Unit 3—Rational Exponents and Radicals Test Review

Simplify the following expressions. Your answers should contain only positive exponents.

1. $4a^{-3} \cdot 2a^2 r^4$

2. $\dfrac{18y^{-5}}{9y^2}$

3. $\left(3x^{-3}\right)^{-3}$

4. $a^{\frac{1}{4}} \cdot a^{\frac{2}{3}}$

5. $\dfrac{p}{p^{\frac{1}{9}}}$

6. $\left(x^{\frac{2}{7}}\right)^{-\frac{3}{4}}$

Simplify each radical expression.

7. $4\sqrt{32x^3}$

8. $\sqrt[3]{54m^5}$

9. $-3\sqrt{45}$

10. $\sqrt{120}$

11. $\sqrt{81}$

12. $\sqrt{324x^3 y^4}$

13. $3\sqrt{56x^5 y^2}$

14. $\sqrt[3]{40x^3 y^8}$

Rewrite each expression in radical form, then simplify if possible.

15. $4^{\frac{5}{2}}$

16. $2(ab)^{\frac{2}{7}}$

Rewrite each expression using a rational exponent.

17. $\sqrt[4]{7r}$

18. $9\sqrt[3]{x^7}$

Rewrite using rational exponents, use the rules of exponents to simplify, then write your answer in radical form.

19. $\sqrt[8]{r^4}$

20. $\sqrt[5]{t^4} \cdot \sqrt[10]{t}$

Add or subtract. Simplify by combining like radical terms, if possible.

21. $\sqrt{75} - 5\sqrt{3}$

22. $2\sqrt{45} - 9\sqrt{3} + 3\sqrt{20}$

23. $\sqrt{7} + \sqrt{28} - \sqrt{63}$

Multiply and simplify.

24. $4\sqrt{3}\left(5 + \sqrt{6}\right)$

25. $\left(5 + \sqrt{3}\right)\left(5 - \sqrt{3}\right)$

26. $\left(-6\sqrt{12}\right)\left(2\sqrt{3}\right)$