

7.1 Addition and Subtraction of Polynomials

Answers

1. $3x^2 + 7x + 12$

2. $-r^2 + r - 1$

3. $5t^2 + 3t + 1$

4. $-s^2 - 9s + 3$

5. $3y^2 + 2y + 3$

6. $2x^2 + 23x - 20$

7. $21a^2 + 28a + 15$

8. $14y^2 - 5y - 8$

9. $-4b^2 - 12b + 9$

10. $14x^3 + 25x^2 + 31x - 12$

11. $-8y^2 + 5y - 13$

12. $-2x^2 - x + 2$

13. $9a^3 + a^2 + 8a + 3$

14. $2x^2 - 3x + 10$

15. $4s^3 + 6s^2 - 8$

7.2 Multiplication of Polynomials

Answers

1. $x^2 + 10x + 24$

2. $x^2 + 8x + 15$

3. $x^2 - x - 56$

4. $x^2 - 14x + 45$

5. $x^2 - 11x + 28$

6. $x^3 + 4x^2 + 8x + 15$

7. $x^3 + 4x^2 - 15x + 42$

8. $2x^3 - 11x^2 - 34x + 15$

9. $6x^3 + 5x^2 - 9x - 18$

10. $20x^3 - 56x^2 + 57x - 20$

11. $54a^5 + 27a^3 + 63a^2$

12. $-12s^5 - 28s^4 - 44s^2$

13. $5x^4 + 27x^3 + 13x^2 + 24x + 45$

14. $6t^4 - 7t^3 - 33t^2 + 22t - 66$

15. $6g^4 + 3g^3 - 31g^2 - 11g - 60$

7.3 Special Products of Polynomials

Answers

1. $t^2 + 24t + 144$

2. $w^2 + 30w + 225$

3. $4e^2 + 28e + 49$

4. $9z^2 + 12z + 4$

5. $49m^2 + 84m + 36$

6. $g^2 - 12g + 36$

7. $d^2 - 30g + 225$

8. $16x^2 - 24x + 9$

9. $4p^2 - 20p + 25$

10. $36t^2 - 84t + 49$

11. $x^2 - 169$

12. $x^2 - 36$

13. $4x^2 - 25$

14. $9x^2 - 16$

15. $36x^2 - 49$

7.4 Monomial Factors of Polynomials

Answers

1. $7(x^2 + 2)$

2. $3(3c^2 + 1)$

3. $4a(2a + 1)$

4. $8(2x^2 + 3y^2)$

5. $2(x^2 - 6x + 4)$

6. $8x(4w^2 + 2y + x)$

7. $6c(2ab + bd + 4ad)$

8. $5x^2y(3 - 2y + 5) = 5x^2y(8 - 2y)$

9. $6ab(2a - 3b - 4ab)$

10. $4st^2(s^2 - 4st + 3 - 6t)$

11. $(x - 5)(2x + 7)$

12. $(x - 3)(4x + 5)$

13. $(e + 4)(3x^2 - 5)$

14. $(c - 3)(8x^2 - 7)$

15. $(x - b)(ax + c)$

7.5 Factorization of Quadratic Expressions

Answers

1. $(x + 4)(x + 1)$

2. $(x + 10)(x + 2)$

3. $(a + 12)(a + 1)$

4. $(z + 5)(z + 2)$

5. $(w + 5)(w + 3)$

6. $(x - 5)(x - 2)$

7. $(x - 6)(x - 4)$

8. $(m - 3)(m - 1)$

9. $(s - 7)(s + 1)$

10. $(y - 6)(y - 2)$

11. $(x - 4)(x + 3)$

12. $(x + 4)(x - 3)$

13. $(x - 7)(x + 2)$

14. $(x - 11)(x + 4)$

15. $(y + 5)(y - 4)$

16. $(3x + 2)(x + 1)$

17. $(5x - 1)(x + 2)$

18. $(4x - 3)(x + 1)$

19. $(2x + 1)(x + 3)$

20. $(2y + 1)(y - 8)$

21. $(2x + 3)(x - 4)$

22. $(2x + 3)(x + 4)$

23. $(2w - 5)(3w + 4)$

Chapter 7 – Polynomials

Answer Key

24. $(3w + 7)(4w - 5)$

25. $(w + 3)(3w + 7)$

26. $(2a - 3)(8a + 3)$

27. $(4a - 3)(9a + 5)$

28. $(3a + 4)(5a + 2)$

29. $(4m - 1)(5m + 4)$

30. $(p - 1)(3p + 20)$

7.6 Special Cases of Quadratic Factorization

Answers

1. $(s + 9)^2$

2. $(x + 6)^2$

3. $(y - 7)^2$

4. $(2a + 5)^2$

5. $(3s - 8)^2$

6. $(s - 9)(s + 9)$

7. $(x - 7)(x + 7)$

8. $(2t - 5)(2t + 5)$

9. $(5w - 6)(5w + 6)$

10. $(8 - 9a)(8 + 9a)$

11. $(y - 11)^2$

12. $(4t - 7)(4t + 7)$

13. $(3a + 5)^2$

14. $(10 - 5b)(10 + 5b)$

15. $(2s - 7)^2$

7.7 Zero Product Property for Quadratic Equations

Answers

1. $x = -1, x = 3$

2. $a = -3, a = -5$

3. $x = 5, x = -4$

4. $t = 2, t = -3$

5. $x = 8, x = \frac{7}{3}$

6. $x = -4, x = 3$

7. $x = -6, x = 4$

8. $x = -6, x = 3$

9. $w = -12, w = 9$

10. $e = -9, e = 11$

11. $x = -\frac{1}{2}, x = \frac{2}{3}$

12. $d = -8, d = 1$

13. $s = -6, s = -\frac{2}{3}$

14. $x = -\frac{1}{3}$

15. $j = \frac{2}{3}, j = 5$

7.8 Applications of Quadratic Equations

Answers

1. 10 *feet*
2. $x = 1$
3. $x = \frac{1}{2}$
4. 2.5 days
5. 500 units
6. 240 units
7. 30 meters; 2 seconds
8. 1 second, 4 seconds
9. 5 seconds
10. 45 meters
11. 1 second, 5 seconds
12. 6 seconds
13. 2 meters
14. 1 meter
15. 3 meters

7.9 Complete Factorization of Polynomials

Answers

1. $6(x^3 - 2)$

2. $4x^2(x - 3)$

3. $8y(y^2 + 4)$

4. $15a^2(a + 2)$

5. $21q(q^2 + 3)$

6. $4(x^3 - 3x^2 - 2)$

7. $6e(e + 1)(2e - 1)$

8. $15(s^3 - 2s + 3)$

9. $22r(r + 1)(r + 2)$

10. $4d(8d^2 - 4d + 3)$

11. $5(x^3 + 3x^2 + 5x - 6)$

12. $3y(y - 3)^2$

13. $12(s^3 - 2s^2 + 3s - 4)$

14. $8x(x + 5)(x - 2)$

15. $5x(x - 7)(x + 2)$

7.10 Factorization by Grouping

Answers

1. $(x - 6)(x - 3)(x + 6)$

2. $(e - 9)(e - 3)(e + 9)$

3. $(x - 10)(x - 7)(x + 7)$

4. $(y - 7)(y^2 - 5)$

5. $(x + 9)(x^2 + 3)$

6. $(x - 1)(x + 1)(3x + 1)$

7. $(s - 3)(s + 3)(5s - 6)$

8. $(4a - 7)(a^2 + 1)$

9. $5(y - 3)(y + 3)^2$

10. $3(x - 2)(x + 2)(x + 5)$

11. $(x + 7)(2x^2 + 7)$

12. $2(k + 1)(k + 3)(k + 4)$

13. $-3(x - 3)(x + 3)(2x - 1)$

14. $-(m - 2)(m + 2)(5m + 6)$

15. $-2(x + 4)(x^2 - 7)$

7.11 Factorization of Special Cubics

Answers

1. $(x + h)(x^2 - xh + h^2)$
2. $(a + 5)(a^2 - 5a + 25)$
3. $(2x + 4)(4x^2 - 8x + 16)$
4. $(x + 12)(x^2 - 12x + 144)$
5. $2(x + 15)(x^2 - 15x + 225)$
6. $(h - 4)(h^2 + 4h + 16)$
7. $(s - 6)(s^2 + 6s + 36)$
8. $(p - 8)(p^2 + 8p + 64)$
9. $4(e - 2)(e^2 + 2e + 4)$
10. $2(w - 5)(w^2 + 5w + 25)$
11. $(x + 2)(x^2 - 2x + 4)$
12. $(y - 1)(y^2 + y + 1)$
13. $(5e - 2)(25e^2 + 10e + 4)$
14. $(4a + 13)(16a^2 - 52a + 169)$
15. $54(z + 4)(z^2 - 4z + 16)$

7.12 Division of a Polynomial by a Monomial

Answers

1. $a^3 + 5a^2 + 4a$

2. $3b^3 + 4b^2 + b$

3. $2c^3 + 3c + 1$

4. $2d^{11} + 3d^{10} + d^7$

5. $3e^6 + 9e^2 + 2e$

6. $2a^3 - 2a$

7. $b^3 - 2b^2 + 10b - 5$

8. $-8c^{10} - 4c^9 - 5c^7 - 6c$

9. $4d^9 + 2d^5 + 3d^2 - 8$

10. $-7e^7 + 9e^6 + 6e^5 + 9e^2$

11. $6a^8 - 3a^6 + 24a^5 + 3a^3 + 1$

12. $4b^6 - 7b^4 - 7b^3$

13. $-12c^7 + 21c^2 + 9c$

14. $-2d^8 - 3d^5 - 6d^3$

15. $4e^{10} - 3e^8 + e^2 - 3e - \frac{8}{e}$

7.13 Long Division and Synthetic Division

Answers

1. $x + 4$

2. $x + 1$

3. $a + 5$

4. $x + 2$

5. $x - 2$

6. $b - 2$

7. $x - 2$

8. $a - 1$

9. $c + 3$

10. $5r - 3$

11. $2x^2 + 3x + 1$

12. $3x - 5$

13. $3x^2 + 2x + 3$

14. $x^3 + 3x^2 + 1$

15. $2x^2 - 5x + 3$

16. $4x^2 - 3x + 5$

17. $3x^2 + 4$

18. $9x - 1$

19. $-x^2 + 3x + 4$

20. $x^2 - 5$

7.14 The Factor Theorem

Answers

1. Yes

2. Yes

3. Yes

4. No

5. Yes

6. $(x + 1)(x^2 + x + 1)$

7. $(x - 1)(x + 1)^2$

8. $(x - 1)(2x^2 - 3x - 1)$

9. $(b + 2)(2b^2 - 3)$

10. $(c - 1)^2(3c + 2)$

11. $(x - 3)(2x + 1)(x - 4)$

12. $(x - 1)(x + 2)(x + 1)$

13. $(x - 3)(3x - 4)(x + 5)$

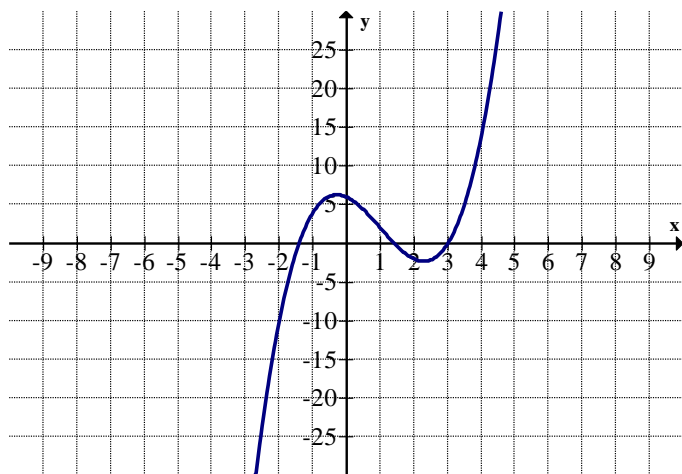
14. $(x - 5)(x + 1)(x - 3)$

15. $(x + 2)(x - 3)(x + 4)(x + 1)$

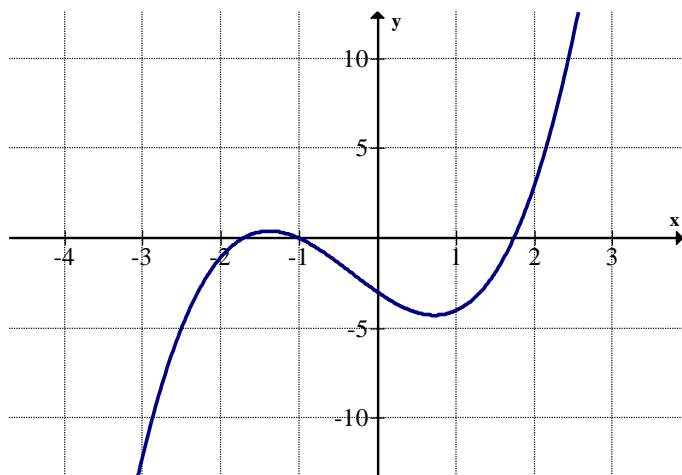
7.15 Graphs of Polynomial Functions

Answers

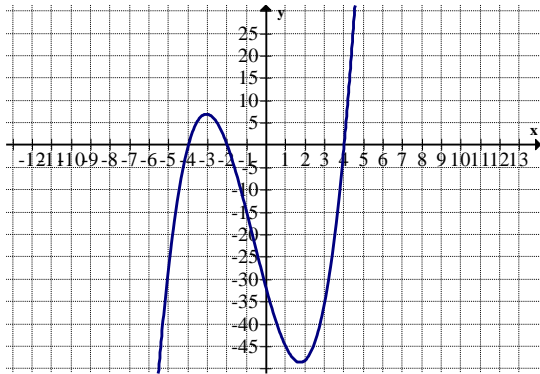
1. The real roots are -2, 2, and 3.
2. The real roots are -5, -2, and 2.
3. The real root is approximately 0.515.
4. The real root is 4.
5. The real root is 1.
6. One factor is $(x - 3)$.



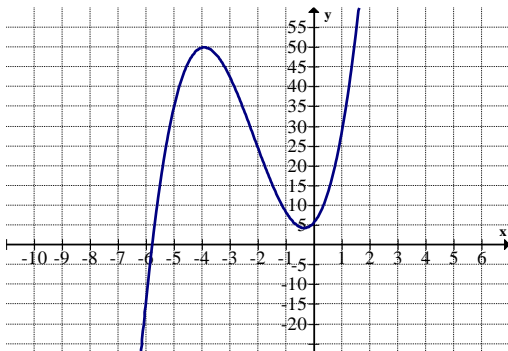
7. One factor is $(x + 1)$.



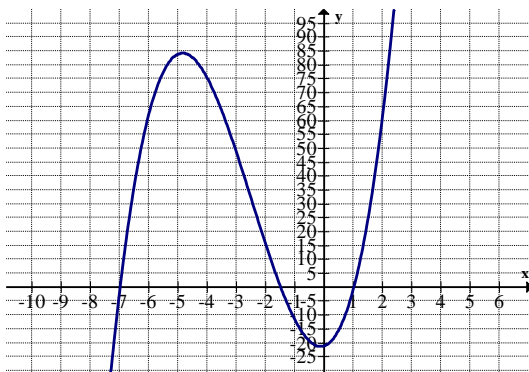
8. Factors are $(x - 4)$, $(x + 4)$, $(x + 2)$.



9. There are no integer roots so there are no factors.



10. Factors are $(x + 7)$ and $(x - 1)$.



11. No

12. Yes

13. Yes

14. Yes

15. Yes

16. The real roots are at approximately -1.6 and 4.4.
17. The real roots are at -3 and 3.
18. The real roots are at approximately -1.5 and 1.2.
19. The real roots are at approximately -2.25, -0.85, 0.6, and 2.4.
20. The real roots are at -3, 1, and 2.
21. This graph makes a W shape and has 4 real roots.
22. This graph makes a W shape and has 2 real roots.
23. This graph makes an M shape and has 2 real roots.
24. This graph makes an M shape and has 4 real roots.
25. This graph makes an upside down U shape and has 0 real roots.