

## Unit 6 Review

Name: Key

NO Calculators!

1. Evaluate:  $8^{\frac{-4}{3}}$

$$\sqrt[3]{8^4} = \frac{1}{2^4} = \frac{1}{16}$$

2. Evaluate:  $-\left(\frac{1}{64}\right)^{\frac{-2}{3}}$

$$-\sqrt[3]{64^2} = -4^2 = -16$$

3. Simplify:  $\sqrt[4]{324a^7b^{-18}c^{13}} - c^{12}c$

$$3ab^{-3}c^3 \sqrt[4]{4a^3c}$$

$$= \frac{3ac^3 \sqrt[4]{4a^3c}}{b^3}$$

4. Rationalize the denominator:  $\frac{3-\sqrt{3}}{3+\sqrt{3}}$   $\frac{(3-\sqrt{3})}{(3-\sqrt{3})}$

$$\frac{9 - 6\sqrt{3} + 3}{9-3} = \frac{12 - 6\sqrt{3}}{6} = 2 - \sqrt{3}$$

5. Simplify:  $\frac{m^{\frac{4}{3}}x^{\frac{3}{2}}}{(mx)^{\frac{5}{6}}}$  =  $m^{\frac{1}{2}}x^{\frac{2}{3}}$

$$m^{\frac{4}{3} - \frac{5}{6}} = m^{\frac{8}{6} - \frac{5}{6}} = m^{\frac{3}{6}}$$

$$x^{\frac{3}{2} - \frac{5}{6}} = x^{\frac{9}{6} - \frac{5}{6}} = x^{\frac{4}{6}}$$

6. Simplify:  $7a^8(3a^9)^3$

$$7a^8 27a^{27} = 189a^{35}$$

7. Rewrite the expression with positive exponents and simplify:  $(-3x^2)^{-4}(-2x^{-3})^4$

$$\frac{1}{81x^8} \cdot \frac{16}{x^{12}} = \frac{16}{81x^{20}}$$

8. Rewrite the expression with positive exponents and simplify:  $\left(\frac{u^{-4}}{m^{-6}}\right)\left(\frac{u}{m}\right)^8$

$$\frac{m^6}{u^4} \cdot \frac{u^8}{m^8} = \frac{u^4}{m^2}$$

9. Simplify:  $\sqrt[3]{54x^{14}} - 3\sqrt[3]{16x^{14}}$

$$\begin{array}{c} \sqrt[3]{27} \sqrt[3]{2x^2x^2} \quad \sqrt[3]{8} \sqrt[3]{2} \end{array}$$

$$3x^4 \sqrt[3]{2x^2} - \underbrace{3(2)}_6 x^4 \sqrt[3]{2x^2}$$

$$\boxed{-3x^4 \sqrt[3]{2x^2}}$$

11. Solve:  $(\sqrt{3-2x})^2 = (4x)^2$

$$3-2x = 16x^2$$

$$0 = 16x^2 + 2x - 3$$

$$0 = (8x-3)(2x+1)$$

$$x = 3/8 \quad x = -1/2$$

↑  
extraneous

13. Simplify:  $\frac{-36a^{-2}b^5c^3}{4a^{-3}bc^{-1}}$

$$\boxed{-9ab^4c^4}$$

10. Solve:  $\sqrt{x} + \sqrt{x+8} = 3$

$$(\sqrt{x+8})^2 = (3 - \sqrt{x})^2$$

$$x+8 = 9 - 6\sqrt{x} + x$$

$$-1 = -6\sqrt{x}$$

$$\frac{1}{6} = \sqrt{x}$$

$$\boxed{\frac{1}{36} = x}$$

12. Solve:  $(x+7)^{2/3} = 64$

$$\left[ (x+7)^{3/2} \right]^{2/3} = 64^{2/3}$$

$$x+7 = 16$$

$$x = 9$$

14. Simplify:  $\frac{\sqrt[3]{c^2c^4c^{-1}}}{\sqrt{c^3}}$

$$\frac{c^{2/3} c^{4/3} c^{-1/6}}{c^{3/2}}$$

$$\frac{2}{6} + \frac{8}{6} - \frac{1}{6}$$

$$= \frac{c^{11/6}}{c^{9/6}} = \boxed{c^{1/3}}$$