

**N.RN.A.2: Operations with Radicals 1**

1 The product of  $(3 + \sqrt{5})$  and  $(3 - \sqrt{5})$  is

- 1)  $4 - 6\sqrt{5}$
- 2)  $14 - 6\sqrt{5}$
- 3) 14
- 4) 4

2 Simplify:  $(\sqrt{2} + 1)(\sqrt{2} - 1)$

3 Simplify:  $5\sqrt{27} \div 3\sqrt{24}$

4 Simplify:  $\frac{\sqrt{18}}{\sqrt{54}}$

5 Simplify:  $\left(\frac{\sqrt{18} \times \sqrt{12}}{\sqrt{27}}\right)^3$

6 Simplify:  $\frac{3\sqrt{15}}{\sqrt{27}} \times \frac{5\sqrt{82}}{6\sqrt{105}} \div \frac{5\sqrt{6}}{2\sqrt{63}}$

7 Simplify:  $\frac{(\sqrt{5} - 2)(3 + \sqrt{5})}{5 - \sqrt{5}}$

8 Which expression represents the sum of

$$\frac{1}{\sqrt{3}} + \frac{1}{\sqrt{2}}?$$

1)  $\frac{2\sqrt{3} + 3\sqrt{2}}{6}$

2)  $\frac{2}{\sqrt{5}}$

3)  $\frac{\sqrt{3} + \sqrt{2}}{3}$

4)  $\frac{\sqrt{3} + \sqrt{2}}{2}$

9 Simplify:  $3\sqrt{\frac{2}{5}} - 2\sqrt{\frac{1}{10}}$

10 Simplify:  $\sqrt{\frac{4}{5}} + \frac{1}{2}\sqrt{20} - \frac{1}{5}\sqrt{45}$

11 Simplify:  $2\sqrt{12} - 3\sqrt{\frac{1}{27}} - \sqrt{300} + 3\sqrt{27}$

12 Classical mathematics uses the term "Golden Ratio" for the ratio  $(1 + \sqrt{5}) : 2$ . The Golden Ratio was used by many famous artists to determine the dimensions of their paintings. If the ratio of the length to the width of a painting is  $(1 + \sqrt{5}) : 2$ , find the length, in feet, of a painting that has a width of 14 feet. Express your answer in simplest radical form.

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### Answer Section

1 ANS: 4

$$(3 + \sqrt{5})(3 - \sqrt{5}) = 9 - \sqrt{25} = 4$$

REF: 081001a2

2 ANS:

1

REF: 089710a1

3 ANS:

$$\frac{5\sqrt{2}}{4}$$

REF: 039114a1

4 ANS:

$$\frac{\sqrt{3}}{3}$$

REF: 039505a1

5 ANS:

$$16\sqrt{2}$$

REF: 039309a1

6 ANS:

$$\frac{\sqrt{41}}{3}$$

REF: 060505a1

7 ANS:

$$\frac{\sqrt{5}}{5}$$

REF: 010610a1

8 ANS: 1

$$\frac{1}{\sqrt{3}} + \frac{1}{\sqrt{2}} = \frac{\sqrt{2} + \sqrt{3}}{\sqrt{6}} = \frac{\sqrt{2} + \sqrt{3}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{12} + \sqrt{18}}{6} = \frac{\sqrt{4}\sqrt{3} + \sqrt{9}\sqrt{2}}{6} = \frac{2\sqrt{3} + 3\sqrt{2}}{6}$$

REF: 080210b

9 ANS:

$$\frac{2\sqrt{10}}{5}$$

REF: 089710a1

10 ANS:

$$\frac{4\sqrt{5}}{5}$$

REF: 090404al

11 ANS:

$$\frac{8\sqrt{3}}{3}$$

REF: 010511al

12 ANS:

$$\frac{1+\sqrt{5}}{2} = \frac{x}{14}$$

$$7+7\sqrt{5}. \quad x = \frac{14(1+\sqrt{5})}{2}$$

$$x = 7(1+\sqrt{5})$$

$$x = 7+7\sqrt{5}$$

REF: 080724b