Exponents and Powers REVIEW SHEET NAME:
DATE: HR:

Integer Exponents:

Evaluate

1. 5^3

$5 \cdot 5 \cdot 5 = 125$

2. $(-2)^2$

$= -2 \cdot -2 = 4$

3. $3^{-3} \rightarrow \frac{1}{3^3} = \frac{1}{3 \cdot 3 \cdot 3}$

$= \frac{1}{27}$

4. $6^{-3} = \frac{1}{6^3} = \frac{1}{6 \cdot 6 \cdot 6}$

$= \frac{1}{216}$

5. $\left(\frac{3}{4}\right)^3$

$= \frac{3}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} = \frac{27}{64}$

6. $\left(\frac{4}{5}\right)^3$

$= \frac{4}{5} \cdot \frac{4}{5} \cdot \frac{4}{5} = \frac{64}{125}$

Multiplication Property of Exponents:

Write the answer as a power

7. $5^5 \cdot 5^9$

$= 5^{14}$

8. $m^5 \cdot m^{-9}$

$= m^{-4} = \frac{1}{m^4}$

9. $x^5 \cdot x^5$

$= x^{10}$

10. $11^{12} \cdot 11^{-8}$

$= 11^4$

11. $c^4 \cdot c^{14}$

$= c^{18}$

12. $n^8 \cdot n^{-5} \cdot n^{-3}$

$= n^0 = 1$

Division Property of Exponents:

Write the answer as a power

13. $\frac{k^{15}}{k^{21}}$

$= k^{-6} \rightarrow \frac{1}{k^6}$

14. $\frac{9^6}{9^5}$

$= 9^1$

15. $\frac{5^{-9}}{5^{-14}} = 5^5$

16. $\frac{a^{-7}}{a^{5}} = a^{-12} = \frac{1}{a^{12}}$ 17. $\frac{7^{11}}{7^{-8}} = 7^{19}$ 18. $\frac{8^{0}}{8^{7}} = 8^{-7} \rightarrow \frac{1}{8^{7}}$

Power of a Power Property of Exponents:

Write the answer as a power

19. $(v^{5})^{8} = v^{40}$ 20. $(9^{4})^{6} = 9^{24}$ 21. $(m^{8})^{3} = m^{24}$

22. $(2^{5})^{-5}$ $2^{-25} \rightarrow \frac{1}{2^{25}}$ 23. $(g^{-10})^{-2} = g^{20}$ 24. $(p^{9})^{8} = p^{72}$

21. Select **all** the expressions that equal $\frac{1}{2^{6}}$. (There is more than one).

$\uparrow 2^{-6}$

✓ a. $(2^{-2})^{3} = 2^{-6} = \frac{1}{2^{6}}$ ✗ c. $\frac{6^{-3}}{6^{7}}$ ✗ e. $\frac{2^{5} \cdot 2^{-1}}{2^{-6}} = \frac{2^{4}}{2^{-6}} = 2^{10}$

✗ b. $2^{-3} \cdot 2^{2} = 2^{-1}$

✓ d. $\left(\frac{1}{2^{2}}\right)^{3} = \frac{1}{2^{6}}$

✓ f. $\frac{2^{-6} \cdot 2^{2}}{2^{5} \cdot 2^{-3}} = \frac{2^{-4}}{2^{2}} = 2^{-6} \rightarrow \frac{1}{2^{6}}$

22. A bacteria is being studied. The scientists noticed that after one hour, the bacteria had divided into three. They continued to observe the bacteria and saw that each of the three new bacteria had divided into three after another hour. This division continued. Write an expression to represent the number of bacteria that will be under the microscope after 24 hours.

x3 each hour

3^{24}