## SchoolNova, Math 5b <br> Homework 7 <br> Algebra with Fractions and Exponents <br> November 4, 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 each of the following algebraic expressions, by opening the parenthesis and collecting like terms:
(a) $a(a+b)+b(a+b)$
(b) $(a+b)(a+b)$
(c) $a(a+b)-b(a+b)$
(d) $(a-b)(a+b)$
(e) $(a+b)^{2}$
(f) $(a+b)^{3}$
(g) $(a+b+c)^{2}$
2. Solve the following equations for $x$ :
(a) $x+2=6$
(b) $x-2=11$
(c) $10-x=4$
(d) $2 x+18=20$
(e) $4 x=24$
(f) $2 x+6=x+10$
3. Solve the following equations for $x$ :
(a) $5^{x}=25$
(b) $6^{x}=1$
(c) $3^{x}=3^{2} 3^{3}$
(d) $7^{2 x}=49$
(e) $4^{x}=2^{3}$
(f) $\left(3^{4}\right)^{x}=81 \times 3^{6}$
(g) $8 \times 2^{x+2}=32$
4. 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) $\frac{2}{3} x-\frac{1}{4}=\frac{1}{3} x+\frac{1}{2}$
5. $*$ It is given that $a+b=10, b+c=14$ and $a+c=16$. Find $a+b+c$.
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 $F=2 C$ ?
7. In the following sequence of numbers, each number has one more 1 than the preceding number: $1,11,111,1111, \ldots$. What is the tens digit of the sum of the first 30 numbers of the sequence?

