SM2 2.2: Operations with Radicals

Simplify each expression.

1) $-2\sqrt{5} \cdot \sqrt{10}$ $-10\sqrt{2}$
2) $\sqrt{6} \cdot \sqrt{2}$ $2\sqrt{3}$

3) $\sqrt{6r^3} \cdot \sqrt{12r^3}$ $6r^3\sqrt{2}$
4) $-\sqrt{8n^2} \cdot \sqrt{8n^2}$ $-8n^2$

5) $\sqrt{6}(5 + \sqrt{3})$ $5\sqrt{6} + 3\sqrt{2}$
6) $\sqrt{10}(4 + \sqrt{5})$ $4\sqrt{10} + 5\sqrt{2}$

7) $-4\sqrt{6} + 2\sqrt{6}$ $-2\sqrt{6}$
8) $-\sqrt{3} + 3\sqrt{6} + 2\sqrt{3}$ $\sqrt{3} + 3\sqrt{6}$

9) $-2\sqrt{5} - 2\sqrt{45}$ $-8\sqrt{5}$
10) $-\sqrt{20} + 2\sqrt{45}$ $4\sqrt{5}$

Rationalize the denominator.

11) $\dfrac{\sqrt{3}}{\sqrt{12}}$ $\dfrac{1}{2}$
12) $\dfrac{3}{\sqrt{5}}$ $\dfrac{3\sqrt{5}}{5}$

13) $\dfrac{\sqrt{4}}{3\sqrt{16}}$ $\dfrac{1}{6}$
14) $\dfrac{3\sqrt{3}}{\sqrt{2}}$ $\dfrac{3\sqrt{6}}{2}$

15) $\dfrac{2\sqrt{5}}{\sqrt{3}}$ $\dfrac{2\sqrt{15}}{3}$
16) $\dfrac{\sqrt{4}}{\sqrt{5}}$ $\dfrac{2\sqrt{5}}{5}$

17) $\dfrac{2\sqrt{6}}{3\sqrt{25}}$ $\dfrac{2\sqrt{6}}{15}$
18) $\dfrac{2}{\sqrt{2}}$ $\sqrt{2}$

19) $\dfrac{5\sqrt{2}}{\sqrt{5}}$ $\sqrt{10}$
20) $-\dfrac{1}{2\sqrt{3}}$ $-\dfrac{\sqrt{3}}{6}$

21) $\dfrac{\sqrt{2} + 5}{\sqrt{2}}$ $\dfrac{2 + 5\sqrt{2}}{2}$
22) $\dfrac{-3 + 2\sqrt{5}}{5\sqrt{2}}$ $\dfrac{-3\sqrt{2} + 2\sqrt{10}}{10}$

Determine which are rational ($\mathbb{Q}$) and which are irrational (I). Justify your response.

23) $-\sqrt{3} + 3\sqrt{25}$ I
24) $4 + \sqrt{6}$ I

25) $-2\sqrt{27} + 2\sqrt{27}$ $\mathbb{Q}$
26) $4\sqrt{10} \cdot \sqrt{20}$ I

27) $-\sqrt{8} \cdot \sqrt{2}$ $\mathbb{Q}$
28) $\sqrt{3} \cdot \sqrt{5}$ I