SchoolNova, Math 5c
Homework 9
Algebra with Exponents and Fractions
December 10, 2017

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 the following expressions:

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

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

   (c) $\left(2z^2 3z^3 z\right)^2$

   (d) $\left(x^2 y\right)^3$

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

   (f) $\frac{(-ab)^4}{(ab)^2}$

2. Find each of the following products

   (a) $(-5a) \times \left(-10a^2\right) \times \left(-2a^3\right)$

   (b) $\left(4s^2 t\right) \times \left(3s^3 t^3\right) \times \left(2st^4\right) \times (-2)$

   (c) $\left(\frac{6}{5}ab\right) \times \left(\frac{5}{6}bc\right) \times \left(\frac{9}{12}abc\right)$

3. Compute

   (a) 5^{-3}

   (b) 4^{-2}

   (c) $(-2)^5$

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

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

4. Solve the following equations for x:

   (a) $\left(3^4\right)^x = 81 \times 3^6$

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

   (c) $\left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{-11} = \left(\frac{5}{3}\right)^{8x}$

   (d) $\left(\frac{8}{3}\right)^{2x+1} \times \left(\frac{8}{3}\right)^5 = \left(\frac{8}{3}\right)^{x+2}$

5. Determine each of the following products

   (a) $(x + y) \times (x + y)$

   (b) $(x + y) \times (x - y)$

   (c) $(2x + 3y) \times (2x + 3y)$

   (d) $(2x + 3y) \times (2x - 3y)$

6. Solve the following linear equations, and check your solution:

   (a) $\frac{x}{2} - \frac{x}{3} = 8$

   (b) $\frac{x+1}{x+3} = 9$

   (c) $\frac{y-1}{3} - \frac{y-2}{4} = 1$

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

   (a) $a^2 b$

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

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

8. How many cubic centimeters are there in one cubic kilometer? ($1 \text{ km} = 1000 \text{ m}$, $1 \text{ m} = 100 \text{ cm}$)

9. 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.