Math 5e, Homework 19

Due February 9

Instructions: Some of the problems we solved in class, and some are new. Please try to solve all problems, do your best, and show your work. Write on separate sheets of paper, not between the lines of this handout!

Formulas for fast multiplication

We also revised the ***identities***: $(a+b)^2 = a^2 + 2ab + b^2$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)(a-b) = a^2 - b^2$

And ***factorizing***:

$$a(b+c) = ab + ac$$

… and used them to solve equations.

Homework problems

1. Open the parentheses and simplify using the formulas for fast multiplication
   a) $(5-y)^2 =$
   b) $(-z+3)^2 =$
   c) $(x+y)^2 - (x-y)^2 =$
   d) $3(2-y)^2 + 4(y-5)^2 =$

2. Solve the equations
   a) $x(x-1) + 2(x-1) - x^2 = 0$
   b) $x\left(x - \frac{1}{2}\right) - x(x+1) - x = 0$
   c) $(3x-1)(2x+7) = (x+1)(6x-5)$
   d) $\frac{(2x+1)}{7} + \frac{(x+1)}{4} = 2$

      (*Hint: write* $2 = \frac{2}{1}$, *you have fractions with denominators* $7, 4, 1$)

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

3. The perimeter of an isosceles triangle is 42 cm. The sides are 6 cm shorter than the base. Find the lengths of all sides of the triangle.

4. The distance between two cities, A and B, is 304 km. Find the time it will take to cover this distance if a car travels at 40 km/h, 45 km/h, 35 km/h, or v km/h.

5. A traveler begins an "around the world" trip from point A, covering 40 km each day. The following day, another traveler starts from the same point A, covering 45 km per day. After how many days will the second traveler catch up with the first traveler?

6. Calculate using $\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$, $\sqrt{a^2} = \left(\sqrt{a}\right)^2 = a$, as well as $\sqrt{a^{2n}} = \sqrt{(a^n)^2} = a^n$
   a) $\sqrt{81 \cdot 64}$
   b) $\sqrt{72 \cdot 18}$
   c) $\sqrt{2^3 \cdot 3^5 \cdot 2}$
   d) $\sqrt{6 \cdot 3^3}$