

Math 6a/b: Homework 23
Homework #23 is due April 14.

Arithmetic sequences

Important formulas:

$$\begin{aligned}a_n &= a_1 + (n - 1)d \\a_n &= \frac{a_{n-1} + a_{n+1}}{2} \\d &= \frac{a_s - a_t}{s - t} \\S &= \frac{(a_1 + a_n) \times n}{2}\end{aligned}$$

Powers Review:

$$a^n = a \times a \times a \times \dots \times a \text{ (} n \text{ times)}$$

$$a^0 = 1 \quad \text{read: } a\text{-to-the-zero}$$

$$a^1 = a \quad \text{is just itself 'a'}$$

$$(ab)^n = a^n \times b^n$$

$$a^n a^m = a^{n+m}$$

$$\frac{a^n}{a^m} = a^{n-m}$$

$$a^n = \frac{1}{a^{-n}} \quad , \quad a^{-n} = \frac{1}{a^n}$$

Homework

1. If $a = 2^{-13}3^9$ and $b = 2^{11}3^{-7}$ what is the value of ab ? of a/b ?
2. How many zeroes does the number $4^{15}5^{26}$ end with?
3. Simplify the following and show the answer in the exponent (power) form

(a) $\frac{3^7 \cdot 2^7}{2^3 \cdot 2^4} =$

(b) $\frac{6^5 \cdot 2^4}{3^5 \cdot 2^2} =$

(c) $\frac{7^9 \cdot 2^5}{7^2 \cdot 2^4} =$

(d) $\frac{11^4}{11^2 \cdot 5^2 \cdot 5^3} =$

(e) $7^4 \cdot 11^2 \cdot 11^{-5} \cdot 7^2 =$

(f) $\frac{3^{-5} \cdot 2^7}{3^{-3} \cdot 2^4} =$

(g) $\frac{42^2}{6^2} =$

(h) $\frac{3^5 \cdot 3^{-5}}{3^9} =$

(i) $\frac{x^2 \cdot y^2 \cdot x^{-3}}{x^2} =$

4. If $a_3 + a_8 + a_{10} + a_{16} + a_{18} + a_{23} = 126$, find the sum of the first 25 terms.
5. For an arithmetic progression, $a_1 + a_2 + a_3 = 102$ and $a_1 = 15$. Find a_{10}
6. If 6 times the sixth term of an arithmetic progression is equal to 9 times the 9th term, find the 15th term.
7. Find the sum of the first three elements of an arithmetic progression for which $a_1 + a_5 = 22$ and $a_8 - a_5 = 6$