

9

CHAPTER REVIEW

9.7 Factor Special Products

pp. 600–605

EXAMPLE

Factor the polynomial.

a. $100x^2 - y^2$

b. $4x^2 - 36x + 81$

Solution

$$\begin{aligned} \text{a. } 100x^2 - y^2 &= (10x)^2 - y^2 \\ &= (10x + y)(10x - y) \end{aligned}$$

Write as $a^2 - b^2$.

Difference of two squares pattern

$$\begin{aligned} \text{b. } 4x^2 - 36x + 81 &= (2x)^2 - 2(2x \cdot 9) + 9^2 \\ &= (2x - 9)^2 \end{aligned}$$

Write as $a^2 - 2ab + b^2$.

Perfect square trinomial pattern

EXERCISES

Factor the polynomial.

51. $z^2 - 225$

52. $a^2 - 16y^2$

53. $12 - 48n^2$

54. $x^2 + 20x + 100$

55. $16p^2 - 8p + 1$

56. $-2y^2 + 32y - 128$

57. **DROPPED OBJECT** You drop a penny from a height of 16 feet. After how many seconds does the penny land on the ground?

EXAMPLES

1, 2, 3, 4, and 6
on pp. 600–602
for Exs. 51–57

9.8 Factor Polynomials Completely

pp. 606–613

EXAMPLE

Factor the polynomial completely.

a. $y^3 - 4y^2 + 8y - 32$

b. $5x^3 - 40x^2 + 80x$

Solution

$$\begin{aligned} \text{a. } y^3 - 4y^2 + 8y - 32 &= (y^3 - 4y^2) + (8y - 32) \\ &= y^2(y - 4) + 8(y - 4) \\ &= (y - 4)(y^2 + 8) \end{aligned}$$

Group terms.

Factor each group.

Distributive property

$$\begin{aligned} \text{b. } 5x^3 - 40x^2 + 80x &= 5x(x^2 - 8x + 16) \\ &= 5x(x - 4)^2 \end{aligned}$$

Factor out 5x.

Perfect square trinomial pattern

EXERCISES

Factor the polynomial completely.

58. $a^3 + 6a - 5a^2 - 30$

59. $y^2 + 3y + yx + 3x$

60. $x^3 - 11x^2 - x + 11$

61. $5s^4 - 125s^2$

62. $147n^5 - 3n^3$

63. $2z^3 + 2z^2 - 60z$

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

65. $2b^3 + 3b^2 - 8b - 12$

66. $x^3 + x^2 - 6x - 6$

EXAMPLE 4

on pp. 606–608
for Exs. 58–66