

Math 6e: Homework 1

HW#1 is Due September 30; submit to Google Classroom 15 minutes before class time.

Review from Math 5

1. A boy had a bag of apples. He gave one-half of them to his parents, one-fifth to his brother, one-fourth to his sister, and he ate the last apple himself. How many apples did he initially have?

2. Simplify the following expressions

a) $x + 4(1 - x)$

b) $2 + 5x - 4(3 - x)$

c) $5(x - 1) - 3(2x + 1)$

d) $(2x + 5y)(3x + y + 2)$

Hint: Use the distributive property of multiplication: $a(b + c) = ab + ac$

Example: $(x + y)(z + d) = x(z + d) + y(z + d)$

3. Two secretaries, Barbara and Mary, need to type a 100-page document. Barbara can type it in 4 hours; Mary types slower, so it would take her 5 hours to do this. How fast can they type it together if they divide the work between the two of them most efficiently?

4. Simplify the following expression:

$$\frac{(x^2y^2) \cdot x^3}{x^2y^5}$$

5. Let $a = 2 \cdot 10^8$, $b = 10^5$. Compute $a^2 \cdot b$, $\frac{a}{b}$, $a^2 \div b^3$

6. If $a = 2^{-13}3^9$, $b = 2^{11}3^{-7}$ what is the value of ab ? of a/b ?

7. If, in a right triangle, one leg has length 3 and the hypotenuse has length 5, what is the length of the other leg? (Hint: this is a very famous theorem about a right triangle)

8. Simplify: $(\sqrt{17})^2$, $(\sqrt{13})^4$, $(\sqrt{11})^3$, $\sqrt{2^43^6}$, $\sqrt{2^43^5}$

Power Rules

A) Multiplication: $a^m \cdot a^n = a^{m+n}$

B) Raised to a power: $(a^m)^n = a^{m \cdot n}$

C) No power: $a = a^1$

D) Zeroth power: $a^0 = 1$

E) Switching numerator-denominator: $a^n = \frac{1}{a^{-n}}$ or $\frac{1}{a^n} = a^{-n}$

F) Division: $\frac{a^m}{a^n} = a^{m-n}$ if $m > n$ or $\frac{a^m}{a^n} = \frac{1}{a^{n-m}}$ if $m < n$

G) Change of base

Use powers of numbers to get to a smaller or larger base

Example: $32 = 2^5$ or $9 = 3^2$