

Math 20-2
Radical Quiz 2 September 2019

Name: Key

31

1. Express as a radical in simplest form.

a) $\sqrt{72} = \sqrt{36 \times 2}$
 $= 6\sqrt{2}$

$$\begin{aligned}\sqrt{9 \times 8} &= 3\sqrt{8} \\ &= 3\sqrt{4 \times 2} \\ &= 3(2)\sqrt{2} \\ &= 6\sqrt{2}\end{aligned}$$

$$\begin{aligned}\sqrt{4 \times 18} &= 2\sqrt{18} \\ &= 2\sqrt{9 \times 2} \\ &= 2(3)\sqrt{2} \\ &= 6\sqrt{2}\end{aligned}$$

b) $\sqrt[3]{72} = \sqrt[3]{8 \times 9}$
 $= 2\sqrt[3]{9}$

2. Express as a whole radical.

a) $2\sqrt{5}$
 $= \sqrt{4 \times 5}$
 $= \sqrt{20}$

b) $5\sqrt[3]{2}$
 $= \sqrt[3]{125 \times 2}$
 $= \sqrt[3]{250}$

3. Write the expression in simplest form.

a) $4\sqrt{5} + 7\sqrt{10} - 7\sqrt{5}$
 $= 7\sqrt{10} - 3\sqrt{5}$

b) $4\sqrt{18} + \sqrt{27} + 4\sqrt{3}$
 $= 4\sqrt{9 \times 2} + \sqrt{9 \times 3} + 4\sqrt{3}$
 $= 4(3)\sqrt{2} + 3\sqrt{3} + 4\sqrt{3}$
 $= 12\sqrt{2} + 7\sqrt{3}$

3. Write the expression in simplest form.

$$\begin{aligned} \text{c) } \sqrt[3]{24} - 5\sqrt{24} - 2\sqrt{54} &= \sqrt[3]{8 \times 3} - 5\sqrt{4 \times 6} - 2\sqrt{9 \times 6} \\ &= 2\sqrt[3]{3} - 5(2)\sqrt{6} - 2(3)\sqrt{6} \\ &= 2\sqrt[3]{3} - 10\sqrt{6} - 6\sqrt{6} \\ &= 2\sqrt[3]{3} - 16\sqrt{6} \end{aligned}$$

4. Express each product in simplest form.

$$\begin{aligned} \text{a) } 2\sqrt{10}(3\sqrt{2} + \sqrt{5}) \\ &= 6\sqrt{20} + 2\sqrt{50} \\ &= 6\sqrt{4 \times 5} + 2\sqrt{25 \times 2} \\ &= 6(2)\sqrt{5} + 2(5)\sqrt{2} \\ &= 12\sqrt{5} + 10\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{b) } (7\sqrt{3} - \sqrt{6})(\sqrt{3} - 2\sqrt{6}) \\ &= 7\sqrt{9} - 14\sqrt{18} - \sqrt{18} + 2\sqrt{36} \\ &= 7(3) - 15\sqrt{18} + 2(6) \\ &= 21 - 15\sqrt{9 \times 2} + 12 \\ &= 33 - 15(3)\sqrt{2} \\ &= 33 - 45\sqrt{2} \end{aligned}$$

5. Simplify each expression - rational denominators in simplest form.

$$\text{a) } \frac{15\sqrt{21}}{3\sqrt{7}} = 5\sqrt{3}$$

$$\text{b) } \frac{3\sqrt{12}}{2\sqrt{5}} \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{60}}{2\sqrt{25}}$$

$$= \frac{3\sqrt{60}}{2(5)}$$

$$= \frac{3\sqrt{4 \times 15}}{10}$$

$$= \frac{3(2)\sqrt{15}}{10}$$

$$= \frac{6\sqrt{15}}{10}$$

$$= \frac{3\sqrt{15}}{5}$$

$$\text{c) } \frac{12\sqrt{10} + 8\sqrt{5}}{4\sqrt{2}}$$

$$= \frac{3\sqrt{10} + 2\sqrt{5}}{\sqrt{2}} \left(\frac{\sqrt{2}}{\sqrt{10}} \right)$$

$$= \frac{3\sqrt{20} + 2\sqrt{10}}{\sqrt{4}}$$

$$= \frac{3\sqrt{4 \times 5} + 2\sqrt{10}}{2}$$

$$= \frac{3(2)\sqrt{5} + 2\sqrt{10}}{2}$$

$$= \frac{6\sqrt{5} + 2\sqrt{10}}{2}$$

$$= 3\sqrt{5} + \sqrt{10}$$

6. Solve.

a) $3\sqrt{x+2} = 18$

$$\sqrt{x+2} = 6$$

$$(\sqrt{x+2})^2 = (6)^2$$

$$x+2 = 36$$

$$x = 34$$

b) $3\sqrt{x-5} + 4 = 16$

$$3\sqrt{x-5} = 12$$

$$\sqrt{x-5} = 4$$

$$(\sqrt{x-5})^2 = (4)^2$$

$$x-5 = 16$$

$$x = 21$$

7. Solve at least one puzzle:



Each row, column and diagonal add up to the values shown. Can you log the rest of the grid of numbers?

1	2	12	5	→	20	
15	13	14	7	→	49	49 - 36
9	11	16	8	→	44	
6	10	3	4	→	23	
↓	↓	↓	↓	↓		
31	36	45	24		34	34 - 18
						24 - 16

2	16	15	12	→	45	
14	1	4	9	→	28	
6	13	5	10	→	34	
7	3	8	11	→	29	29 - 22
↓	↓	↓	↓	↓		
29	33	32	42		19	19 - 17
						29 - 15
						32 - 28

8. Solve at least one puzzle:

Sudoku

Two-by-Three With Six Possible Values

3	1	2	4	5	6
6	5	4	1	3	2
5	2	1	3	6	4
4	6	3	2	1	5
2	3	5	6	4	1
1	4	6	5	2	3

5	6	3	2	4	1
4	1	2	6	3	5
1	3	6	5	2	4
2	4	5	3	1	6
3	5	1	4	6	2
6	2	4	1	5	3