

### **P6: Factoring**

1. One of the factors of  $3y^3 + 15y^2 - 12y - 60$  is

A)  $y + 2$

B)  $y^2 - 2$

C)  $y^2 + 4$

D)  $y - 5$

E)  $y - 4$

2. If  $4x^2 + 36x + C = (ax + b)^2$ , then  $a + b =$

A) 11

B) 7

C) 9

D)  $-7$

E)  $-9$

3. One of the factors of  $(2x - 1)^3 - 1$  is

A)  $4x^2 - 2x + 1$

B)  $2x$

C)  $2x - 1$

D)  $x - 2$

E)  $4x^2 + 2x + 1$

4. 
$$\frac{3(x^2+3)^{-1/3} - 2x^2(x^2+3)^{-4/3}}{(x^2+3)^{-4/3}} =$$

A)  $x^2 + 9$

B)  $3(1 + x)^{4/3}$

C)  $\frac{3}{(1+x)^{4/3}}$

D)  $(2x + 3)(1 + x)^{4/3}$

E)  $\frac{2x+3}{(1+x)^{4/3}}$

5. If  $(2x - 1)^3 + 8 = (2x + 1)(mx^2 + nx + p)$ , then  $m + n + p$

A) 3

B) 7

C) 4

D) 1

E) 6

6. If the polynomial  $27y^3 + 1$  factors into  $(3y + 1)(My^2 + Ny + 1)$ ,  
then  $M + N =$

A) 6

B) 12

C) 15

D) 3

E) 9

7. One factor of  $2t^{3/2} - 7t^{1/2} - 4t^{-1/2}$  is

A)  $2t + 1$

B)  $2t - 1$

C)  $t - 2$

D)  $t + 2$

E)  $t + 4$

8. One factor of the polynomial  $q^2 - p^2 + 4p - 4$ , is

A)  $(q - p + 2)$

B)  $(q - p - 2)$

C)  $(q + p + 1)$

D)  $(q - p)$

E)  $(q + p)$

9. One factor of the polynomial  $(x^2 - 1)^2 + (x^2 - 1) - 12$  is

A)  $x + 2$

B)  $x - 1$

C)  $x + 1$

D)  $x + 3$

E)  $x - 3$

10. One factor of  $a^2 + 4b^2 + 4b - 4ab - 2a$ , is

A)  $a - 2b - 2$

B)  $a + 2b + 2$

C)  $a + 2b - 2$

D)  $a - 2b + 2$

E)  $a - b - 1$

11. One factor of  $24 + 3(x - 1)^3$ , is

A)  $x^2 - 4x + 7$

B)  $x^2 - 4x - 7$

C)  $x^2 - 2x + 7$

D)  $x^2 - 6x + 7$

E)  $x^2 + x + 9$

12. If the expression  $64 + (x - 3)^3$  factors into  $(x + 1)(x^2 + Ax + B)$ , then  $A + B =$

A) 27

B) -27

C) 47

D) -47

E) -37

13. One of the factors of  $4x^3 + 4x^2y - 9xy^2 - 9y^3$  is equal to

A)  $2x - 3y$

B)  $x - y$

C)  $x - 3y$

D)  $2x + y$

E)  $2x - y$

14. If the expression  $x^{4n} - 1$  factors into  $x^{4n} - 1 = (x^n - 1)A$  then  $A$  is equal to

A)  $(x^n + 1)(x^{2n} + 1)$

B)  $(x^n - 1)(x^{2n} + 1)$

C)  $(x^n + 1)(x^n - 1)$

D)  $x^{3n} + 1$

E)  $x^{2n} + 1$

15. One factor of  $6(4x^2 - 12xy + 9y^2) + 7(2x - 3y) - 3$  is

A)  $6x - 9y - 1$

B)  $4x + 6y - 1$

C)  $6x - 9y + 3$

D)  $4x - 6y - 1$

E)  $6x - 9y - 3$

16. One of the factors of  $3x^{5/2} - 9x^{3/2} + 6x^{1/2}$  is

A)  $x - 1$

B)  $x + 1$

C)  $x + 2$

D)  $3x - 1$

E)  $3x - 2$

17. One factor of  $y^4 + 64$  is:

A)  $y^2 + 4y + 8$

B)  $y^2 + 4y - 8$

C)  $y^2 - 4y - 8$

D)  $y^2 + 8$

E)  $y^2 - 8$

18. One factor of  $18x^5 + 15x^4z - 75x^3z^2$  is

A)  $3x - 5z$

B)  $2x - 5z$

C)  $3x + 25z$

D)  $6x - 5z$

E)  $3x - 25z$

19. One factor of  $27z^9 + 64y^{12}$  is

A)  $9z^6 - 12z^3y^4 + 16y^8$

B)  $9z^6 + 12z^3y^2 + 16y^4$

C)  $9z^6 - 12z^3y^4 + 4y^8$

D)  $9z^6 + 12z^3y^4 + 8y^4$

E)  $9z^6 - 12z^3y^4 + 2y^8$

20. The sum of the two factors of the polynomial  $p^2q^2 - 10 - 2q^2 + 5p^2$ , is

A)  $p^2 + q^2 + 3$

B)  $p^2 + q^2 - 7$

C)  $p^2 - q^2 + 3$

D)  $p^2 - q^2 - 7$

E)  $p^2 + q^2 - 3$

21. One factor of  $(3a + 5)^2 + 6(3a + 5) - 16$  is

A)  $(3a + 13)$

B)  $(3a - 2)$

C)  $(3a - 3)$

D)  $(3a - 16)$

22. Sum of the factors of  $(2a + 1)^3 - 8$  is equal to

A)  $4a^2 + 10a + 6$

B)  $4a^2 - 6a + 10$

C)  $4a^2 + 10a + 8$

D)  $4a^2 + 6a - 10$

E)  $4a^2 + 10a - 6$

23. One factor of  $x^2y^2 - 10xy + 25 - a^4$  is

A)  $(xy + a^2 - 5)$

B)  $(xy - a^2 + 5)$

C)  $(xy + a^2 + 5)$

D)  $(xy + a + 5)$

E)  $(xy - a - 5)$

24. Factor  $(x^2 + 1)^{1/2} + 2(x^2 + 1)^{-1/2}$

A)  $\frac{x^2+3}{\sqrt{x^2+1}}$

25. Factor  $2x^{1/3}(x-2)^{2/3} - 5x^{4/3}(x-2)^{-1/3}$

A)  $\frac{(-3x-4)\sqrt[3]{x}}{\sqrt[3]{x-2}}$

26. One of the factors of  $(2x+3)^{\frac{3}{2}} - (2x+3)^{\frac{1}{2}} - 2(2x+3)^{-\frac{1}{2}}$

A)  $2x+1$

B)  $x-1$

C)  $x-2$

D)  $x+1$

E)  $2x+5$

27. One of the factors of  $9 + x^3y^2 - 9x^3 - y^2$

A)  $x^2 + x + 1$

B)  $x^2 - x + 1$

C)  $y - 9$

D)  $y + 9$

E)  $y^2 + y + 3$

28. One of the factors of  $3x^3 - 2x^2 - 12x + 8$  is:

A)  $x + 2$

B)  $3x + 2$

C)  $x - 4$

D)  $x + 4$

E)  $x - 1$

29. The expression  $\left(x + \frac{1}{x}\right)^2 - \left(x - \frac{1}{x}\right)^2$  simplifies to:

A) 4

B)  $\frac{4}{x}$

C)  $-\frac{4}{x}$

D) 0

E) 8

30. One factor of the polynomial  $8x^4 - 8x^3 + x - 1$ , is

A)  $4x^2 + 2x - 1$

B)  $4x^2 - x - 2$

(C)  $4x^2 - 2x + 1$

31. 
$$\frac{(1+2x^2)^{\frac{1}{3}} - (x^2-1)(1+2x^2)^{-\frac{2}{3}}}{(1+2x^2)^{-\frac{2}{3}}}$$

A)  $x^2 - 1$

B)  $1$

C)  $x^2$

D)  $x^2 + 1$

E)  $x^2 + 2$

32. One factor of  $y^3 - x^2y + x^2 - y^2$ , is

A)  $y + x$

33.  $\frac{(1+x^2)^{\frac{1}{2}} - x^2(1+x^2)^{-\frac{1}{2}}}{(1+x^2)^{-\frac{3}{2}}} =$

A)  $1 + x^2$

34. One factor of  $54 + 2(2x + 1)^3$  is

A)  $(x + 2)$

35. One factor of  $y^{\frac{1}{4}} + y^{-\frac{3}{4}} - 2y^{-\frac{7}{4}}$  is

A)  $(y - 2)$

B)  $(y - 3)$

C)  $(y + 3)$

D)  $(y - 1)$

36. If  $4x^2y^2 - 36xy + k + 1$  is a perfect square trinomial, then  $k =$

A) 82

B) 48

C) 8

D) 80

E) 24

37. One of the factors of  $4y^5 - y^3 + 4y^2 - 1$  is

A)  $y^2 - y + 1$

B)  $y + 2$

C)  $y - 1$

D)  $y^2 + y + 1$

E)  $y - 2$

38. If  $18(x + 1)^{-1/2} + 2(x + 1)^{1/2} = \frac{A(x+B)}{(x+1)^{1/2}}$ , then  $A + B =$

A) 10

B) -2

C) 2

D) 8

E) 12

39.  $[2x + (y - 1)][2x - (y - 1)] + [2x - (y - 1)]^2 =$

A)  $8x^2 + 2xy - 4x$

B)  $8x^2 - 4xy - 4x$

C)  $8x^2 - 4xy + 4x$

D)  $8x^2 - 2xy + 4x$

E)  $8x^2 + 4xy - 4x$