

Extending Number System Study Guide

Simplify.

1) $\sqrt{24}$
 $2\sqrt{6}$

2) $-8\sqrt{18}$
 $-24\sqrt{2}$

3) $7\sqrt{20}$
 $14\sqrt{5}$

4) $7\sqrt{448}$
 $56\sqrt{7}$

5) $2\sqrt{2} - \sqrt{2} - 2\sqrt{2} - \sqrt{3}$
 $-\sqrt{2} - \sqrt{3}$

6) $\sqrt{8} + \sqrt{2}$
 $3\sqrt{2}$

7) $2\sqrt{18} + 3\sqrt{8}$
 $12\sqrt{2}$

8) $-\sqrt{27} - \sqrt{45} - \sqrt{27}$
 $-6\sqrt{3} - 3\sqrt{5}$

9) $-4\sqrt{20} \cdot \sqrt{5}$
 -40

10) $-5\sqrt{5} \cdot 2\sqrt{5}$
 -50

11) $\sqrt{6}(-3\sqrt{2} - 4\sqrt{6})$
 $-6\sqrt{3} - 24$

12) $\sqrt{6}(\sqrt{3} + \sqrt{5})$
 $3\sqrt{2} + \sqrt{30}$

$$13) (-5\sqrt{5} - 1)(\sqrt{5} + 5)$$

$$-30 - 26\sqrt{5}$$

$$14) (2\sqrt{3} + 2)(\sqrt{3} - 2)$$

$$2 - 2\sqrt{3}$$

$$15) (-4\sqrt{3} - 2)(5\sqrt{3} - 3)$$

$$-54 + 2\sqrt{3}$$

$$16) (-1 + \sqrt{3})(-5 + \sqrt{3})$$

$$8 - 6\sqrt{3}$$

Determine if the result is a rational or irrational number and explain why.

$$17) -2\sqrt{45} + 3\sqrt{20}$$

$$18) \sqrt{6}(\sqrt{6} + 3)$$

0 Rational since you can write zero as a ratio of two integers
 $3\sqrt{6}$ Irrational since a rational times an irrational rational and an irrational is irrational.

Simplify each expression.

$$19) (4 - 2n^4 + 8n) + (8n^5 - 2n^3 + 3 + 4n^2) + (3n^3 - 6n^5)$$

$$2n^5 - 2n^4 + n^3 + 4n^2 + 8n + 7$$

$$20) (5x^5 + 5x^4) - (-6x^4 + 3x^5)$$

$$2x^5 + 11x^4$$

$$21) (2 - 7m^2 - 7m^4 - 7m) + (-7m^2 - 5 + 4m - 5m^4) - (4m + 7m^2 - 1 + 3m^4)$$

$$-15m^4 - 21m^2 - 7m - 2$$

Find each product.

22) $5(4n - 1)$

$20n - 5$

23) $(6n + 8)(3n + 2)$

$18n^2 + 36n + 16$

24) $(6a - 2)(5a - 4)$

$30a^2 - 34a + 8$

25) $(7p + 7)(6p + 5)$

$42p^2 + 77p + 35$

26) $(4n + 7)(8n^2 + 4n - 1)$

$32n^3 + 72n^2 + 24n - 7$

27) $(8v - 2)(7v^2 + 6v + 2)$

$56v^3 + 34v^2 + 4v - 4$

28) $(8x - 1)(6x^2 - 3x + 6)$

$48x^3 - 30x^2 + 51x - 6$

29) $(3x + 3)(7x^2 + 4x + 2)$

$21x^3 + 33x^2 + 18x + 6$

30) $(-3v^2 + 8v - 6)(-7v^2 - 4v - 4)$

$21v^4 - 44v^3 + 22v^2 - 8v + 24$

31) $(-5r^2 - r + 7)(8r^2 - 2r + 4)$

$-40r^4 + 2r^3 + 38r^2 - 18r + 28$

32) $(-6v^2 + v - 6)(-4v^2 - 8v - 3)$

$24v^4 + 44v^3 + 34v^2 + 45v + 18$