Answers to some of the test 1 practice problems:

6. The answer is $\dfrac{3}{4}-\dfrac{2}{5}=\dfrac{3}{4}\times\dfrac{5}{5}-\dfrac{2}{5}\times\dfrac{4}{4}=\dfrac{15}{20}-\dfrac{8}{20}=\dfrac{7}{20}$ of a cup of milk

7. $\dfrac{2}{3}\times\dfrac{1}{4}=\dfrac{2}{12}=\dfrac{\cancel{2}}{\cancel{2}\times6}=\dfrac{1}{6}$ of a lb of peanuts (notice that the question asked how much she ate, not how much is left)

8. $\dfrac{3}{4}+\dfrac{1}{2}=\dfrac{3}{4}+\dfrac{1}{2}\times\dfrac{2}{2}=\dfrac{3}{4}+\dfrac{2}{4}=\dfrac{5}{4}=1\dfrac{1}{4}$ lbs of Legos
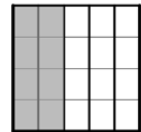
9. $\dfrac{1}{3}\times\dfrac{4}{5}=\dfrac{4}{15}$ ft was given to Kim. $\dfrac{4}{5}-\dfrac{4}{15}=\dfrac{4}{5}\times\dfrac{3}{3}-\dfrac{4}{15}=\dfrac{12}{15}-\dfrac{4}{15}=\dfrac{8}{15}$ is how much she has left

What sorts of details I want to see on explanations:
12. Find an equivalent fraction for 4/5 using a
     a.   on a number line
     b.   on a circle diagram
     c.   on a rectangular diagram
- Show 4/5 using the correct type of diagram
- Show and explain splitting each fifth into the same number of pieces (for example: split each fifth into 3 pieces)
- Use multiplication to find the number of shaded pieces and explain (for example: each of the 4 shaded fifths is split into 3 pieces, so there are 4×3 pieces shaded)
- Use multiplication to find the number of pieces in a whole (eg. each of the 5 fifths in a whole are split into 3 pieces so there are 5×3 pieces in a whole)
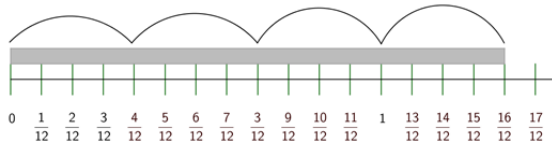- Tell the equivalent fractions (eg. $\dfrac{4}{5}=\dfrac{4\times3}{5\times3}=\dfrac{12}{15}$

13. Use multiplication to find and explain the equivalent fractions shown in this diagram:
- Explain the fraction with the smaller denominator: eg. there are 5 columns in the whole and 2 columns are shaded, so this picture shows 2/5
- Explain the fraction with the larger denominator using multiplication:
  o   The small rectangles in the whole are in an array that is 5 across and 4 down, so there are 5×4 parts in the whole, and each part is 1/20 of the whole
  o   The small rectangles in the shaded section are in an array that is 2 across and 4 down, so there are 2×4 parts that are shaded
- Make the equivalent fractions: so $\dfrac{2}{5}=\dfrac{2\times4}{5\times4}=\dfrac{8}{20}$

14. Use grouping and division to find a simplified version of the fraction shown in this diagram:

- Show how to group the smaller fractions into groups. You should have a whole number of groups that make up the fraction, and a whole number of groups that make up 1 whole
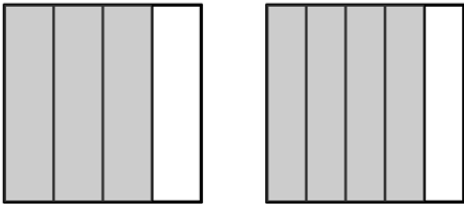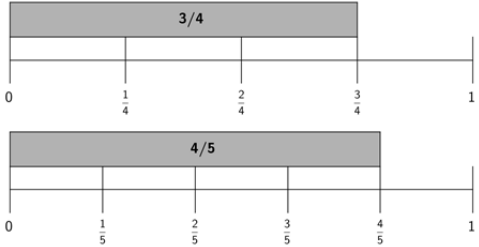

| 0 | $\frac{1}{12}$ | $\frac{2}{12}$ | $\frac{3}{12}$ | $\frac{4}{12}$ | $\frac{5}{12}$ | $\frac{6}{12}$ | $\frac{7}{12}$ | $\frac{3}{12}$ | $\frac{9}{12}$ | $\frac{10}{12}$ | $\frac{11}{12}$ | 1 | $\frac{13}{12}$ | $\frac{14}{12}$ | $\frac{15}{12}$ | $\frac{16}{12}$ | $\frac{17}{12}$ |

- Explain your grouping: eg.
  - I can group the twelfths into groups of 4 twelfths. $16 \div 4 = 4$, so there are 4 groups in the total 16/12
  - $12 \div 4 = 3$, so there are 3 groups in a whole 12/12.
- Write the equivalent fractions, showing the division or factoring step: $\dfrac{16}{12} = \dfrac{16 \div 4}{12 \div 4} = \dfrac{4}{3}$

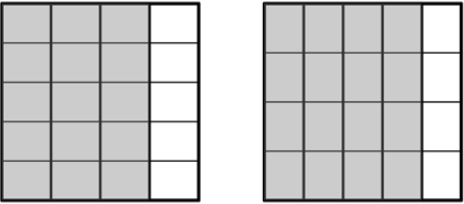 or $\dfrac{16}{12} = \dfrac{4 \times \cancel{4}}{3 \times \cancel{4}} = \dfrac{4}{3}$
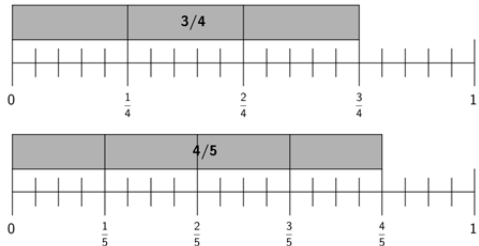
15. Use a diagram and multiplication to find equivalent fractions with a common denominator for 4/5 and 3/4

Bonus! You get two versions of the answer. I expect most of you will want to use the rectangular model, but it works with circles and number lines too. You only have to know one of these ways of showing and explaining.

- Draw both fractions separately, but part of the same-sized whole

Rectangular model	Number line model
The left square shows fourths. 3 of the fourths are shaded in. The right square shows fifths. 4 of the fifths are shaded in	The bar on the top number line has a length of 3/4, and the bar on the bottom number line has a length of 4/5.

- Subdivide each of the fractions so that the two wholes now have the same sized parts. Explain why your subdivision makes equal sized parts (by explaining why each subdivision gives the same number of parts in a whole)

If I split each of the 4 fourths on the left into 5 pieces, there will be 4×5 pieces in the whole. Each piece is 1/20. If I split each of the 5 fifths on the right into 4 pieces there will be 5×4 pieces in the whole. Each piece is 1/20.	On the top number line, if I split each of the 4 fourths in a whole into 5 pieces, there will be 4×5 pieces in the whole. Each piece is 1/20. On the bottom number line, if I split each of the 5 fifths in a whole into 4 pieces there will be 5×4 pieces in the whole. Each piece is 1/20.

- Show and explain the multiplications that get you the equivalent fractions

The shaded part that shows 3/4 has 3×5 pieces in it because each of the 3 shaded columns was split into 5 pieces. So $\dfrac{3}{4} = \dfrac{3\times5}{4\times5} = \dfrac{15}{20}$ The shaded part that shows 4/5 has 4×4 pieces in it because each of the 4 shaded columns was split into 4 pieces. So $\dfrac{4}{5} = \dfrac{4\times4}{5\times4} = \dfrac{16}{20}$	Each fourth in the top number line is the same length as 5 short pieces, so the 3 shaded parts have the same length as 3×5 short pieces, and $\dfrac{3}{4} = \dfrac{3\times5}{4\times5} = \dfrac{15}{20}$ Each fifth in the bottom number line is the same length as 4 short pieces, so the 4 shaded parts have the same length as 4×4 short pieces, and $\dfrac{4}{5} = \dfrac{4\times4}{5\times4} = \dfrac{16}{20}$