

Algebra 1 – Unit 8 Study Packet

Exponent Rules (Laws of Exponents)

Skill #1 – Powers of Zero

1. Simplify:

$$(6x)^0 = \boxed{1}$$

2. Simplify:

$$6x^0 = 6 \cdot 1 = \boxed{6}$$

3. Simplify:

$$[4(x^2)^4]^0 = \boxed{1}$$

4. Simplify:

$$4[(x^2)^4]^0 = 4 \cdot 1 = \boxed{4}$$

Skill #1 I can evaluate expressions involving a power of zero.

Skill #2 – Product Rule (Multiplying with Like Bases)

5. Write the following expression in simplified form:

$$\frac{(8x^6)(x^3)}{1} = \boxed{8x^9}$$

6. Write the following expression in simplified form:

$$\frac{(-3y^2z^2)(y^4z^5)}{1} = \boxed{-3y^6z^7}$$

7. Write the following expression in simplified form:

$$\frac{(3x^8y)(-10xy^{10})}{1} = \boxed{-30x^9y^{11}}$$

8. Write the following expression in simplified form:

$$\frac{(7a^3b^5)(-9a^6b^3)}{1} = \boxed{-63a^9b^8}$$

Skill #2 I can evaluate expressions involving multiplication of exponents with the same base.
 Need more practice (IXL – V.4)

Skill #3 – Quotient Rule (Dividing with Like Bases)

9. Write the following expression in simplified form:

$$\frac{x^3}{x} = \boxed{x^2}$$

10. Write the following expression in simplified form:

$$\frac{4g^5h^8}{2g^2h^2} = \boxed{2g^3h^6}$$

11. Identify each true statement:

$$\frac{12x^5y^8}{4xy^3} = 3x^4y^5$$

$$\frac{14x^4y^{10}}{2x^2y^4} = \frac{12x^2y^6}{7x^2y^6} \quad \times$$

$$\frac{15x^7y}{3x^5y} = 5x^2$$

$$\frac{20x^4y^8}{10x^2y^4} = 2x^2y^4 \quad \times$$

Skill #3 I can evaluate expressions involving division of exponents with the same base.
 Need more practice (IXL – V.5)

Skill #4 – Power Rule 1 (Raising a Power to a Power)

12.

$$(y^3)^9 = \boxed{y^{27}}$$

13.

$$(3x^2y^3)^3 = 3^3x^6y^9 = \boxed{27x^6y^9}$$

14. Identify each true statement:

$$(5x^3y^2)^4 = 625x^{12}y^8$$

$$(5xy^2)^2 = 25x^2y^4$$

$$(2x^3y^2)^2 = \frac{4x^6y^4}{4x^6y^4} \quad \times$$

$$(2x^3y^2)^3 = \frac{6x^9y^6}{8x^9y^6} \quad \times$$

Skill #3 I can evaluate expressions involving raising an exponent to another power.
 Need more practice (IXL – V.7)

Skill #5 – Power Rule 2 (Raising a Product/Quotient to a Power)

15. Simplify:

$$(4x^7y^5)^4 = \boxed{256x^{28}y^{20}}$$

16. Simplify:

$$\left(\frac{x^4}{y^5}\right)^3 = \boxed{\frac{x^{12}}{y^{15}}}$$

17. Simplify:

$$\left(\frac{3ab^2}{c^3}\right)^2 = \boxed{\frac{9a^2b^4}{c^6}}$$

18. Simplify:

$$\left(\frac{2x^3}{6y^5}\right)^3 = \frac{8x^9}{216y^{15}} = \boxed{\frac{x^9}{27y^{15}}}$$

Skill #3 I can evaluate expressions involving raising a product/quotient to a power.
 Need more practice (IXL – V.7)

Skill #6 – Negative Exponent Rules

19. Simplify:

$$\frac{x^4}{x^4} = \boxed{\frac{1}{x^4}}$$

20. Simplify:

$$\frac{1}{b^{-5}} = \boxed{b^5}$$

21. Simplify:

$$\frac{b^{-6}}{a^{-7}} = \boxed{\frac{a^7}{b^6}}$$

22. Simplify:

$$\frac{9x^{-4}}{3y^2} = \boxed{\frac{3}{x^4y^2}}$$

Skill #3 I can evaluate expressions involving negative exponents.
 Need more practice (IXL – V.3)

Skill #7 - Combination of Exponent Rules

23. What is equivalent to:

$$\frac{ab(15a^3b^2c)}{25b^5c^2}$$

$$= \frac{15a^4b^3c}{25b^5c^2} = \boxed{\frac{3a^4}{5b^2c}}$$

24. What expression is the simplest form of:

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

$$= (4x^3y)(25x^{10}y^4)$$

$$= \boxed{100x^{13}y^5}$$

25. What expression is the simplest form of:

$$(6x^4)^{-1}$$

$$= 6^{-1}x^{-4}$$

$$= \boxed{\frac{1}{6x^4}}$$

26. What is a simplified form of the following expression where $a \neq 0$ and $b \neq 0$?

$$\frac{(4ab^3)^2}{32a^7b}$$

$$= \frac{16a^2b^6}{32a^7b}$$

$$= \frac{1b^5}{2a^5} = \boxed{\frac{b^5}{2a^5}}$$

27. Which is a simplified form of the following expression using only positive exponents?

$$\left(\frac{x^3}{y^4}\right)^{-3}$$

$$= \frac{x^{-9}}{y^{-12}} = \boxed{\frac{y^{12}}{x^9}}$$

28. Which is a simplified form of the following expression using only positive exponents?

$$(5x)^{-3}(25x^{-8})$$

$$= 5^{-3}x^{-3}(25x^{-8})$$

$$= \frac{25}{5^3x^3x^8} = \frac{25}{125x^3x^8}$$

$$= \boxed{\frac{1}{5x^{11}}}$$

29. Simplify:

$$\frac{6(x^4)^2}{x^5}$$

$$= \frac{6x^8}{x^5} = \boxed{6x^3}$$

30. Simplify:

$$\frac{(8x^3)^3}{20x^{10}}$$

$$= \frac{512x^9}{20x^{10}} = \frac{128}{5x}$$

$$= \boxed{\frac{128}{5x}}$$

Skill #3

- I can evaluate an expression involving a combination of exponent rules.
 Need more practice (IXL - V.6)