

## Unit 4 Review

Name \_\_\_\_\_

**Concept 2: Simplify.**

1)  $\sqrt{100p^3}$

2)  $\sqrt{384a}$

3)  $\sqrt{18k}$

4)  $\sqrt{72n^3}$

5)  $\sqrt{32xy^3}$

6)  $\sqrt{384x^2y^4}$

7)  $\sqrt{45x^2y}$

8)  $\sqrt{54x^3y^3}$

9)  $\sqrt{216m^4p^3q^4}$

10)  $\sqrt{72h^3j^3k^2}$

**Concept 7: Simplify each sum.**

11)  $(4x^3 - 4 + 7x) + (6 - 3x + 3x^3)$

12)  $(7 - 5n^2 + 3n^3) + (2n^4 + 6n^2 - 7)$

**Concept 8: Simplify each difference.**

13)  $(4x^3 - 7x + 5) - (3x^3 + 1 + 5x)$

14)  $(x + 2x^3 + 6x^2) - (2x + 7x^2 - 3x^3)$

**Concept 9: Find each product.**

15)  $(8v - 4)(6v - 1)$

16)  $(3x - 5)(2x^2 - 5x - 2)$

**Concept 1: Simplify.**

17)  $\sqrt{512}$

18)  $\sqrt{32}$

19)  $\sqrt{392}$

20)  $\sqrt{200}$

21)  $3\sqrt{2} + 2\sqrt{18}$

22)  $-3\sqrt{45} + 3\sqrt{20}$

23)  $2\sqrt{3}(\sqrt{5} + \sqrt{6})$

24)  $\sqrt{6}(\sqrt{2} + \sqrt{10})$

Concept 3: State whether the number is rational or irrational. EXPLAIN WHY!

25)  $\sqrt{2}$

26)  $\frac{7}{\sqrt{5}}$

27)  $-10$

28)  $\frac{1}{3}$

29)  $\frac{5}{4}$

30)  $2.13\dots$

Concept 4-b: state whether the result will be a rational or irrational number.

31)  $2.5 \times \frac{\sqrt{3}}{2}$

32)  $\frac{7}{5} + \frac{2}{3}$

33)  $\pi + 7.654$

34)  $5 \times \frac{1}{6}$

$$\begin{aligned} \textcircled{1} \sqrt{100p^3} & \quad \begin{matrix} 2 \cdot 192 \\ 3 \cdot 128 \\ 4 \cdot 96 \\ \textcircled{6 \cdot 64} \\ 8 \cdot 48 \\ 12 \cdot 32 \\ 16 \cdot 24 \end{matrix} \\ \sqrt{100} \cdot \sqrt{p^3} & \\ 10 \cdot \sqrt{p^2} \cdot p & \\ 10 \cdot \sqrt{p^2} \cdot \sqrt{p} & \\ 10 \cdot p \cdot \sqrt{p} & \\ \textcircled{10p\sqrt{p}} & \end{aligned}$$

$$\begin{aligned} \textcircled{2} \sqrt{384a} & \\ \sqrt{384} \cdot \sqrt{a} & \\ \sqrt{6} \cdot \sqrt{64} \cdot \sqrt{a} & \\ \sqrt{6} \cdot 8 \cdot \sqrt{a} & \\ \textcircled{8\sqrt{6a}} & \end{aligned}$$

$$\begin{aligned} \textcircled{3} \sqrt{18K} & \\ \textcircled{2 \cdot 9} \sqrt{18} \cdot \sqrt{K} & \\ 3 \cdot 6 \sqrt{2} \cdot \sqrt{9} \cdot \sqrt{K} & \\ \sqrt{2} \cdot 3 \cdot \sqrt{K} & \\ \textcircled{3\sqrt{2K}} & \end{aligned}$$

$\begin{matrix} \textcircled{2 \cdot 36} \\ 3 \cdot 24 \\ 4 \cdot 18 \\ 6 \cdot 12 \\ 8 \cdot 9 \end{matrix}$

$$\begin{aligned} \textcircled{4} \sqrt{72n^3} & \\ \sqrt{72} \cdot \sqrt{n^3} & \\ \sqrt{2} \cdot \sqrt{36} \cdot \sqrt{n^2} \cdot \sqrt{n} & \\ \sqrt{2} \cdot 6 \cdot n \cdot \sqrt{n} & \\ \textcircled{6n\sqrt{2n}} & \end{aligned}$$

$$\begin{aligned} \textcircled{5} \sqrt{32xy^3} & \quad \begin{matrix} \textcircled{2 \cdot 16} \\ 4 \cdot 8 \end{matrix} \\ \sqrt{32} \cdot \sqrt{x} \cdot \sqrt{y^3} & \\ \sqrt{2} \cdot \sqrt{16} \cdot \sqrt{x} \cdot \sqrt{y^2} \cdot \sqrt{y} & \\ \sqrt{2} \cdot 4 \cdot \sqrt{x} \cdot y \cdot \sqrt{y} & \\ \textcircled{4y\sqrt{2xy}} & \end{aligned}$$

$$\begin{aligned} \textcircled{6} \sqrt{384x^2y^4} & \quad \begin{matrix} 3 \cdot 15 \\ \textcircled{5 \cdot 9} \end{matrix} \\ \sqrt{384} \cdot \sqrt{x^2} \cdot \sqrt{y^4} & \\ \sqrt{6} \cdot \sqrt{64} \cdot x \cdot y^2 & \\ \sqrt{6} \cdot 8 \cdot x \cdot y^2 & \\ \textcircled{8xy^2\sqrt{6}} & \end{aligned}$$

$$\begin{aligned} \textcircled{7} \sqrt{45x^2y} & \quad \begin{matrix} 2 \cdot 27 \\ 3 \cdot 18 \\ \textcircled{6 \cdot 9} \end{matrix} \\ \sqrt{45} \cdot \sqrt{x^2} \cdot \sqrt{y} & \\ \sqrt{5} \cdot \sqrt{9} \cdot x \cdot \sqrt{y} & \\ \sqrt{5} \cdot 3 \cdot x \cdot \sqrt{y} & \\ \textcircled{3x\sqrt{5y}} & \end{aligned}$$

$$\begin{aligned} \textcircled{8} \sqrt{54x^3y^3} & \\ \sqrt{6} \cdot \sqrt{9} \cdot \sqrt{x^3} \cdot \sqrt{y^3} & \\ \sqrt{6} \cdot 3 \cdot \sqrt{x^2} \cdot \sqrt{x} \cdot \sqrt{y^2} & \\ \sqrt{6} \cdot 3 \cdot x \cdot \sqrt{x} \cdot y \cdot \sqrt{y} & \\ \textcircled{3xy\sqrt{6xy}} & \end{aligned}$$

$\begin{matrix} 2 \cdot 108 \\ 3 \cdot 72 \\ 4 \cdot 54 \\ \textcircled{6 \cdot 36} \\ 8 \cdot 27 \\ 9 \cdot 24 \\ 12 \cdot 18 \end{matrix}$

$$\begin{aligned} \textcircled{9} \sqrt{216m^4p^3q^4} & \\ \sqrt{216} \cdot \sqrt{m^4} \cdot \sqrt{p^3} \cdot \sqrt{q^4} & \\ \sqrt{6} \cdot \sqrt{36} \cdot m^2 \cdot \sqrt{p^2} \cdot \sqrt{p} \cdot q^2 & \\ \sqrt{6} \cdot 6 \cdot m^2 \cdot p \cdot \sqrt{p} \cdot q^2 & \\ \textcircled{6m^2pq^2\sqrt{6p}} & \end{aligned}$$

$$\begin{aligned} \textcircled{10} \sqrt{72h^3j^3k^2} & \\ \sqrt{72} \cdot \sqrt{h^3} \cdot \sqrt{j^3} \cdot \sqrt{k^2} & \\ \sqrt{2} \cdot \sqrt{36} \cdot \sqrt{h^2} \cdot \sqrt{h} \cdot \sqrt{j^2} \cdot \sqrt{j} \cdot k & \\ \sqrt{2} \cdot 6 \cdot h \cdot \sqrt{h} \cdot j \cdot \sqrt{j} \cdot k & \\ \textcircled{6hjk\sqrt{2hj}} & \end{aligned}$$

$$\begin{aligned} \textcircled{11} (4x^3 - 4 + 7x) + (6 - 3x + 3x^3) & \\ \textcircled{4x^3} - \textcircled{4} + \textcircled{7x} + \textcircled{6} - \textcircled{3x} + \textcircled{3x^3} & \\ \textcircled{7x^3 + 4x + 2} & \end{aligned}$$

$$\begin{aligned} \textcircled{12} (7 - 5n^2 + 3n^3) + (2n^4 + 6n^2 - 7) & \\ \textcircled{7} - \textcircled{5n^2} + \textcircled{3n^3} + \textcircled{2n^4} + \textcircled{6n^2} - \textcircled{7} & \\ \textcircled{2n^4 + 3n^3 + n^2} & \end{aligned}$$



$$\textcircled{13} (4x^3 - 7x + 5) - (3x^3 + 1 + 5x)$$

$$\begin{array}{r} 4x^3 - 7x + 5 \\ - 3x^3 + 1 + 5x \\ \hline x^3 - 12x + 4 \end{array}$$

$$\textcircled{14} (x + 2x^3 + 6x^2) - (2x + 7x^2 - 3x^3)$$

$$\begin{array}{r} x + 2x^3 + 6x^2 \\ - 2x - 7x^2 + 3x^3 \\ \hline 5x^3 - x^2 - x \end{array}$$

$$\textcircled{15} (8v - 4)(6v - 1)$$

	6v	-1
8v	48v <sup>2</sup>	-8v
-4	-24v	4

$$48v^2 - 32v + 4$$

$$\textcircled{16} (3x - 5)(2x^2 - 5x - 2)$$

	2x <sup>2</sup>	-5x	-2
3x	6x <sup>3</sup>	-15x <sup>2</sup>	-6x
-5	-10x <sup>2</sup>	25x	10

$$6x^3 - 25x^2 + 19x + 10$$

2 · 256

$$\textcircled{17} \sqrt{512}$$

$$\begin{array}{l} \sqrt{2 \cdot 256} \\ \sqrt{2} \cdot \sqrt{256} \\ \sqrt{2} \cdot 16 \\ 16\sqrt{2} \end{array}$$

$$\textcircled{18} \sqrt{32}$$

$$\begin{array}{l} \sqrt{2 \cdot 16} \\ \sqrt{2} \cdot \sqrt{16} \\ \sqrt{2} \cdot 4 \\ 4\sqrt{2} \end{array}$$

2 · 16  
4 · 8

2 · 196

$$\textcircled{19} \sqrt{392}$$

$$\begin{array}{l} \sqrt{2 \cdot 196} \\ \sqrt{2} \cdot \sqrt{196} \\ \sqrt{2} \cdot 14 \\ 14\sqrt{2} \end{array}$$

$$\textcircled{20} \sqrt{200}$$

$$\begin{array}{l} \sqrt{2 \cdot 100} \\ \sqrt{2} \cdot \sqrt{100} \\ \sqrt{2} \cdot 10 \\ 10\sqrt{2} \end{array}$$

2 · 9  
3 · 6

$$\textcircled{21} 3\sqrt{2} + 2\sqrt{18}$$

$$\begin{array}{l} 3\sqrt{2} + 2\sqrt{2 \cdot 9} \\ 3\sqrt{2} + 2 \cdot \sqrt{2} \cdot \sqrt{9} \\ 3\sqrt{2} + 2 \cdot \sqrt{2} \cdot 3 \\ 3\sqrt{2} + 6\sqrt{2} \\ 9\sqrt{2} \end{array}$$

$$\textcircled{22} -3\sqrt{45} + 3\sqrt{20}$$

$$\begin{array}{l} -3\sqrt{5 \cdot 9} + 3\sqrt{4 \cdot 5} \\ -3\sqrt{5} \cdot \sqrt{9} + 3 \cdot \sqrt{4} \cdot \sqrt{5} \\ -3\sqrt{5} \cdot 3 + 3 \cdot 2 \cdot \sqrt{5} \\ -9\sqrt{5} + 6\sqrt{5} \\ -3\sqrt{5} \end{array}$$

3 · 5  
5 · 9  
2 · 10  
4 · 5

$$\begin{aligned}
 (23) \quad & 2\sqrt{3}(\sqrt{5} + \sqrt{6}) \\
 & 2\sqrt{15} + 2\sqrt{18} \\
 & 2\sqrt{15} + 2\sqrt{9 \cdot 2} \\
 & 2\sqrt{15} + 2\sqrt{9} \cdot \sqrt{2} \\
 & 2\sqrt{15} + 2 \cdot 3 \cdot \sqrt{2} \\
 & \underline{(2\sqrt{15} + 6\sqrt{2})}
 \end{aligned}$$

$$\begin{aligned}
 (24) \quad & \sqrt{6}(\sqrt{2} + \sqrt{10}) \\
 & \sqrt{12} + \sqrt{60} \\
 & \sqrt{4 \cdot 3} + \sqrt{4 \cdot 15} \\
 & \sqrt{4} \cdot \sqrt{3} + \sqrt{4} \cdot \sqrt{15} \\
 & \underline{(2\sqrt{3} + 2\sqrt{15})}
 \end{aligned}$$

$2 \cdot 60$   
 $3 \cdot 20$   
 $4 \cdot 15$   
 $5 \cdot 12$   
 $6 \cdot 10$

(25)  $\sqrt{2}$  irrational; decimal doesn't terminate or repeat

(26)  $\frac{7}{\sqrt{5}}$  irrational; decimal doesn't terminate or repeat

(27)  $-10$  rational; integer! / can be written as a repeating or terminating decimal  $-10.0$  or  $-10.000\dots$

(28)  $\frac{1}{3}$  rational; can be written as a repeating decimal

(29)  $\frac{5}{4}$  rational; terminating decimal

(30)  $2.13\dots$  can't tell;  $\dots$  is not clear

(31)  $2.5 \times \frac{\sqrt{3}}{2} =$  Irrational b/c  $R \times I = I$

(32)  $\frac{7}{5} + \frac{2}{3} =$  Rational b/c  $R + R = R$

(33)  $\pi + 7.654 =$  Irrational b/c  $I + R = I$

(34)  $5 \times \frac{1}{6} =$  Rational b/c  $R \times R = R$