

KEY

EXPONENT WORKSHEET

SIMPLIFY EACH PRODUCT:

1) $10^{12} \cdot 10^{35} = 10^{47}$

2) $c^3 \cdot c^8 = c^{11}$

~~3) $x^{2e} \cdot x^{8e} = x^{10e}$~~

4) $w^{103} \cdot w^{1030} = w^{1133}$

5) $a^6 \cdot b^5 = a^6 b^5$

~~6) $10^a \cdot 10^b = 10^{a+b}$~~

~~7) Solve for x: $(3^4)(3^x) = 3^{10}$~~

SIMPLIFY EACH PRODUCT:

8) $(2x^2)(4x^3y^2) = 8x^5y^2$

9) $(-3a^2b)(6db^4c) = -18a^2b^5c$

10) $(11c^8)(-10c^4d) = -110c^{12}d$

~~11) $(9x^{10}z^2)(-x^5y^3) = -9x^{15}y^3z^2$~~

12) $(1.3a^6b^{11}c^5)(0.5a^2b^3c^3) = 0.65a^8b^{14}c^8$

~~13) $(a^x b^y c^z)(a^r b^s c^t) = a^{x+r} b^{y+s} c^{z+t}$~~

SIMPLIFY EACH EXPRESSION:

14) $(x^2)^3 = x^6$

15) $(w^{-21})^{-15} = w^{315}$

16) $(5^2)^3 = 5^6 = 15,625$

17) $(-y^5)^4 = y^{20}$

18) $(4y^3)^2 = 16y^6$

19) $(-3h^9)^3 = (-3)^3 h^{27} = -27h^{27}$

20) $(3y^6)^2(x^5y^2z) = (9y^{12})(x^5y^2z) = 9x^5y^{14}z$

21) $(4h^3)^2(-2g^3h)^3 = (16h^6)(-8g^9h^3) = -128g^9h^9$

SIMPLIFY EACH EXPRESSION:

$$24) \left(\frac{x}{y}\right)^6 = \frac{x^6}{y^6}$$

$$25) \left(\frac{5c}{d^2}\right)^2 = \frac{5^2 c^2}{d^4}$$

$$26) \left(\frac{4d^3}{c^5}\right)^3 = \frac{4^3 d^9}{c^{15}}$$

$$27) \left(\frac{-4s^6}{t^9 r^5}\right)^3 = \frac{(-4)^3 s^{18}}{t^9 r^{15}}$$

$$28) \left(\frac{-2d^{11} f^6}{c^{18}}\right)^2 = \frac{(-2)^2 d^{22} f^{12}}{c^{36}}$$

$$29) \left(\frac{2d^4}{3e}\right)^3 = \frac{2^3 d^{12}}{3^3 e^3}$$

$$\frac{-64s^{18}}{t^9 r^{15}}$$

$$31) \frac{-2 \cancel{40s^6}}{\cancel{20s^3}} = -2s^3$$

$$32) \frac{2^3 \cancel{1d^{18} e^5}}{\cancel{1d^{11} e^3}} = 3d^7 e^2$$

$$30) \frac{3 \cancel{6r^3}}{\cancel{2r^1}} = 3r^2$$

$$33) \frac{-16w^7 r^2}{-4wr^1} = 4w^6 r$$

$$34) \frac{a^3 b^5 c^5}{-a^2 b^3 c^4} = -a^3 b^2 c$$

$$35) \frac{4.2x^4 y^{14}}{0.6x^9 y^5} = \frac{7y^9}{x^5}$$

$$36) \left(\frac{-24t^6}{8t^3}\right)^5 = (-3t^3)^5$$

$$37) \left(\frac{d^{11} f^{16}}{d^6 f^6}\right)^3 = (d^5 f^{10})^3$$

$$38) \left(\frac{7d^2}{14d^4}\right)^5 = \left(\frac{1}{d^2}\right)^5 = \frac{1}{d^{10}}$$

$$(-3)^5 t^{15}$$

$$d^{15} f^{30}$$

$$-729t^{15}$$

KEY

Algebra 1

Unit 7 Exponent Rules Worksheet #2

Simplify each expression below using exponent rules. Your final answer should not include any negative exponents. You MUST show work in order to receive credit.

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|---|--|---|
| 1. $x^5 \cdot x^2$ x^7 | 2. $y^3 \cdot y^1 \cdot y^4$ y^8 | 3. $b^4 \cdot b^{-4}$ $b^0 = 1$ |
| 4. $7x^3y^2 \cdot 5xy^9$ $35x^4y^{11}$ | 5. $a^{10} \cdot a^2 \cdot a^{-6}$ a^6 | 6. $(z^5)^5$ z^{25} |
| 7. $(b^7)^2$ b^{14} | 8. $(m^{-8})^{-3}$ m^{24} | 9. $(x^2y^4m^3)^8$ $x^{16}y^{32}m^{24}$ |
| 10. $(3x^2)^4$ $3^4x^8 = 81x^8$ | 11. $(2ab)^5$ $2^5a^5b^5$ $32a^5b^5$ | 12. $(2x^3y)^6$ $2^6x^{18}y^6$ $64x^{18}y^6$ |
| 13. $(m^7)^4 \cdot m^3$ $m^{28} \cdot m^3$ m^{31} | 14. $p^2 \cdot (p^5)^2$ $p^2 \cdot p^{10}$ p^{12} | 15. $\frac{x^5}{x^2} = x^3$ |
| 16. $\frac{c^4}{c^8} = c^{-4} = \frac{1}{c^4}$ | 17. $\frac{5x^{-4}}{x^{-9}} = 5x^5$ $-4 - (-9)$ $-4 + 9$ | 18. $\frac{x^3 \cdot x^4}{x^2} = \frac{x^7}{x^2} = x^5$ |

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|--|---|---|
| <p>19. $\left(\frac{6}{z^4}\right)^3 = \frac{6^3}{z^{12}}$</p> <p>$\frac{216}{z^{12}}$</p> | <p>20. $\left(\frac{a^3}{b^5}\right)^4$</p> <p>$\frac{a^{12}}{b^{20}}$</p> | <p>21. $\left(\frac{3x^4}{y^6}\right)^5$</p> <p>$\frac{3^5 x^{20}}{y^{30}} = \frac{243x^{20}}{y^{30}}$</p> |
| <p>22. $\left(\frac{m^4}{5n^9}\right)^3 \cdot \frac{m^{12}}{5^3 n^{27}}$</p> <p>$\frac{m^{12}}{125n^{27}}$</p> | <p>23. $\left(\frac{3x^7}{2y^{12}}\right)^4 \cdot \frac{3^4 x^{28}}{2^4 y^{48}}$</p> <p>$\frac{81x^{48}}{16y^{48}}$</p> | <p>24. $(8m)^0$</p> <p>1</p> |
| <p>25. $5x^0y^5$</p> <p>$5(1)(y^5)$</p> <p>$5y^5$</p> | <p>26. $2x^{-2}$</p> <p>$\frac{2}{x^2}$</p> | <p>27. $5m^{-3}n^4$</p> <p>$\frac{5n^4}{m^3}$</p> |
| <p>28. $3x^{-2}y^{-5}$</p> <p>$\frac{3}{x^2 y^5}$</p> | <p>29. $(x^{-2}y^2)^{-3}$</p> <p>$x^6 y^{-6} = \frac{x^6}{y^6}$</p> | <p>30. $(4x^4y^{-3})^{-2}$</p> <p>$\frac{4^{-2} x^{-8} y^6}{4^2 x^8} = \frac{y^6}{16x^8}$</p> |
| <p>31. $(f^{-3}g^5h^8)^{-3}$</p> <p>$f^9 g^{-15} h^{-24}$</p> <p>$\frac{f^9}{g^{15} h^{24}}$</p> | <p>32. $(x^2)^4 \cdot 3x^5$</p> <p>$x^8 \cdot 3x^5$</p> <p>$3x^{13}$</p> | <p>33. $(3x^3)^2 \cdot (2x)^3$</p> <p>$(3^2 x^6)(2^3 x^3)$</p> <p>$(9x^6)(8x^3)$</p> <p>$72x^9$</p> |

| | |
|---|--|
| <p>34. $(5x^2y^3)^2 \cdot (2x^3y^4)^3$</p> $(5^2 x^4 y^6) (2^3 x^9 y^{12})$ $(25 x^4 y^6) (8 x^9 y^{12})$ $200 x^y$ | <p>35. $\frac{x^8}{2y} \cdot \frac{5y^2}{x^3}$</p> $= \frac{5x^5y^2}{2x^3y^1}$ |
| <p>36. $\frac{x^3y^6}{xy^5} \cdot \frac{x^2y^9}{x^8}$</p> $= \frac{x^5y^{10}}{x^7y^5} = x^{-4}y^5$ $= \frac{y^5}{x^4}$ | <p>37. $\left(\frac{r^2t^{-3}}{r^{-3}t^5}\right)^{-8}$</p> $= (r^5t^{-8})^{-8}$ $= r^{-40}t^{64} = \frac{t^{64}}{r^{40}}$ |
| <p>38. $\left(\frac{x^4y^{-7}}{x^{-2}y^4}\right)^2$</p> $= (x^6y^{-11})^2$ $= x^{12}y^{-22} = \frac{x^{12}}{y^{22}}$ | <p>39. $\left(\frac{x^{-3}y^{-8}}{x^4y^{-2}}\right)^{-7}$</p> $= (x^{-7}y^{-6})^{-7}$ $= \frac{49}{x^49y^{42}}$ |
| <p>Bonus</p> <p>40. $\left(\frac{m^3p^5}{n^7}\right)^6 \cdot \left(\frac{m^2n^0p^3}{m^4n^2}\right)^3$</p> $= \left(\frac{m^3p^5}{n^7}\right)^6 \cdot \left(\frac{m^{-2}n^{-2}p^3}{1}\right)^3$ $= \left(\frac{m^{18}p^{30}}{n^{42}}\right) \left(\frac{m^{-6}n^{-6}p^9}{1}\right) = \frac{m^{12}n^{-6}p^{39}}{n^{42}} = \frac{m^{12}n^{-48}p^{39}}{n^{48}}$ | |

BONUS: $(5x^7y^3z^{-1})^2 \cdot (2xy^{-5})^3 \cdot (2y^{-3}z^2)^3$

$$(25x^{14}y^6z^{-2})(8x^3y^{-15})(8y^{-9}z^6)$$

$$1600x^{17}y^{-18}z^4 = \frac{1600x^{17}z^4}{y^{18}}$$

