

Examples 3 in Irrationals in Arithmetic 3

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Examples 3 in Irrationals

0. $\sqrt{3} \times \sqrt{7}$

1. $\sqrt[3]{3} \times \sqrt[3]{4}$

2. $\sqrt{4}\sqrt{8}$

3. $\sqrt{18}\sqrt{8}$

4. $\sqrt{45}\sqrt{20}$

5. $\sqrt{24}\sqrt{14}$

6. $\sqrt{21}\sqrt{45}$

7. $\sqrt{150}\sqrt{28}$

8. $\sqrt{72}\sqrt{36}$

9. $\sqrt{27}\sqrt{24}$

A. $\sqrt{54}\sqrt{162}$

B. $\sqrt{625}\sqrt{125}$

C. $\sqrt{48}\sqrt{216}$

D. $\sqrt{363}\sqrt{338}$

E. $\sqrt{150}\sqrt{432}$

F. $\sqrt[3]{54}\sqrt[3]{192}$

G. $\sqrt[3]{250}\sqrt[3]{432}$

H. $\sqrt[3]{108}\sqrt[3]{32}$

I. $\sqrt[3]{72}\sqrt[3]{243}$

J. $\sqrt[3]{-54}\sqrt[3]{-128}$

K. $\sqrt[3]{-0.008} \cdot \sqrt[3]{125}$

L. $\sqrt[3]{1.6} \cdot \sqrt[3]{16}$

M. $\sqrt[3]{270}\sqrt[3]{-80}$

N. $\sqrt[3]{0.016} \cdot \sqrt[3]{16}$

**Suggestions or Solutions
To the Examples 3 in Irrationals**

$$0. \sqrt{3} \times \sqrt{7} = \sqrt{3} \cdot \sqrt{7} = \sqrt{3}\sqrt{7} = \sqrt{3 \times 7} = \sqrt{3 \cdot 7} = \sqrt{21}$$

$$1. \sqrt[3]{3} \times \sqrt[3]{4} = \sqrt[3]{3} \cdot \sqrt[3]{4} = \sqrt[3]{3}\sqrt[3]{4} = \sqrt[3]{3 \times 4} = \sqrt[3]{3 \cdot 4} = \sqrt[3]{12}$$

$$2. \sqrt{4}\sqrt{8} = 2 \cdot 2\sqrt{2} = 4\sqrt{2}, \text{ or } \sqrt{4}\sqrt{8} = \sqrt{32} = \sqrt{16 \cdot 2} = 4\sqrt{2}$$

$$3. \sqrt{18}\sqrt{8} = 3\sqrt{2} \cdot 2\sqrt{2} = 6 \cdot 2 = 12, \text{ or } \sqrt{18}\sqrt{8} = \sqrt{144} = \sqrt{12^2} = 12$$

$$4. \sqrt{45}\sqrt{20} = 3\sqrt{5} \cdot 2\sqrt{5} = 6 \cdot 5 = 30, \text{ or } \sqrt{45}\sqrt{20} = \sqrt{900} = \sqrt{30^2} = 30$$

$$5. \sqrt{24}\sqrt{14} = 2\sqrt{6} \cdot \sqrt{14} = 2\sqrt{6 \cdot 14} = 2\sqrt{2 \cdot 3 \cdot 2 \cdot 7} = 2\sqrt{4 \cdot 3 \cdot 7} = 4\sqrt{3 \cdot 7} = 4\sqrt{21}$$

$$6. \sqrt{21}\sqrt{45} = \sqrt{3 \cdot 7} \cdot \sqrt{5 \cdot 9} = 3\sqrt{3 \cdot 5 \cdot 7} = 3\sqrt{105}$$

$$7. \sqrt{150}\sqrt{28} = \sqrt{25 \cdot 6} \sqrt{7 \cdot 4} = 5\sqrt{6} \cdot 2\sqrt{7} = 10\sqrt{6 \cdot 7} = 10\sqrt{42}$$

$$8. \sqrt{72}\sqrt{36} = \sqrt{36 \cdot 2} \sqrt{36} = 36\sqrt{2}$$

$$9. \sqrt{27}\sqrt{24} = \sqrt{9 \cdot 3} \sqrt{4 \cdot 6} = 3\sqrt{3} \cdot 2\sqrt{3 \cdot 2} = 3 \cdot 2 \cdot \sqrt{3}\sqrt{3 \cdot 2} = 6 \cdot 3\sqrt{2} = 18\sqrt{2}$$

$$A. \sqrt{54}\sqrt{162} = \sqrt{9 \cdot 6} \sqrt{81 \cdot 2} = 3\sqrt{6} \cdot 9\sqrt{2} = 18\sqrt{12} = 18\sqrt{4 \cdot 3} = 36\sqrt{3},$$

$$B. \sqrt{625}\sqrt{125} = \sqrt{25^2}\sqrt{25 \cdot 5} = 25 \cdot 5\sqrt{5} = 125\sqrt{5}$$

In fact, $625 = 125 \cdot 5$, so $\sqrt{625}\sqrt{125} = \sqrt{125 \cdot 5}\sqrt{125} = 125\sqrt{5}$

$$C. \sqrt{48}\sqrt{216} = \sqrt{16 \cdot 3}\sqrt{36 \cdot 6} = 4\sqrt{3} \cdot 6\sqrt{6} = 24 \cdot 3\sqrt{2} = 72\sqrt{2}$$

$$D. \sqrt{363}\sqrt{338} = \sqrt{121 \cdot 3}\sqrt{169 \cdot 2} = \sqrt{11^2}\sqrt{3}\sqrt{13^2}\sqrt{2} = 11 \cdot 13\sqrt{6} = 143\sqrt{6}$$

$$E. \sqrt{150}\sqrt{432} = \sqrt{50 \cdot 3}\sqrt{144 \cdot 3} = \sqrt{25 \cdot 6}\sqrt{12^2}\sqrt{3} = 5\sqrt{6} \cdot 12\sqrt{3} = 60 \cdot 3\sqrt{2} = 180\sqrt{2}$$

$$F. \sqrt[3]{54}\sqrt[3]{192} = \sqrt[3]{27 \cdot 2}\sqrt[3]{64 \cdot 3} = 3\sqrt[3]{2} \cdot 4\sqrt[3]{3} = 12\sqrt[3]{2 \cdot 3} = 12\sqrt[3]{6}$$

$$G. \sqrt[3]{250}\sqrt[3]{432} = \sqrt[3]{125 \cdot 2}\sqrt[3]{216 \cdot 2} = \sqrt[3]{5^3 2}\sqrt[3]{6^3 2} = 5\sqrt[3]{2} \cdot 6\sqrt[3]{2} = 30\sqrt[3]{4}$$

$$H. \sqrt[3]{108}\sqrt[3]{32} = \sqrt[3]{27 \cdot 4}\sqrt[3]{8 \cdot 4} = 3\sqrt[3]{4} \cdot 2\sqrt[3]{4} = 8\sqrt[3]{16} = 8\sqrt[3]{8 \cdot 2} = 16\sqrt[3]{2}$$

$$I. \sqrt[3]{72}\sqrt[3]{243} = \sqrt[3]{9 \cdot 8}\sqrt[3]{27 \cdot 9} = 2\sqrt[3]{9} \cdot 3\sqrt[3]{9} = 6\sqrt[3]{81} = 6\sqrt[3]{27 \cdot 3} = 18\sqrt[3]{3}$$

$$J. \sqrt[3]{-54}\sqrt[3]{-128} = \sqrt[3]{-27 \cdot 2}\sqrt[3]{-64 \cdot 2} = -3\sqrt[3]{2}(-4\sqrt[3]{2}) = 12\sqrt[3]{4}$$

$$K. \sqrt[3]{-0.008} \cdot \sqrt[3]{125} = \sqrt[3]{(-0.2)^3} \sqrt[3]{5^3} = -0.2 \cdot 5 = -1$$

$$L. \sqrt[3]{1.6} \cdot \sqrt[3]{16} = \sqrt[3]{8 \cdot 0.2} \cdot \sqrt[3]{8 \cdot 2} = 2\sqrt[3]{0.2} \cdot 2\sqrt[3]{2} = 4\sqrt[3]{0.4}$$

$$M. \sqrt[3]{270}\sqrt[3]{-80} = \sqrt[3]{27 \cdot 10} \cdot \sqrt[3]{-8 \cdot 10} = 3\sqrt[3]{10}(-2\sqrt[3]{10}) = -6\sqrt[3]{100}$$

$$N. \sqrt[3]{0.016} \cdot \sqrt[3]{16} = \sqrt[3]{0.001 \cdot 16} \cdot \sqrt[3]{16} = 0.1\sqrt[3]{16} \cdot \sqrt[3]{16} = 0.1\sqrt[3]{16 \cdot 16}$$

$$= 0.1\sqrt[3]{64 \cdot 4} = 0.1\sqrt[3]{64}\sqrt[3]{4} = 0.1 \cdot 4\sqrt[3]{4} = 0.4\sqrt[3]{4}$$