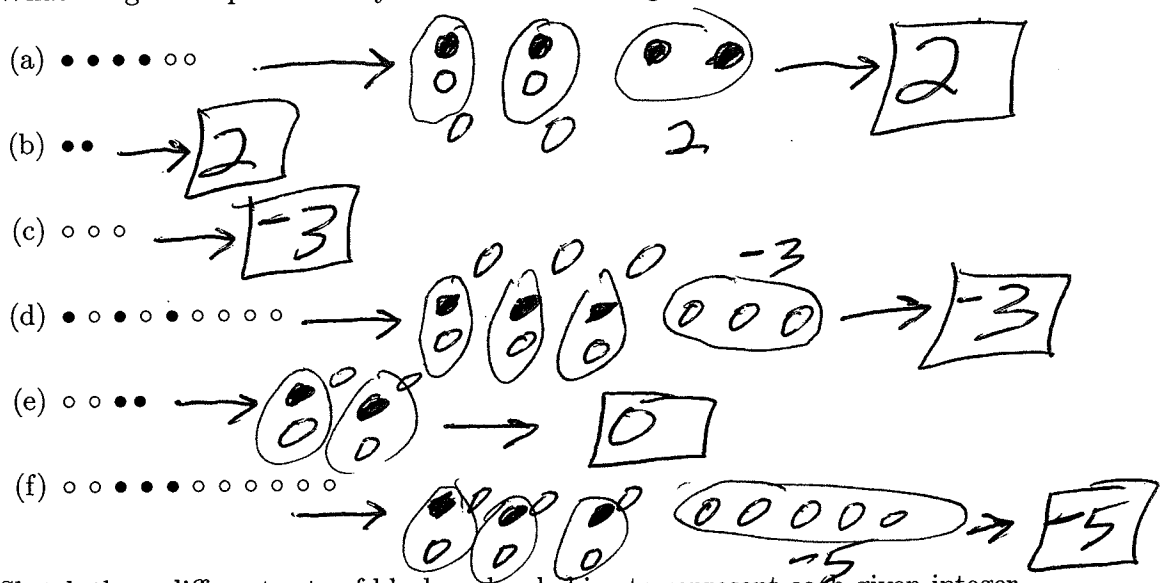
solutions

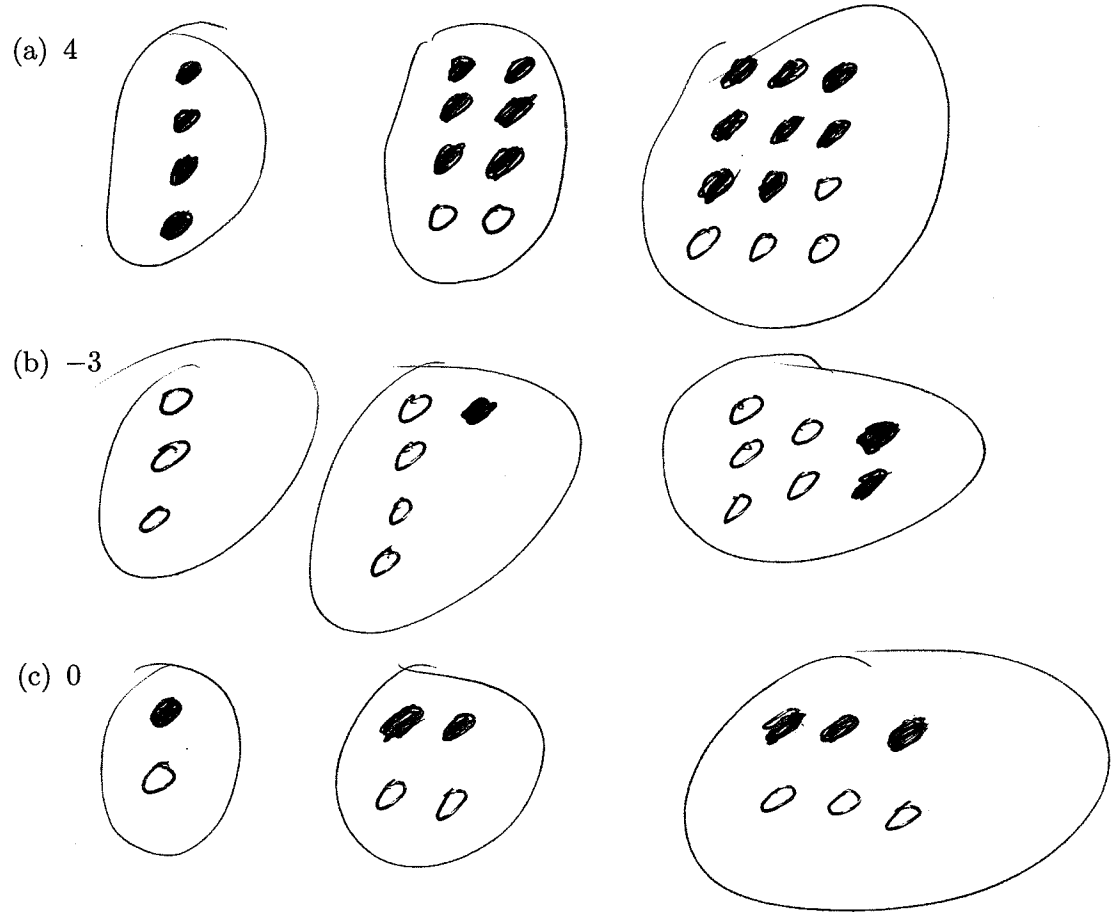
Integers, Models for Arithmetic, Basic Fractions

When using the black and red chips model for this worksheet, I will use
• for each black chip (+) and ○ for each red chip (−).

1. What integer is represented by each of the following sets of chips?

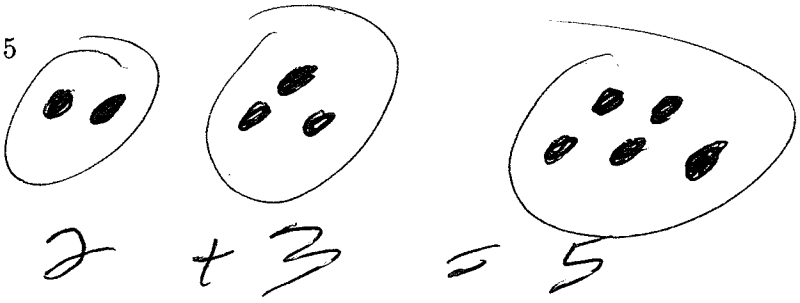


2. Sketch three different sets of black and red chips to represent each given integer.

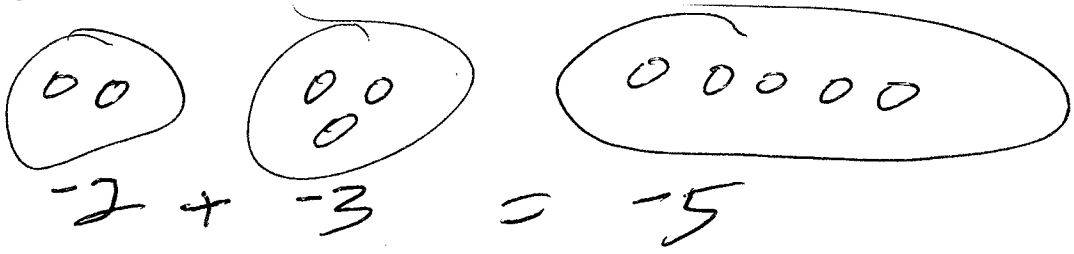


3. Show how to use the black and red chips model to illustrate the following computations.

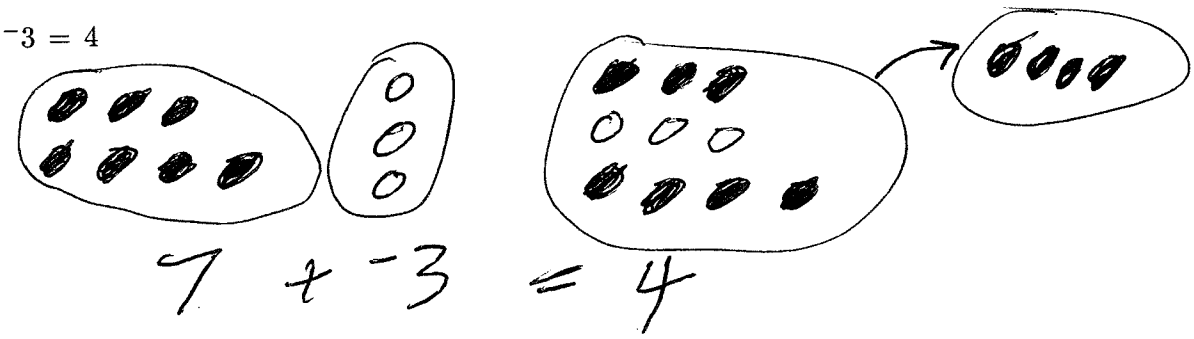
(a) $2 + 3 = 5$



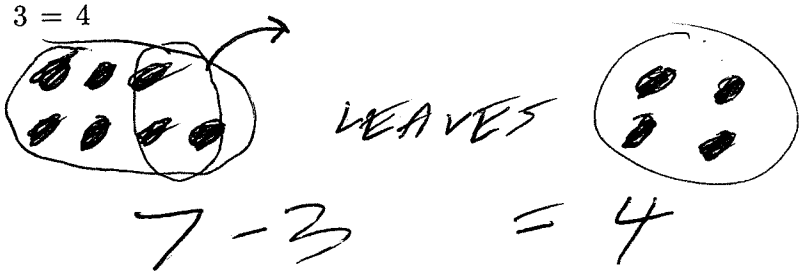
(b) $^{-}2 + {}^{-}3 = {}^{-}5$



(c) $7 + {}^{-}3 = 4$

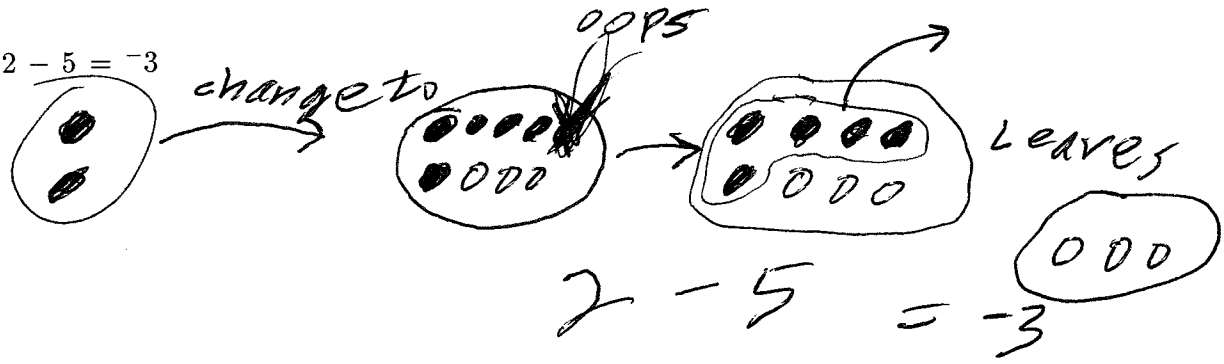


(d) $7 - 3 = 4$

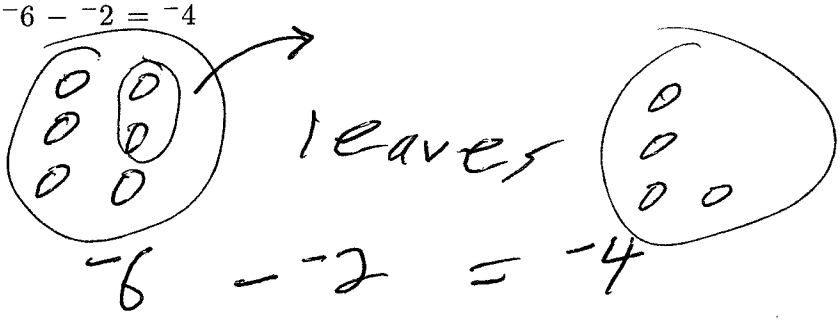


(e) $2 + {}^{-}5 = {}^{-}3$

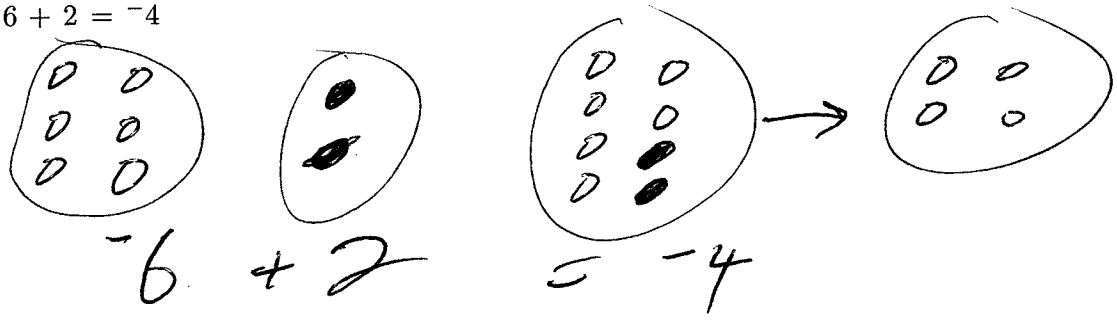
(f) $2 - 5 = {}^{-}3$



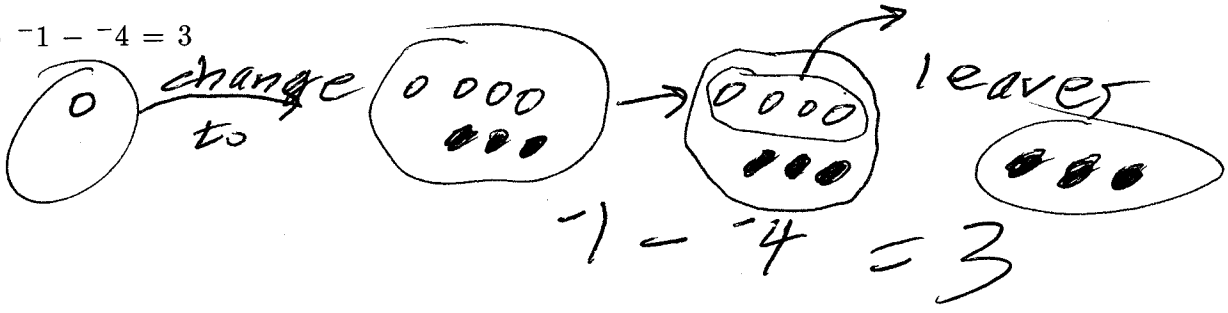
(g) ${}^{-}6 - {}^{-}2 = {}^{-}4$



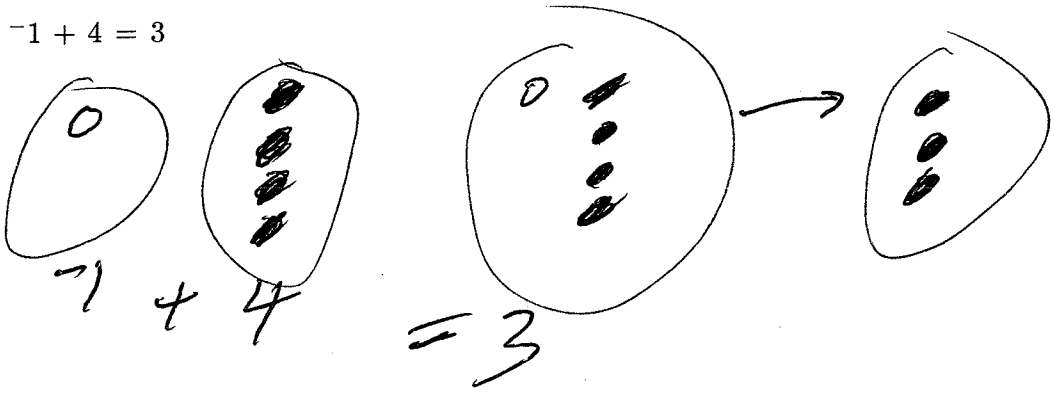
(h) ${}^{-}6 + 2 = {}^{-}4$



(i) ${}^{-}1 - {}^{-}4 = 3$



(j) ${}^{-}1 + 4 = 3$



4. Visit the website

   `http://www.math.sc.edu/~filaseta/courses/Math221/AdditionSubtractionModels.mov`

   for a nice demonstration of both the chips model and the number line model for addition and subtraction of integers. Think about how you would describe these approaches to children. Which do you prefer?

5. In addition to your assigned reading of sections 5.1 and 5.2, I will email you a list of homework problems to be turned in at the beginning of Tuesday's lecture. Some of the problems may be based on your visiting the website listed above and on your reading of these sections.

6. In anticipation of our work with fractions next week make sure that you can easily compute and simplify the following.

   (a) $\frac{2}{3}+\frac{2}{5}$ $= \frac{2\cdot 5}{3\cdot 5} + \frac{2\cdot 3}{5\cdot 3} = \frac{10}{15} + \frac{6}{15} = \frac{16}{15}$

   (b) $\frac{7}{8}-\frac{3}{4}$ $= \frac{7}{8} - \frac{3\cdot 2}{4\cdot 2} = \frac{7}{8} - \frac{6}{8} = \frac{1}{8}$

   (c) $\frac{4}{3}\times\frac{6}{5}$ $= \frac{4\cdot 6}{3\cdot 5} = \frac{24}{15} = \frac{8}{5}$

   (d) $\frac{3}{8}\div\frac{1}{2}$ $= \frac{3}{8}\cdot\frac{2}{1} = \frac{6}{8} = \frac{3}{4}$

   (e) $3\div\frac{3}{4}$ $= 3\cdot\frac{4}{3} = 4$

   (f) $\frac{3}{4}+\frac{1}{6}-\frac{1}{10}$ $= \frac{3\cdot 15}{4\cdot 15} + \frac{1\cdot 10}{6\cdot 10} - \frac{1\cdot 6}{10\cdot 6} = \frac{45}{60} + \frac{10}{60} - \frac{6}{60} = \frac{49}{60}$

   (g) $1+\frac{1}{1+1}$ $= 1+\frac{1}{2} = \frac{3}{2}$

   (h) $1+\frac{1}{1+\frac{1}{1+1}}$ $= 1+\frac{1}{1+\frac{1}{2}} = 1+\frac{1}{3/2} = 1+\frac{2}{3} = \frac{5}{3}$

   (i) $1+\frac{1}{1+\frac{1}{1+\frac{1}{1+1}}}$ $= 1+\frac{1}{1+\frac{1}{1+\frac{1}{2}}} = 1+\frac{1}{1+\frac{1}{3/2}} = 1+\frac{1}{1+\frac{2}{3}}$

   $= 1+\frac{1}{5/3} = 1+\frac{3}{5} = \frac{8}{5}$