Math 6c, homework 16.

1. Write as a single fraction:
   Example:
   $$\frac{15}{2x-8}+\frac{7}{x-4}=\frac{15}{2(x-4)}+\frac{7}{x-4}=\frac{15}{2(x-4)}+\frac{7\cdot 2}{(x-4)\cdot 2}=\frac{15+14}{2(x-4)}=\frac{29}{2x-8}$$
   $x \neq 4$

   $a.\ \frac{x}{x-2}-\frac{1}{2-x};$ $b.\ \frac{x}{5+x}+\frac{3}{x+5};$ $c.\ \frac{2x}{3x+6}+\frac{5}{x+2};$

   $d.\ \frac{4x}{x-1}+\frac{1}{1-x};$ $e.\ \frac{3-x}{5-x}+\frac{5}{2x-10};$ $f.\ \frac{m+1}{m+n}+\frac{3-m}{m+n};$

2. Write as polynomials (perform the multiplication of the expressions; remember that each term of one expression should be multiplied by each term of the other, then combine like terms if possible):
   Example:
   $(x+y+z)(x+y-z)=$
   $=x\cdot x+x\cdot y-x\cdot z+y\cdot x+y\cdot y-y\cdot z+z\cdot x+z\cdot y-z\cdot z=$
   $=x^2+xy-xz+yx+y^2-yz+zx+zy-z^2=$
   $=x^2+2xy+y^2-z^2=x^2+y^2-z^2+2xy$

   $a.\ (x-y+z)(x+y+z);$ $b.\ (x-y+z)(x-y-z);$

   $c.\ (x-y-z)(x+y+z);$ $d.\ (-x-y-z)(x-y-z)$

3. Evaluate:

   $a.\ 2+\sqrt{1};$ $b.\ 15-\sqrt{36};$ $c.\sqrt{9}+\sqrt{4}$

   $d.\ \sqrt{16}+\sqrt{25};$ $e.\ \sqrt{49}-\sqrt{1};$ $f.\sqrt{81}-\sqrt{49}$

   $g.\ \sqrt{100}-\sqrt{36};$ $h.\ \sqrt{144}-\sqrt{121};$ $i.\sqrt{0.36}-\sqrt{0.49}$

   $j.\ 2\cdot\sqrt{81};$ $k.\ \frac{1}{3}\cdot\sqrt{100};$ $l.\sqrt{4}\cdot\sqrt{0.25}$

   $m.\ \frac{1}{9}\cdot\sqrt{81};$ $n.\ \sqrt{0.36}:\sqrt{\frac{1}{36}};$ $o.\sqrt{1.69}:\sqrt{0.0625}$

4. Four boys—Alex, Sam, Michael, and Julian—were playing soccer in the yard and broke a window.
   "Who broke the window?" Aunt Dorothy asked.
   "Either Julian or Michael broke the window," said Sam.

"I didn't break the window," Julian objected.
"Michael did it," said Alex.
"No, Alex, you're wrong," Michael noted.
"Well, did they give you a puzzle?" Uncle Bill, who was watching this conversation, summarized. "I can also add that three of these soccer players always tell only the truth. But I don't know the fourth one very well."
Who broke the window? With which of the boys was Uncle Bill not very familiar?

5. Three squares are drawn. A line is drawn from a vertex of the largest square to a vertex of the smallest square. Find the shaded area.