Math 5b: Homework 10

Review

Powers: $a^n = a \times a \times a \times \ldots \times a$ (*n* times)

$a^0 = 1$ read: *a*-to-the-zero
$a^1 = a$ is just itself '*a*'
$(ab)^n = a^n \times b^n$
$a^n a^m = a^{n+m}$
$\frac{a^n}{a^m} = a^{n-m}$
$a^n = \frac{1}{a^{-n}}$, $a^{-n} = \frac{1}{a^n}$

Homework 10

1. Simplify the expressions:
   (a) $(2z^2.3z^3.z)^2$
   (b) $(4c^2.c^3)^3$
   (c) $\left(\frac{5\,g^4b^5}{4\,g^2b^3}\right)^3$
   (d) $\left(\frac{8dg^2}{3d^3g^4}\right)^3$
2. Find *x*:
   a) $|-52 + 48| = x$
   b) $|-52| + x = |48|$
   c) $|x| = 48$
   d) $|x - 1| = 53$
3. Open the brackets:
   a) $(-6a - 7b + 8) * .3 =$
   b) $-b + b(x - 1) =$
   c) $2(a - b) - 2(6 - b + a) =$
   d) $(a + 2)(a^2 + a + 2) - 2a(a - 1) =$
4. Solve the equations:
   a) $5(3x - 2) - (14x - 8) = 18$

b) $\frac{3}{4}x = \frac{3}{5}x + 3$

c) $\frac{3}{x} = \frac{15}{4}$

5. Suppose that $100 is deposited into an account and the amount doubles every 8 years. How much will be in the account after 40 years? Express your answer using powers.

6. At the beginning of an epidemic, 50 people are sick. If the number of sick people triples every other day, how many people will be sick at the end of 2 weeks? Express your answer using powers.

7. Find n
   a) $3^n = 81$
   b) $3^n = 729$
   c) $3^2 * 3^n = 729$
   d) $(3^2)^n = 729$
   e) $3^n = \frac{1}{81}$
   f) $3^{-n} = 27$
   g) $3^{-n} = \frac{1}{81}$
   h) $(-5)^n = -125$
   i) $(-5)^n = -\frac{1}{125}$

8. Solve by aligning to the same base first, then opening parenthesis, then adjusting powers, and only then calculating :

   (a) $3^{-2} \cdot (3^2 + 9^2) =$

   (b) $10^3 \cdot (2^{-3} + 5^{-3}) =$

   (c) $100^5 \cdot (20^{-4} + 50^{-3} - 10^{-7}) =$

9. A swimming pool can be filled by an inlet pipe in 12 hours and emptied by an outlet pipe in 15 hours. One day the pool is empty and the owner opens the inlet pipe to fill it. However, he forgets to close the outlet pipe. How long will it take the pool to fill?

10. * **Completely Optional**
    https://kangaroo.math.ca/samples/2014/2014gr0506e.pdf
    Please, do not look at the answer key until you solve the problems.