Math 2 Unit 8 Worksheet 3 **Name:**_____
Simplify Exponential Expressions **Date:**_____ **Per:**_____

[1-6] Use exponents to fill in the blanks.

1. $x^3 \cdot x^{\square} = x^7$
2. $x^4 \cdot x^{\square} = x^{12}$
3. $5^2 \cdot 5^{\square} = 5^{11}$
4. $a^{\square} \cdot a^4 = 1$
5. $x^{12} \cdot x^{\square} = x^5$
6. $x^{\square} \cdot x^8 = x^2$

[7-10] Find the value of x.

7. $\sqrt[4]{15^3} \cdot \sqrt[4]{15^6} = 15^{\frac{x}{4}}$
8. $\sqrt[3]{25^2} \cdot 25^{\frac{4}{3}} = 25^x$
9. $\frac{7^{\frac{4}{3}}}{\sqrt[9]{7^6}} = 7^{\frac{x}{3}}$
10. $\frac{5^{\frac{4}{3}}}{\sqrt[6]{5^2}} = 5^x$

[11-28] Simplify each expression. Write the final answer using only positive exponents.

11. $(2x)^{-3}$
12. $2x^{-3}$
13. $\frac{(3m)^4}{(6m)^2}$
14. $\frac{6xy^{-1}}{-2x^{-2}y^{-1}}$
15. $\frac{21m^{\frac{5}{4}}}{3m^{\frac{1}{4}}}$
16. $\left(\frac{3x^4}{2y^5}\right)^{-3}$

17. $\frac{3x^{-5}y^{-2}}{21x^{-8}y^{-9}}$

18. $\frac{-8w^{-9}x^{3}}{w^{-2}x^{2}}$

19. $\frac{-7a^{3}b^{-8}}{28a^{-7}b^{-12}}$

20. $\frac{3n^{2}(5^{0})}{4n^{3}}$

21. $\left(\frac{2m^{4}}{m^{2}}\right)^{-4}$

22. $\left(\frac{9t^{\frac{2}{3}}}{4t}\right)^{3}$

23. $\frac{(3m^{\frac{1}{2}})^{3}}{(9m)^{\frac{1}{2}}}$

24. $\frac{(6x^{\frac{1}{3}})^{2}\cdot(2x^{\frac{5}{3}})}{(8x)^{\frac{1}{3}}}$

25. $\frac{7^{\frac{5}{2}}}{\sqrt{7}}$

26. $\frac{8^{\frac{7}{3}}}{\sqrt[6]{8^{4}}}$

27. $\frac{\sqrt[8]{6^{2}}}{\sqrt[4]{6}}$

28. $7^{\frac{5}{6}}\cdot\sqrt[3]{7^{2}}$