

49, 144, \swarrow
9, x^2

Subtract \swarrow

[7c] Difference of Two Perfect Squares

Multiply

① $(x+5)(x-5)$
 $x^2 - 25$

② $(x-7)(x+7)$
 $x^2 - 49$

Factor

③ $x^2 - 100$

$(x+10)(x-10)$

④ $4 - 9x^2$

$(2+3x)(2-3x)$

⑤ $64p^4 - 121r^2$

$(8p^2+11r)(8p^2-11r)$

⑥ $x^6 - 1$

$(x^3+1)(x^3-1)$

⑦ $18x^2 - 200$
 $2(9x^2 - 100)$

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

⑧ $25x^2 - 49y^2$

$(5x+7y)(5x-7y)$

⑨ $a^8 - b^8$

$(a^4+b^4)(a^4-b^4)$
 $(a^4+b^4)(a^2+b^2)(a^2-b^2)$

$(a^4+b^4)(a^2+b^2)(a+b)(a-b)$

Prime Factorization

15
 \wedge
3 · 5

360
 \wedge
② 180

\wedge
② 90

$2^3 \cdot 3^2 \cdot 5$

\wedge
② 45

\wedge
③ 9

7c Differences of Two Squares

Objective: To simplify products of the form $(a + b)(a - b)$ and to factor differences of two squares.

Vocabulary

Product of the Sum and Difference of Two Numbers

$$(a + b)(a - b) = a^2 - ab + ab - b^2 = a^2 - b^2$$

Difference of Two Squares

$$a^2 - b^2 = (a + b)(a - b)$$

• Set E
 • WS 7c (#2-16) x 2
 (#25-36) all
 Mixed Review all
 (#1-12)

Example 1 Write each product as a binomial.

a. $(x + 2)(x - 2)$ b. $(2n + 3)(2n - 3)$

Solution These products fit the form $(a + b)(a - b)$, so each binomial is of the form $a^2 - b^2$.

a. $(x + 2)(x - 2) = (x)^2 - (2)^2$
 $= x^2 - 4$

b. $(2n + 3)(2n - 3) = (2n)^2 - (3)^2$
 $= 4n^2 - 9$

evens

Write each product as a binomial.

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

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

5. $(5a + 2)(5a - 2)$

7. $(4 + 3x)(4 - 3x)$

9. $(3 - 5x)(3 + 5x)$

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

4. $(9 - x)(9 + x)$

6. $(7a - 2)(7a + 2)$

8. $(6 - 5x)(6 + 5x)$

10. $(8x + 7)(8x - 7)$

Example 2 Write each product as a binomial.

a. $(a^2 - 3b)(a^2 + 3b)$ b. $(xy + z)(xy - z)$

Solution These products fit the form $(a + b)(a - b)$, so each binomial is of the form $a^2 - b^2$.

a. $(a^2 - 3b)(a^2 + 3b) = (a^2)^2 - (3b)^2$
 $= a^4 - 9b^2$

b. $(xy + z)(xy - z) = (xy)^2 - z^2$
 $= x^2y^2 - z^2$

Write each product as a binomial.

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

12. $(2u + v)(2u - v)$

13. $(x^2 - 8y)(x^2 + 8y)$

14. $(x^2 - 3y^2)(x^2 + 3y^2)$

15. $(2a^2 + 5b^2)(2a^2 - 5b^2)$

16. $(ab - 2c)(ab + 2c)$

NAME _____

DATE _____

7c Differences of Two Squares (continued)

Example 3 Multiply. Use the pattern $(a + b)(a - b) = a^2 - b^2$.

a. $58 \cdot 62$

b. $93 \cdot 87$

Solution

a. $58 \cdot 62 = (60 - 2)(60 + 2)$ b. $93 \cdot 87 = (90 + 3)(90 - 3)$
 $= 3600 - 4$
 $= 3596$

Multiply. Use the pattern $(a + b)(a - b) = a^2 - b^2$.

17. $16 \cdot 24$

18. $27 \cdot 33$

19.

21. $41 \cdot 39$

22. $92 \cdot 88$

23.

Example 4 Factor: a. $a^2 - 16$ b. $9 - 4b^2$ **Solution** Use the pattern $a^2 - b^2 = (a + b)(a - b)$

a. $a^2 - 16 = a^2 - 4^2$
 $= (a + 4)(a - 4)$

b. $9 - 4b^2 = 3^2 - (2b)^2$
 $= (3 + 2b)(3 - 2b)$

c. $25a^2 - 36x^6 = (5a)^2 - (6x^3)^2$
 $= (5a + 6x^3)(5a - 6x^3)$

• Set E

• WS 7c

(#2-16) × 2

(#25-36) all

Mixed Review all
(#1-12)

Factor. You may use a calculator or a table of squares.

25. $b^2 - 16$

26. $f^2 - 81$

27. $36 - x^2$

28. $9e^2 - 16$

29. $49n^2 - 1$

30. $4a^2 - 9$

31. $a^4 - 36$

32. $49b^2 - 16c^2$

33. $100 - 121r^2$

34. $121 - y^2$

35. $25u^2 - 36$

36. $16x^2 - 225$

Mixed Review Exercises

Simplify.

1. $5z(z - 2) + 3z(z + 4)$

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

3. $-3(m + 2) - 4m(m - 3)$

4. $\frac{36a^5b^2}{9a^3}$

5. $\frac{15a + 5}{5}$

6. $\frac{18n^2x}{6nx}$

7. $(a + 2)(2a - 1)$

8. $(3b + 2)(b - 1)$

9. $(4x)^2 \left(\frac{1}{4}\right)^2 x$

10. $\frac{12y^3 + 28y^2 - 8y}{4y}$

11. $\frac{30x^3 + 45x^2 - 15x}{15x}$

12. $\frac{24x^3y^4z}{3x^3y^3z}$

All