

SchoolNova, Math 5c
Homework 7
Algebra with Fractions and Exponents
November 3, 2019

Please provide sufficient details about how you solved the problem. More difficult problems are marked with a *. If unable to solve a problem, please present your thoughts and any partial solution.

1. Simplify or compute the following expressions:

(a) $\left(\frac{5}{2}\right)^{-1}$

(b) $\left(\frac{5}{2}\right)^2 \left(\frac{5}{2}\right)^{-1}$

(c) $\frac{9^4}{3^2}$

(d) $(3^2)^2$

(e) $(3^2)^{-1}$

(f) $(2^3)^2$

(g) 2^{3^2}

2. Simplify the following expressions:

(a) $(2z^3)^2$

(b) $(x^2y)^3$

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

(d) $\frac{(-xy)^4}{(xy)^2}$

(e) $\frac{9^n}{3^n}$

(f) $\frac{18^n}{3^n 2^n}$

3. Let $a = 10^4$ and $b = 10^5$. Compute

(a) a^2b

(b) $\frac{a}{b}$

(c) $a^2 \div b^3$

4. Solve the following equations for x :

(a) $5^x = 25$

(b) $6^x = 1$

(c) $3^x = 3^2 3^3$

(d) $7^{2x} = 49$

(e) $4^x = 2^3$

(f) $(3^4)^x = 81 \times 3^6$

(g) $8 \times 2^{x+2} = 32$

5. Solve the following equations for x , and check your solution:

(a) $\frac{x}{5} = 4$

(b) $\frac{x+1}{3} = 8$

(c) $\frac{5}{8}x = 10$

(d) $\frac{1}{2}x = \frac{1}{4}x + 2$

(e) $\frac{x}{2} + \frac{x}{3} = 10$

(f) $\frac{2}{3}x - \frac{1}{4} = \frac{1}{3}x + \frac{1}{2}$

6. How many cubic centimeters are there in one cubic kilometer? (1 km = 1000 m, 1 m = 100 cm)

7. At the beginning of an epidemic, 27 people are sick. If the number of sick people triples every other day, how many people will be sick at the end of two weeks? Express your answer using powers.

8. * One can measure temperature using either the Fahrenheit scale or the Celsius scale. The relation between the two is given by

$$C = \frac{5}{9}(F - 32)$$

(a) Is there a temperature which gives the same value on both scales, that is $F = C$?

(b) Is there a temperature, which in Fahrenheit scale is twice as large as Celsius, that is $F = 2C$?

9. In the following sequence of numbers, each number has one more 1 than the preceding number: 1, 11, 111, 1111, ... What is the tens digit of the sum of the first 30 numbers of the sequence?