SchoolNova, Math 5b
Homework 6
Algebra with Exponents
October 28, 2018

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) $\dfrac{9^4}{3^2}$

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

   (e) $\left(3^2\right)^{-1}$

   (f) $\left(2^3\right)^2$

   (g) 2^{3^2}

2. Simplify the following expressions:

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

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

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

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

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

   (f) $\dfrac{18^n}{3^n2^n}$

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

   (a) a^2b

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

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

4. Simplify each of the following algebraic expressions, by opening the parenthesis and collecting **like terms**:

   (a) $-x^2 + [-(3x^2 + 2y^2) + (3x^2 + y^2)]$

   (b) $x - \frac{1}{3}(x^2 + 3x + 6)$

   (c) $xy - [yz - xz + (xy - 3yz)]$

   (d) $(xy^2)^2 + (xy)^2 + 3(x^2y^4 + x^2y^2)$

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

6. 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.

7. TGV is France's high speed rail service. TGV trains can comfortably go as fast as 300 km/hr, while the US train service Amtrak goes at a speed of 130 km/hr. How long will it take TGV and Amtrak to go from New York to Washington, D.C., if the distance between New York and Washington, D.C. is 400 km. How much time would we save, if the TGV operated between New York and Washington, D.C.?

8. Solve the following puzzle (different letters stand for different digits):

   ```
     T  H  I  S
   +     I  S
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     E  A  S  Y
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9. For more practice, you can use the link $https://www.mathsisfun.com/algebra/index.html$