Algebra II
Unit 6 Review
"Don't waste this paper. ***Do the review!!***" ELKS

Name Answer Key

1. Simplify each radical.

a) $\sqrt{80}$

16 5

4 4

$4\sqrt{5}$

b) $\sqrt[3]{2^5 \cdot 3^3 a^4 b}$

$2 \cdot 3 \cdot a \sqrt[3]{2^2 \cdot a \cdot b}$

$6a\sqrt[3]{4ab}$

c) $\sqrt{3} \cdot \sqrt{15}$

$\sqrt{45}$

9 5

3 3

$3\sqrt{5}$

d) $(5\sqrt{2})^2$

$25 \cdot 2$

50

e) $\frac{24}{\sqrt{3}} \cdot \left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{24\sqrt{3}}{3} = 8\sqrt{3}$

2. Simplify

a) $\sqrt{75} + 3\sqrt{12}$

25 3 4 3

5 5 2 2

$5\sqrt{3} + 3 \cdot 2\sqrt{3}$

$5\sqrt{3} + 6\sqrt{3}$

$11\sqrt{3}$

b) $\sqrt{3}(\sqrt{27} + \sqrt{5})$

$\sqrt{81} + \sqrt{15}$

$9 + \sqrt{15}$

3. Simplify

a) $(5 + 3\sqrt{3})(2 - \sqrt{3})$

$10 - 5\sqrt{3} + 6\sqrt{3} - 3 \cdot 3$

$10 + \sqrt{3} - 9$

$\boxed{1 + \sqrt{3}}$

b) $\frac{5}{3+\sqrt{5}} \cdot \left(\frac{3-\sqrt{5}}{3-\sqrt{5}}\right) = \frac{15 - 5\sqrt{5}}{9-5}$

$= \boxed{\frac{15 - 5\sqrt{5}}{4}}$

4. Solve each equation.

a) $x + 5 = \sqrt{x+5} + 6$

$-6 \quad -6$

$(x-1)^2 = \left(\sqrt{x+5}\right)^2$

$x^2 - x - x + 1 = x + 5$

$x^2 - 2x + 1 = x + 5$

$-x - 5 \quad -x - 5$

$x^2 - 3x - 4 = 0$

$(x-4)(x+1) = 0$

$x - 4 = 0 \quad x + 1 = 0$

$+4 \quad +4 \quad -1 \quad -1$

$\boxed{x = 4} \quad \cancel{-1}$

$x = -1$

$-1 + 5 = \sqrt{-1+5} + 6$

$4 = \sqrt{4} + 6$

$4 \neq 2 + 6$

$x = 4$

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

$9 = \sqrt{9} + 6$

$9 = 3 + 6$ ✓

b) $\sqrt[3]{x-2} + 4 = 6$

$-4 \quad -4$

$\left(\sqrt[3]{x-2}\right)^3 = 2^3$

$x - 2 = 8$

$+2 \quad +2$

$\boxed{x = 10}$

$\sqrt[3]{10-2} + 4 = 6$

$\sqrt[3]{8} + 4 = 6$

$2 + 4 = 6$ ✓

5. Identify each number as rational or irrational.

a) 0.75 b) $\sqrt{25}$ c) $0.\overline{16}$ d) $\sqrt{2}$ e) 3π

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6. Rewrite the following decimals as simplified fractions. **Show the process**.

a) $0.\overline{18} = N$ 100

$18.\overline{18} = 100N$

$-\ .\overline{18} = N$

$18 = 99N$

$\frac{18}{99} = \frac{99N}{99}$

$\frac{2}{11} = N$

b) 0.32

$\frac{32 \div 4}{100 \div 4} = \frac{8}{25}$

7. Simplify each expression.

a) $3\sqrt{-48}$

$3i\sqrt{48}$

$\sqrt{16}\ 3$

$(4)4$

$3i(4)\sqrt{3}$

$12i\sqrt{3}$

b) $(3i)^2$

$9i^2$

-9

c) $\frac{35}{5\sqrt{-7}} = \frac{7}{i\sqrt{7}}\left(\frac{i\sqrt{7}}{i\sqrt{7}}\right)$

$\frac{7i\sqrt{7}}{7i^2} = \frac{7i\sqrt{7}}{-7}$

$-i\sqrt{7}$

8. Simplify each complex expression. **Pay attention to what operation you are being asked to do!**

a) $(10 + 8i) + (6 - 5i)$

$16 + 3i$

b) $(8 - 3i) - (5 - 3i)$

$8 - 3i - 5 + 3i$

$\boxed{3}$

c) $(3 + 4i)(2 - 7i)$

$6 - 21i + 8i - 28i^2$

$6 - 13i + 28 \rightarrow \boxed{34 - 13i}$

d) $\frac{9}{(2+3i)} \cdot \left(\frac{2-3i}{2-3i}\right) = \frac{18 - 27i}{4 - 9i^2} = \frac{18 - 27i}{4 + 9} = \frac{18 - 27i}{13}$

$\boxed{\frac{18}{13} - \frac{27i}{13}}$