

p. 407, #1-24 all

$$\begin{aligned} 1. \quad m^2 - 49 &= m^2 - 7^2 \\ &= (m + 7)(m - 7) \\ \text{So, } m^2 - 49 &= (m + 7)(m - 7). \end{aligned}$$

$$\begin{aligned} 2. \quad z^2 - 81 &= z^2 - 9^2 \\ &= (z + 9)(z - 9) \\ \text{So, } z^2 - 81 &= (z + 9)(z - 9). \end{aligned}$$

$$\begin{aligned} 3. \quad 64 - 81d^2 &= 8^2 - (9d)^2 \\ &= (8 + 9d)(8 - 9d) \\ \text{So, } 64 - 81d^2 &= (8 + 9d)(8 - 9d). \end{aligned}$$

$$\begin{aligned} 4. \quad 25 - 4x^2 &= 5^2 - (2x)^2 \\ &= (5 + 2x)(5 - 2x) \\ \text{So, } 25 - 4x^2 &= (5 + 2x)(5 - 2x). \end{aligned}$$

$$\begin{aligned} 5. \quad 225a^2 - 36b^2 &= 9(25a^2 - 4b^2) \\ &= 9[(5a)^2 - (2b)^2] \\ &= 9(5a + 2b)(5a - 2b) \\ \text{So, } 225a^2 - 36b^2 &= 9(5a + 2b)(5a - 2b). \end{aligned}$$

$$\begin{aligned} 6. \quad 16x^2 - 169y^2 &= (4x)^2 - (13y)^2 \\ &= (4x + 13y)(4x - 13y) \end{aligned}$$

$$\text{So, } 16x^2 - 169y^2 = (4x + 13y)(4x - 13y).$$

$$\begin{aligned} 7. \quad 12^2 - 9^2 &= (12 + 9)(12 - 9) \\ &= 21(3) \\ &= 63 \end{aligned}$$

$$\text{So, } 12^2 - 9^2 = 63.$$

$$\begin{aligned} 8. \quad 19^2 - 11^2 &= (19 + 11)(19 - 11) \\ &= 30(8) \\ &= 240 \end{aligned}$$

$$\text{So, } 19^2 - 11^2 = 240.$$

$$\begin{aligned} 9. \quad 78^2 - 72^2 &= (78 + 72)(78 - 72) \\ &= 150(6) \\ &= 900 \end{aligned}$$

$$\text{So, } 78^2 - 72^2 = 900.$$

$$\begin{aligned} 10. \quad 54^2 - 52^2 &= (54 + 52)(54 - 52) \\ &= 106(2) \\ &= 212 \end{aligned}$$

$$\text{So, } 54^2 - 52^2 = 212.$$

$$\begin{aligned} 11. \quad 53^2 - 47^2 &= (53 + 47)(53 - 47) \\ &= 100(6) \\ &= 600 \end{aligned}$$

$$\text{So, } 53^2 - 47^2 = 600.$$

$$\begin{aligned} 12. \quad 39^2 - 36^2 &= (39 + 36)(39 - 36) \\ &= 75(3) \\ &= 225 \end{aligned}$$

$$\text{So, } 39^2 - 36^2 = 225.$$

$$\begin{aligned} 13. \quad h^2 + 12h + 36 &= h^2 + 2(h)(6) + 6^2 \\ &= (h + 6)^2 \end{aligned}$$

$$\text{So, } h^2 + 12h + 36 = (h + 6)^2.$$

$$\begin{aligned} 14. \quad p^2 + 30p + 225 &= p^2 + 2(p)(15) + 15^2 \\ &= (p + 15)^2 \end{aligned}$$

$$\text{So, } p^2 + 30p + 225 = (p + 15)^2.$$

$$\begin{aligned} 15. \quad y^2 - 22y + 121 &= y^2 - 2(y)(11) + 11^2 \\ &= (y - 11)^2 \end{aligned}$$

$$\text{So, } y^2 - 22y + 121 = (y - 11)^2.$$

$$\begin{aligned} 16. \quad x^2 - 4x + 4 &= x^2 - 2(x)(2) + 2^2 \\ &= (x - 2)^2 \end{aligned}$$

$$\text{So, } x^2 - 4x + 4 = (x - 2)^2.$$

$$\begin{aligned} 17. a^2 - 28a + 196 &= a^2 - 2(a)(14) + 14^2 \\ &= (a - 14)^2 \end{aligned}$$

$$\text{So, } a^2 - 28a + 196 = (a - 14)^2.$$

$$\begin{aligned} 18. m^2 + 24m + 144 &= m^2 + 2(m)(12) + 12^2 \\ &= (m + 12)^2 \end{aligned}$$

$$\text{So, } m^2 + 24m + 144 = (m + 12)^2.$$

$$\begin{aligned} 19. 25n^2 + 20n + 4 &= (5n)^2 + 2(5n)(2) + 2^2 \\ &= (5n + 2)^2 \end{aligned}$$

$$\text{So, } 25n^2 + 20n + 4 = (5n + 2)^2.$$

$$\begin{aligned} 20. 49a^2 - 14a + 1 &= (7a)^2 - 2(7a)(1) + 1^2 \\ &= (7a - 1)^2 \end{aligned}$$

$$\text{So, } 49a^2 - 14a + 1 = (7a - 1)^2.$$

21. The difference of two squares pattern should be used to factor this polynomial.

$$\begin{aligned} n^2 - 64 &= n^2 - 8^2 \\ &= (n + 8)(n - 8) \end{aligned}$$

$$\text{So, } n^2 - 64 = (n + 8)(n - 8).$$

22. The perfect square trinomial pattern should be used to factor this polynomial.

$$\begin{aligned} y^2 - 6y + 9 &= y^2 - 2(y)(3) + 3^2 \\ &= (y - 3)^2 \end{aligned}$$

$$\text{So, } y^2 - 6y + 9 = (y - 3)^2.$$

$$\begin{aligned} 23. \quad d^2 + 8d + 16 &= d^2 + 2(d)(4) + 4^2 \\ &= (d + 4)^2 \end{aligned}$$

An expression that represents the side length of the coaster is $(d + 4)$ centimeters. Use this expression to find an expression for the perimeter.

$$\begin{aligned} P &= 4(s) \\ &= 4(d + 4) \\ &= 4(d) + 4(4) \\ &= 4d + 16 \end{aligned}$$

An expression for the perimeter of the coaster is $(4d + 16)$ centimeters.

$$\begin{aligned} 24. \quad A &= x^2 - 30x + 225 \\ &= x^2 - 2(x)(15) + 15^2 \\ &= (x - 15)^2 \end{aligned}$$

An expression that represents the side length of the playground is $(x - 15)$ feet. Use this expression to find an expression for the perimeter.

$$\begin{aligned} P &= 4(s) \\ &= 4(x - 15) \\ &= 4(x) - 4(15) \\ &= 4x - 60 \end{aligned}$$

An expression for the perimeter of the playground is $(4x - 60)$ feet.