4.2 Multiply and Divide Radicals

PRACTICE

Directions: Multiply.

1) $\sqrt{2}(3-2\sqrt{10})$

$3\sqrt{2}-2\sqrt{20}$

$3\sqrt{2}-2\sqrt{4}\sqrt{5}$

$3\sqrt{2}-2\cdot2\sqrt{5}$

$3\sqrt{2}-4\sqrt{5}$

2) $-4\sqrt{7}(4\sqrt{14}+3\sqrt{7})$

$-16\sqrt{98}-12\sqrt{49}$

$-16\sqrt{49}\sqrt{2}-12\cdot7$

$-16\cdot7\sqrt{2}-84$

$-112\sqrt{2}-84$

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

$2\sqrt{100}+8\sqrt{20}-3\sqrt{20}-12\sqrt{4}$

$=2\cdot10+8\sqrt{4}\sqrt{5}-3\sqrt{4}\sqrt{5}-12\cdot2$

$=20+8\cdot2\sqrt{5}-3\cdot2\sqrt{5}-24$

$=-4+16\sqrt{5}-6\sqrt{5}$

$=-4+10\sqrt{5}$

4) $(5\sqrt{6}-8\sqrt{12})(2\sqrt{15}-\sqrt{2})$

$10\sqrt{90}-5\sqrt{12}-16\sqrt{180}+8\sqrt{24}$

$10\sqrt{9}\sqrt{10}-5\sqrt{4}\sqrt{3}-16\sqrt{36}\sqrt{5}+8\sqrt{4}\sqrt{6}$

$10\cdot3\sqrt{10}-5\cdot2\sqrt{3}-16\cdot6\sqrt{5}+8\cdot2\sqrt{6}$

$30\sqrt{10}-10\sqrt{3}-96\sqrt{5}+16\sqrt{6}$

Directions: Choose the best answer. SHOW WORK.

5) Multiply: $\sqrt[3]{4}(2\sqrt[3]{6}+5\sqrt[3]{32})$

a. $\sqrt[3]{3}+20\sqrt[3]{2}$
b. $2\sqrt[3]{24}+5\sqrt[3]{128}$
c. $4\sqrt{3}+20\sqrt{2}$
d. $4\sqrt[3]{3}+20\sqrt[3]{2}$

$2\sqrt[3]{24}+5\sqrt[3]{128}$

$2\sqrt[3]{8}\sqrt[3]{3}+5\sqrt[3]{64}\sqrt[3]{2}$

$2\cdot2\sqrt[3]{3}+5\cdot4\sqrt[3]{2}$

$4\sqrt[3]{3}+20\sqrt[3]{2}$

6) Divide: $\frac{(\sqrt{21}-\sqrt{3})\sqrt{3}}{\sqrt{3}\sqrt{3}}$

a. $\sqrt{21}$
b. $\sqrt{7}-1$
c. $\frac{\sqrt{63}-3}{3}$
d. $\frac{3\sqrt{7}-3}{3}$

$=\frac{\sqrt{63}-\sqrt{9}}{\sqrt{9}}$

$=\frac{\sqrt{9}\sqrt{7}-3}{3}$

$=\frac{3\sqrt{7}-3}{3}=\frac{3(\sqrt{7}-1)}{3}$

Directions: Divide

7) $\frac{5}{\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}}$

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

8) $\frac{\sqrt{6}}{2\sqrt{8}}\cdot\frac{\sqrt{8}}{\sqrt{8}}=\frac{\sqrt{48}}{2\cdot8}=\frac{\sqrt{16}\sqrt{3}}{16}$

$=\frac{4\sqrt{3}}{16}$

$=\frac{\sqrt{3}}{4}$

9) $\frac{(6+\sqrt{35})\sqrt{5}}{\sqrt{5}\sqrt{5}}$ $\frac{6\sqrt{5}+\sqrt{175}}{5}$

$=\frac{6\sqrt{5}+\sqrt{25}\sqrt{7}}{5}$

$=\frac{6\sqrt{5}+5\sqrt{7}}{5}$

10) $\frac{10}{2-\sqrt{7}}$ $(2+\sqrt{7})$

$(2+\sqrt{7})$

$= \frac{20+10\sqrt{7}}{4-7}$

$= \frac{20+10\sqrt{7}}{-3}$

11) $\frac{2-\sqrt{2}}{\sqrt{6}+\sqrt{2}}$ $(\sqrt{6}-\sqrt{2})$

$(\sqrt{6}-\sqrt{2})$

$= \frac{2\sqrt{6}-2\sqrt{2}-\sqrt{12}+\sqrt{4}}{6-2}$

$= \frac{2\sqrt{6}-2\sqrt{2}-\sqrt{4}\sqrt{3}+2}{4}$

$= \frac{2\sqrt{6}-2\sqrt{2}-2\sqrt{3}+2}{4}$

$= \frac{\sqrt{6}-\sqrt{2}-\sqrt{3}+1}{2}$

12) $\frac{2\sqrt{3}-\sqrt{5}}{\sqrt{5}+\sqrt{6}}$ $(\sqrt{5}-\sqrt{6})$

$(\sqrt{5}-\sqrt{6})$

$= \frac{2\sqrt{15}-2\sqrt{18}-\sqrt{25}+\sqrt{30}}{5-6}$

$= \frac{2\sqrt{15}-2\sqrt{9}\sqrt{2}-5+\sqrt{30}}{-1}$

$= -2\sqrt{15}+2\cdot 3\sqrt{2}+5-\sqrt{30}$

$= -2\sqrt{15}+6\sqrt{2}+5-\sqrt{30}$

Directions: Factor.

13) $4h^2-13h-12$ $X-48$ $+13$

$(4h^2-16h)(+3h-12)$

$4h(h-4)+3(h-4)$

$(h-4)(4h+3)$

14) $28y^3+24y^2-35y-30$

$4y^2(7y+6)-5(7y+6)$

$(7y+6)(4y^2-5)$

15) $2x^4-19x^2+9$ $X18$ -19

$(2x^4-18x^2)(-1x^2+9)$

$2x^2(x^2-9)-1(x^2-9)$

$(x^2-9)(2x^2-1)$

$(x-3)(x+3)(2x^2-1)$