

Math 29  
Factoring

Factor the expression completely.

1.  $9x^4 - 4y^2$

2.  $x^3 - 1$

3.  $3x^2 - 10xy + 8y^2$

4.  $10x^2 - 250$

5.  $x^3 - 4x^2 - 9x + 36$

6.  $4x^3 + 32$

7.  $x^{23}y - x^{21}y$

8.  $3x^2 - 18x - 21$

9.  $4x - 8x^2 - 5x^3$

10.  $x^4 - 4x^2 - 45$

11.  $(a + 2b)^2 - 25c^{20}$

12.  $a^3b - b^7$

13.  $8x^6 + 14x^5 - 4x^4$

14.  $45x^3y^5 - 5xy^9$

15.  $3x^8 - 11x^4 + 6$

16.  $3x^8 - 11x^7 + 6x^6$

17.  $9x^{34} - (y + 10)^2$

18.  $4a^2 - 8ab + 14b - 7a$

19.  $10x^5 + 40x^3 - 50x$

20.  $x^6 + 3x^5 - 10x^4$

21.  $x^6 - 4x^3 - 5$

22.  $1000a^3 + 27b^6$

23.  $x^{12} + 4x^6 - 32$

24.  $(3x - 11)^3 + 27$

25.  $(x^2 - 25)^7$

26.  $x^{\frac{5}{2}} - 9x^{\frac{1}{2}}$

27.  $8x^{\frac{8}{3}} - x^{-\frac{1}{3}}$

28.  $2x^{\frac{4}{3}} - 7x^{\frac{1}{3}} - 4x^{-\frac{2}{3}}$

29.  $2x^{\frac{2}{3}} - 3x^{\frac{1}{3}} - 20$

30.  $x^{-\frac{3}{2}} + 2x^{-\frac{1}{2}} + x^{\frac{1}{2}}$

31.  $11x^5(2x + 3)^7 - 4x(2x + 3)^8$

32.  $(2x - 7)^5(x - 8)^{30} + (2x - 7)^4(x - 8)^{31}$

33.  $10x^{15}(x - 6)^{-4} - 8x^{14}(x - 6)^{-3}$

34.  $3x^{-\frac{1}{2}}(4x + 3)^{\frac{5}{4}} + x^{\frac{3}{2}}(4x + 3)^{\frac{1}{4}}$

35.  $5(x + 8)^7(9x + 2)^{10} - 10(x + 8)^8(9x + 2)^{11}$

36.  $5\sin^2\theta - 3\sin\theta$

37.  $\csc^2x - 3\csc x - 28$

38.  $3\tan^2 2x - 2\tan 2x - 1$

39.  $4\sin^2 t \cos t - \cos t$

40.  $9e^{7x} - 5e^{6x}$

41.  $x^2e^{2x} + 5xe^{2x} - 6e^{2x}$

42.  $e^{2x} - 6e^x + 8$

Answers

1.  $(3x^2 - 2y)(3x^2 + 2y)$
2.  $(x-1)(x^2 + x + 1)$
3.  $(3x - 4y)(x - 2y)$
4.  $10(x+5)(x-5)$
5.  $(x-4)(x+3)(x-3)$
6.  $4(x+2)(x^2 - 2x + 4)$
7.  $x^{21}y(x+1)(x-1)$
8.  $3(x-7)(x+1)$
9.  $-x(5x-2)(x+2)$  OR  $x(2-5x)(2+x)$
10.  $(x^2 + 5)(x+3)(x-3)$
11.  $(a+2b+5c^{10})(a+2b-5c^{10})$
12.  $b(a-b^2)(a^2 + ab^2 + b^4)$
13.  $2x^4(4x-1)(x+2)$
14.  $5xy^5(3x+y^2)(3x-y^2)$
15.  $(3x^4 - 2)(x^4 - 3)$
16.  $x^6(3x-2)(x-3)$
17.  $(3x^{17} + y + 10)(3x^{17} - y - 10)$
18.  $(a-2b)(4a-7)$
19.  $10x(x^2 + 5)(x+1)(x-1)$
20.  $x^4(x+5)(x-2)$
21.  $(x^3 - 5)(x+1)(x^2 - x + 1)$
22.  $(10a + 3b^2)(100a^2 - 30ab^2 + 9b^4)$
23.  $(x^2 + 2)(x^4 - 2x^2 + 4)(x^3 + 2)(x^3 - 2)$
24.  $(3x-8)(9x^2 - 75x + 163)$
25.  $(x+5)^7(x-5)^7$
26.  $x^{\frac{1}{2}}(x+3)(x-3)$
27.  $x^{-\frac{1}{3}}(2x-1)(4x^2 + 2x + 1)$
28.  $x^{-\frac{2}{3}}(2x+1)(x-4)$
29.  $(2x^{\frac{1}{3}} + 5)(x^{\frac{1}{3}} - 4)$
30.  $x^{-\frac{3}{2}}(x+1)^2$
31.  $x(2x+3)^7(11x^4 - 8x - 12)$
32.  $3(2x-7)^4(x-8)^{30}(x-5)$
33.  $2x^{14}(x-6)^{-4}(x+24)$
34.  $x^{-\frac{1}{2}}(4x+3)^{\frac{1}{4}}(x^2 + 12x + 9)$
35.  $-5(x+8)^7(9x+2)^{10}(18x^2 + 148x + 31)$
36.  $\sin \theta(5 \sin \theta - 3)$
37.  $(\csc x + 4)(\csc x - 7)$
38.  $(\tan 2x - 1)(3 \tan 2x + 1)$
39.  $\cos t(2 \sin t + 1)(2 \sin t - 1)$
40.  $e^{6x}(9e^x - 5)$
41.  $e^{2x}(x+6)(x-1)$
42.  $(e^x - 4)(e^x - 2)$