

# Review - CHAPTER 4

Name: KEY  
Date: KEY

1. Simplify. Exponents must be POSITIVE

a)  $(a^2 b^3)(a^3 b^4) = a^5 b^7$

b)  $a^{-4} b^3 = b^3/a^4$

c)  $\frac{a^3}{a^{-3}} = a^6$   $\leftarrow \begin{matrix} a^{3-(-3)} \\ a^{3+3} \end{matrix}$  /3

2. Change each into a rational exponent & simplify

a)  $\sqrt[3]{8x^6y^7} = 2x^2y^{7/3}$

b)  $\sqrt[3]{8x^6y^7} \cdot \sqrt{x^2y^5} = 2x^2y^{7/3} \cdot x^{1/2}y^{5/2}$   
 $(8x^6y^7)^{1/3} (x^2y^5)^{1/2} = 2x^{5/6}y^{29/6}$  /3

c)  $\sqrt{\frac{32x^5y^7}{8x^1y^3}} = \sqrt{4x^4y^4} \rightarrow (4x^4y^4)^{1/2} = 2x^2y^2$  /6

3. Reduce to lowest mixed radical

a)  $\sqrt{20} = \sqrt{4 \cdot 5} = 2\sqrt{5}$  /1

b)  $\sqrt{80} = \sqrt{16 \cdot 5} = 4\sqrt{5}$  /1

c)  $\sqrt{24xy^6} = 2xy^2\sqrt{6xy}$  /3

4. Write as an entire radical

a)  $3\sqrt{3} = \sqrt{9 \cdot 3} = \sqrt{27}$  /1

b)  $2\sqrt[3]{3} = \sqrt[3]{8 \cdot 3} = \sqrt[3]{24}$  /2

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$$2 = -4$$

$$(-2)^2 = 4$$

5. Evaluate:  $-2^3 - 1^3 + (-1)^2$

$$= -8 - 1 + 1 = -8$$

$-1^2 = -1$   
 $(-1)^2 = 1$

6. If a population grows according to the formula  $P = 400(1.3)^n$ , where  $P$  is the population after "n" years.

a) Find the population after 10 years

$$P = 400(1.3)^{10}$$

$$P = 5514.339674 \quad \text{①} \quad \text{5514}$$

b) ... 10 years ago

$$P = 400(1.3)^{-10}$$

$$= 29.01526011 \rightarrow 29 \text{ people} \quad \text{①}$$

7. Which radical is the smallest value (circle)

$\sqrt{20}$      $\sqrt[3]{32}$      $\sqrt[4]{81}$      $\sqrt[5]{125}$      $\sqrt[6]{64}$

= 2                      3                      = 2                      5    //

8. Reduce into lowest terms

a)  $\sqrt[5]{64}$

$$= \sqrt[5]{32 \cdot 2}$$

$$= 2 \sqrt[5]{2} \quad \text{①}$$

b)  $\sqrt{27}$

$$= \sqrt{9 \cdot 3}$$

$$= 3\sqrt{3} \quad \text{①}$$

c)  $\sqrt[3]{27}$

$$= 3 \quad \text{①}$$

d)  $\sqrt{20x^3y^4z^7}$

$$= \sqrt{4 \cdot 5 \cdot x^2 \cdot x \cdot y^4 \cdot z^6 \cdot z}$$

$$= 2xy^2z^3 \sqrt{5xz}$$

$$\sqrt{4x^2y^4z^6} \quad \sqrt{5xz}$$

9. The radius of a sphere can be found using the formula  $\sqrt{A} = r$ . If  $A$  is the area and is  $300 \text{ cm}^2$ , find "r". (2 d.p)

$$\sqrt{300} = r$$

$$17.32 \text{ cm} = r$$

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# PART B:

1. Change to rational exponent & simplify.

a)

$$\sqrt{x^3 y^4} \cdot \sqrt[4]{x^5 y^3}$$

$$= (x^3 y^4)^{1/2} \cdot (x^5 y^3)^{1/4}$$

$$\textcircled{1} \rightarrow = x^{3/2} y^2 \cdot x^{5/4} y^{3/4}$$

$$= x^{6/4 + 5/4} y^{8/4 + 3/4}$$

$$\textcircled{1} \rightarrow = \boxed{x^{11/4} y^{11/4}}$$

b)

$$\sqrt[3]{27x^3 y^7} \cdot \sqrt[4]{81ax^2}$$

$$= (27x^3 y^7)^{1/3} \cdot (81ax^2)^{1/4}$$

$$\textcircled{1} \rightarrow = (3x y^{7/3}) (3a^{1/4} x^{1/2})$$

$$\textcircled{1} \rightarrow = \boxed{9x^{3/2} a^{1/4} y^{7/3}}$$

2)

$$P = 50\,000 (3)^{42} \textcircled{1}$$

$$P = 50\,000 (3^4)$$

$$P = 50\,000 (81)$$

$$P = 4\,050\,000 \text{ bacteria} \textcircled{1}$$

$$\frac{81}{5} \times 50,000 = 4,050,000$$

BONUS!

3. a)  $\sqrt{20} + \sqrt{125}$

$$= \sqrt{4} \sqrt{5} + \sqrt{25} \sqrt{5}$$

$$= 2\sqrt{5} + 5\sqrt{5}$$

$$= 7\sqrt{5} \boxed{+1}$$

$2x + 5x = 7x$

3. b)  $3\sqrt{8} - 4\sqrt{18}$

$$= 3\sqrt{4} \sqrt{2} - 4\sqrt{9} \sqrt{2}$$

$$= 6\sqrt{2} - 12\sqrt{2}$$

$$= -6\sqrt{2} \boxed{+1}$$

~~6~~

4.

$$1000$$

$$\swarrow \quad \searrow$$

$$2 \times 500$$

$$\swarrow \quad \searrow \quad \swarrow \quad \searrow$$

$$2 \times 2 \times 250$$

$$\swarrow \quad \searrow \quad \swarrow \quad \searrow \quad \swarrow \quad \searrow$$

$$2 \times 2 \times 2 \times 125$$

$$\swarrow \quad \searrow \quad \swarrow \quad \searrow \quad \swarrow \quad \searrow \quad \swarrow \quad \searrow$$

$$2 \times 2 \times 2 \times 5 \times 25$$

$$\swarrow \quad \searrow \quad \swarrow \quad \searrow \quad \swarrow \quad \searrow \quad \swarrow \quad \searrow$$

$$2 \times 2 \times 2 \times 5 \times 5 \times 5$$

$$\therefore (2 \times 5)^3 \rightarrow 10^3 = 1000/2$$

## PART C:

1. Factor the following.

$$\begin{aligned} \text{a) } x^2 + 12x - 13 \\ = (x+13)(x-1) \end{aligned}$$

$$\begin{aligned} \text{b) } 8x^2 - 14x + 3 & \quad \begin{array}{l} 24 * \\ -14 + \\ \hline -12, -2 \end{array} \\ = 8x^2 - 12x - 2x + 3 \\ = 4x(2x-3) - 1(2x-3) \\ = (4x-1)(2x-3) \end{aligned}$$

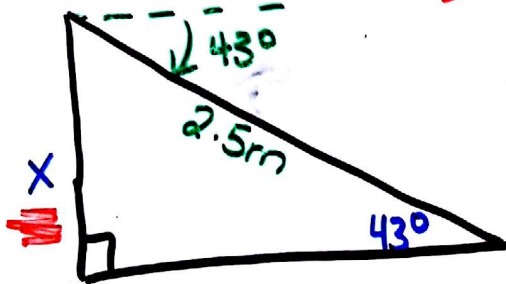
$$\begin{aligned} \text{c) } 2a^2 - 200 \\ = 2(a^2 - 100) \\ = 2(a-10)(a+10) \end{aligned}$$

2. Simplify

$$\begin{aligned} \text{a) } 2a - 4(2a+1) \\ = 2a - 8a - 4 \\ = -6a - 4 \\ 2a - (8a + 4) \end{aligned}$$

$$\begin{aligned} \text{b) } (2a-4)(2a+1) \\ = 4a^2 + 2a - 8a - 4 \\ = 4a^2 - 6a - 4 \end{aligned}$$

3.



$$\begin{aligned} \sin 43^\circ &= \frac{x}{2.5} \\ x &= (\sin 43^\circ)(2.5) \\ x &= 1.705 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{(5) } \left( \frac{81x^4y^8}{9x^3y^{20}} \right)^{-2} &\Rightarrow \left( 9x^1y^{-12} \right)^{-2} \\ &= 9^{-2}x^{-2}y^{24} \\ &= \frac{y^{24}}{81x^2} \end{aligned}$$

$$\text{(3) } A = (x-3)(3x+4) \rightarrow A = 3x^2 - 5x - 12$$