - 7)(x^2 + 14x + 49)$。

A. $x^3 - 7x^2 + 49x + 343$ B. $x^3 - 7x^2 - 49x - 343$

C. $x^3 + 7x^2 + 49x + 343$ D. $x^3 + 7x^2 - 49x - 343$

16. Which of the following is identical to $(2x + 5)^2 - (2x - 5)^2$?

A. 0 B. $20x$ C. $40x$ D. $4x^2 - 25$

17. Which of the following is the common factor of $4xy$, $12x^2y$ and $18xy^2$?

A. $2xy$ B. $4xy$ C. $6xy$ D. $2x^2y^2$

18. Which of the following is the common factor of $6x$, $18y$ and $21z$?

A. 3 B. 9 C. $9xyz$ D. $252xyz$

19. Factorize $8x^2y^4 - 36x^2y$ 。

A. $4x^2y(2y^3 - 1)$ B. $4x^2y(2y^3 - 9)$

C. $2x^2y(4y^3 - 18)$ D. $2xy(4xy^3 - 18x)$

20. Factorize $e(c + d) - f(c + d)$ 。

A. $(c - d)(e - f)$ B. $(c + d)(f - e)$

C. $(c + d)(e - f)$ D. $(c + d)(e + f)$

21. Factorize $p(s - t)q - 3(s - t)a$ 。

A. $(s + t)(pq + 3a)$ B. $(s + t)(pq - 3a)$

C. $(s - t)(pq + 3a)$ D. $(s - t)(pq - 3a)$

22. Factorize $5(x + y)^2 - 10(x + y)z$ 。

A. $5(x + y)(x + y + 2z)$ B. $5(x + y)(x - y - 2z)$

C. $5(x + y)(x - y + 2z)$ D. $5(x + y)(x + y - 2z)$

23. Factorize $4ab^3(x - y) + 10a^2b(x - y)^2 - 12a^3b^2(x - y)^3$ 。

A. $2ab(x - y)[2b^2 + 5a(x - y) - 6ab(x - y)^2]$

B. $2ab(x - y)[2b^2 + 5a(x - y) - 6a^2b(x - y)]$

C. $2ab(x - y)[2b^2 + 5a(x - y) - 6a^2b(x - y)^2]$

D. $2ab(x - y)[2b + 5a(x - y) - 6a^2b(x - y)^2]$

24. Factorize $y^3 - 3y^2 + 3y - 9$ 。

A. $(y^2 + 3)(y + 3)$ B. $(y^2 - 3)(y + 3)$

C. $(y^2 + 3)(y - 3)$ D. $(y^2 - 3)(y - 3)$

25. Which of the following cannot be factorized ?

A. $6ab + 6ac + bd - dc$

B. $6ab - 6ac + bd - dc$

C. $6ab + 6ac + bd + dc$

D. $-6ab + 6ac - bd + dc$

26. Factorize $169 - (a + b)^2$.

A. $(13 - a - b)^2$

B. $(13 - a + b)^2$

C. $(13 + a + b)(13 - a - b)$

D. $(13 - a + b)(13 - a + b)$

27. Factorize $4p^2 - 16p + 16$.

A. $4(p + 2)^2$

B. $4(p - 2)^2$

C. $4(p - 4)^2$

D. $(4p - 8)^2$

28. Factorize $y^4 - 2\,401$.

A. $(y^2 + 49)(y + 7)(y - 7)$

B. $(y^2 + 49)(y^2 + 7)(y - 7)$

C. $(y + 49)(y^2 + 7)(y - 7)$

D. $(y + 49)(y + 7)(y - 7)$

29. Factorize $(4a^2 - 20ab + 25b^2) - 121c^2$.

A. $(2a - 5b - 11c)^2$

B. $(2a - 5b)^2 + (11c)^2$

C. $(2a - 5b + 11c)(2a - 5b - 11c)$

D. $(2a + 5b + 11c)(2a + 5b - 11c)$

30. Simplify $\dfrac{6pq^2}{18p^3q}$.

A. $\dfrac{q}{3p}$ B. $\dfrac{q}{3p^2}$ C. $\dfrac{q^2}{3p}$ D. $\dfrac{q}{12p^2}$

31. Simplify $\dfrac{21ax+14ay}{7ay}$.

A. $\dfrac{x+2y}{y}$ B. $\dfrac{2x+3y}{y}$ C. $\dfrac{3x+y}{y}$ D. $\dfrac{3x+2y}{y}$

32. Simplify $\dfrac{a+4}{16-a^2}$.

A. $\dfrac{1}{a+4}$ B. $\dfrac{1}{4-a}$ C. $\dfrac{1}{a-4}$ D. $\dfrac{a+4}{a-4}$

33. Simplify $\frac{21a^2 - 7a}{5 - 15a}$ 。

A. $\frac{5}{7a}$ B. $\frac{7a}{5}$ C. $-\frac{7a}{5}$ D. $-\frac{5}{7a}$

34. Simplify $\frac{3x}{12x^3 - 9x^2 + 6x}$ 。

A. $4x^2 - 3x + 2$ B. $\frac{1}{4x^2 - 3x + 2}$

C. $\frac{x}{4x^2 - 3x + 2}$ D. $\frac{4x^2 - 3x + 2}{x}$

35. Simplify $\frac{3b^2}{2a} \times \frac{2a^2}{4b^2}$ 。

A. $\frac{3a}{4}$ B. $\frac{4}{3a}$ C. $\frac{4}{a}$ D. $\frac{3}{a}$

36. Simplify $\frac{8b^2}{3a^2} \div \frac{4b^2}{9a}$ 。

A. $\frac{b}{6}$ B. $\frac{6}{a}$ C. $\frac{6}{ab}$ D. $\frac{ab}{6}$

37. Simplify $\frac{b^2 - a^2}{3b} \div \frac{a + b}{2b^2}$ 。

A. $\frac{2b(a - b)}{3}$ B. $\frac{2b(b - a)}{3}$ C. $\frac{2b(a + b)}{3}$ D. $\frac{-2b(a + b)}{3}$

38. Simplify $\frac{6c - 4d}{3(a - b)} \div \frac{3c - 2d}{a - b}$ 。

A. $\frac{2}{3}$ B. $\frac{2}{3(a - b)}$ C. $\frac{2(a + b)}{3}$ D. $\frac{2(c - d)}{3(a - b)}$

39. Simplify $\frac{5c^2}{d^3} \div \frac{10c}{d} \times \frac{d^2}{c}$ 。

A. 2 B. $\frac{1}{2}$ C. −2 D. $-\frac{1}{2}$

Level 1

1. Prove that $3x - 6 = -3(2 - x)$ is an identity.

2. Prove that $2 + 4(2x - 1) = 2(4x - 1)$ is an identity.

3. Prove that $-3(x - 2) + 2(x + 2) = x - 10$ is not an identity.

4. Expand

(a) $(x - 4)(x + 4)$ **(b)** $(3 - x)(3 + x)$

5. Expand

(a) $(4x - 1)(4x + 1)$ **(b)** $(x + 2)^2$

6. Expand

(a) $(3x + 2)(3x - 2)$ **(b)** $(3 - h)^2$

7. Factorize

(a) $xy + y + x + 1$ **(b)** $mr - nr + 5m - 5n$

8. Factorize $3(x + y)y + 6(x + y)x$.

9. Factorize $3ac - 3bc + 4a - 4b$.

10. Factorize

(a) $a^2 - 36$ **(b)** $x^2 + 26x + 169$

11. Factorize

(a) $49 - 64x^2$ **(b)** $4x^2 + 4xy + y^2$

12. Factorize

(a) $x^2 - 18x + 81$ **(b)** $25x^2 + 30xy + 9y^2$

13. Factorize

(a) $5a^2 + 30ab + 45b^2$ **(b)** $2x - 1 - x^2$

14. Simplify

(a) $\dfrac{7tx}{49t^2}$ **(b)** $\dfrac{3x^2 - 6x}{3x}$

15. Simplify $\dfrac{45ab^2}{6a^2b}$

16. Simplify $\dfrac{3x - 2y}{4y - 6x}$

Level 2

17. Prove that $(x-3)^2-1=(x-4)(x-2)$ is an identity.

18. If $(x+7)(2x-5)\equiv Ax^2+Bx+C$, find the values of A, B and C.

19. Expand the following expressions.

(a) $(3x-4y)(3x+4y)$ **(b)** $(3x-4y)^2$ **(c)** $2(x+2y)^2$

20. Factorize $6(a+1)^2+4(a+1)$.

21. Factorize $4c^2-6dx+3cd-8cx$.

22. Factorize $4x^3-3y+4x-3x^2y$.

23. Factorize the following expressions.

(a) $4x^2-64y^2$ **(b)** $16x^2+16x+4$

24. Factorize the following expressions.

(a) $36-(x-y)^2$ **(b)** $(a+b)^2-(a-b)^2$

25. Factorize $9z^2-(x^2-6xy+9y^2)$.

26. Find the values of the following without using a calculator.

(a) 63^2-62^2 **(b)** $13^2-4(4)^2$

27. Simplify the following expressions.

(a) $\dfrac{x^2-2x+1}{2x-2}$ **(b)** $\dfrac{ax+bx-ay-by}{x-y}$

28. Simplify $\left(\dfrac{7a^2b}{4ab^2}\right)\left(\dfrac{16b}{28a}\right)$.

29. Simplify $\dfrac{(2m-3n)^2}{4mn}\times\dfrac{8m}{4m-6n}$.

30. Simplify $\dfrac{9x}{7y}\times\dfrac{2x-6}{6x}\div\dfrac{x-3}{14y}$.

31. Simplify $\dfrac{(3m-4n)^2}{9mn}\div(3m-4n)\times\dfrac{27m^2n}{3m^2-4mn}$.

Level 3

32. **(a)** Prove that $(x^2-1)^2=x^4-2x^2+1$ is an identity.

(b) Using the result of **(a)**, expand $(x+1)^2(x-1)^2$.

33. Prove that $(x+y+z)^2=x^2+y^2+z^2+2(xy+yz+xz)$ is an identity.