

SchoolNova, Math 5c
Homework 10
More Algebra with Exponents and Fractions
December 17, 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) $\frac{25^4}{5^2}$

(b) 2^{2^2}

(c) $2^{2^{2^2}}$

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

(e) $\frac{(-a)^7}{(a)^2}$

(f) $\frac{x^2y^2}{x^4y^5}$

(g) $(ab^2c^3)^2$

2. Find the value of x if

(a) $2^x + 2^x + 2^x = 192$

(b) $2^3 + 2^x = 2^4$

(c) $8^{255} = 32^x$

3. Solve the following equations, and check your solution:

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

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

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

4. 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.?
5. Solve the following puzzle (different letters stand for different digits):

$$\begin{array}{r}
 \text{T H I S} \\
 + \text{ I S} \\
 \hline
 \text{E A S Y}
 \end{array}$$

6. 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 $F = 2C$?
7. * If $x + \frac{1}{x} = 4$, determine the values of

(a)

$$x^2 + \frac{1}{x^2}$$

(b)

$$x^4 + \frac{1}{x^4}$$