

I. Simplify. Write answers in exponential form. (No decimals and no negative exponents!)

1. $5(3^{-2}) = \frac{5}{3^2} = \frac{5}{9}$	2. $\frac{mn^{-4}}{p^0q^{-2}} = \frac{mq^2}{n^4}$	3. $3^0s^{-2}t^2 = \frac{t^2}{s^2}$
4. $(2x^5)(3x^{\frac{3}{5}}) = 2x^{\frac{25}{5}}3x^{\frac{3}{5}} = 6x^{\frac{28}{5}}$	5. $a^2b^0(a^{-3}) = a^{-1} = \frac{1}{a}$	6. $6x^{\frac{1}{3}} \cdot 5x^{\frac{2}{3}} = 30x$

II. Evaluate. No decimals and no negative exponents!

6. $(-5)^3 = -125$	7. $-2^5 = -32$	8. $\left(\frac{1}{6}\right)^{-2} = 36$
9. $-4^{-4} = -\frac{1}{256}$	10. $\left(\frac{3}{10}\right)^3 = \frac{27}{1000}$	

III. Word problems.

11. The area of a trapezoid can be found using the formula $A = \frac{1}{2}(b_1 + b_2)h$, where h is the height of the trapezoid

and b_1 and b_2 are the bases of the trapezoid.

What is the area of a trapezoid with height $18xy^5$ cm, a base $4x^4$ cm, and another base $6x^4$ cm?

$$A = \frac{1}{2}(4x^4 + 6x^4)(18xy^5)$$

$$A = \frac{1}{2}(10x^4)(18xy^5)$$

$$A = \frac{1}{2}(180x^5y^5)$$

$$A = 90x^5y^5 \text{ cm}^2$$

I. Simplify. Write answers in exponential form. (No negative exponents!)

12. $(a^3)^4 = a^{12}$	13. $(a^{\frac{3}{5}})^{-5} = a^{-3} = \frac{1}{a^3}$	14. $\frac{7b^6}{b^4} = 7b^2$
15. $(xy^3z^5)^8 = x^8y^{24}z^{40}$	16. $(3t^{\frac{1}{6}})^3(2t^0)^{-3} = \frac{3^3t^{\frac{1}{2}}}{2^3} = \frac{27t^{\frac{1}{2}}}{8}$	17. $\left(\frac{y}{7z^2}\right)^{-2} = \left(\frac{7z^2}{y}\right)^2 = \frac{49z^4}{y^2}$
18. $(-11d^{\frac{1}{5}})^2 = 121d^{\frac{2}{5}}$	19. $\left(\frac{9a^6b^9}{3a^2b}\right)\left(\frac{ab^3}{2a^8b^5}\right) = \frac{9a^7b^{12}}{6a^{10}b^6} = \frac{3b^6}{2a^3}$	20. $\left(\frac{6x^7}{3y^3}\right) = \frac{2x^7}{y^3}$

II. Word problems.

21. The area of a rectangle is $28x^5y^3$. The length of the rectangle is $7xy^2$. What is the width of the rectangle?

$$A = l \cdot w$$

$$\frac{28x^5y^3}{7xy^2} = \frac{(7xy^2)(w)}{(7xy^2)}$$

$$w = 4x^4y$$

22. A rectangle has a length of $6x^4$ and a width of $3x^7$. Write two separate formulas for the area of the rectangle and for the perimeter of the rectangle. Simplify each.



$$A = l \cdot w$$

$$A = 6x^4 \cdot 3x^7$$

$$A = 18x^{11}$$

$$P = 2l + 2w$$

$$P = 2(6x^4) + 2(3x^7)$$

$$P = 12x^4 + 6x^7$$

22. The radius of Mars is about 3.4×10^3 km. What is the approximate surface area of Mars? (Hint: $S.A. = 4\pi r^2$)

WRITE YOUR ANSWER IN SCIENTIFIC NOTATION. Use $\pi = 3.14$

$$S.A. = 4\pi (3.4 \times 10^3)^2$$

$$= 4(3.14)(3.4^2 \times 10^6)$$

$$= 4(3.14)(11.56 \times 10^6)$$

$$= 145.1936 \times 10^6 \Rightarrow 1.45 \times 10^8 \text{ km}^2$$

$$1.45 \times 10^8 \text{ km}^2$$