Math 247 Final Exam topics:

There will be some questions on the new content, which includes:

- Finding areas that can be broken into rectangles and triangles on a grid.
- Finding perimeters on a grid
- Identifying the height given a triangle with an identified base
- Knowing some common errors:
    - Error: counting dots instead of spaces for lengths
    - Error: counting diagonal lengths the same as regular grid lengths
    - Deciding that if a change to a shape makes the area smaller, then the area has to get smaller or vice versa (when the shapes are not similar)
- Relating lengths, areas, and volumes for similar shapes.
- Ratio problems (multiplicative comparison)

There will also be a lot of the test that is about fractions. In particular, you'll be answering questions about:

- Simplifying fractions
- Adding or subtracting fractions
- Multiplying fractions
- Dividing fractions

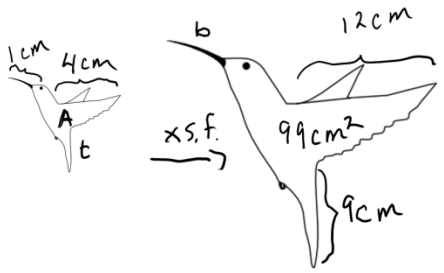
To understand and explain fractions and fraction operations, you can use some of the strategies we have practiced in this class:

- Writing word problems that work with both whole numbers and fractions
- Making fraction diagrams with units carefully labelled that match addition, subtraction, multiplication, partitive division or measurement division.
- Comparing the operations (multiplication, addition etc.) you do for the numerator and denominator in a diagram to the operations (multiplication, addition, etc.) you do for the numerator and denominator in a standard numerical algorithm

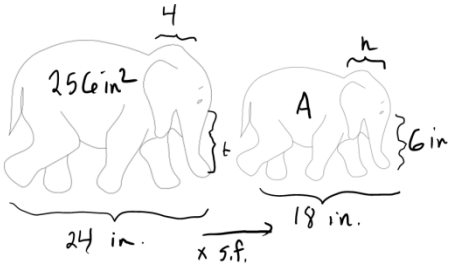
You are likely to be asked to do some or all of these steps for particular fraction operations.

Practice problems:

1.	original	scale factor	new
beak	1 cm		
wing	4 cm		12 cm
tail			9 cm
Area			99 cm^2



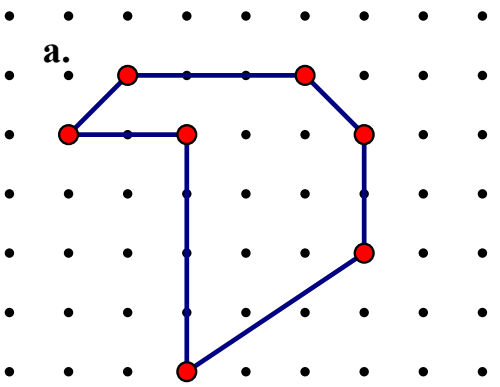
2.	original	scale factor	new
trunk			6 in
length	24 in		18 in
head	4 in		
area	256 in^2		

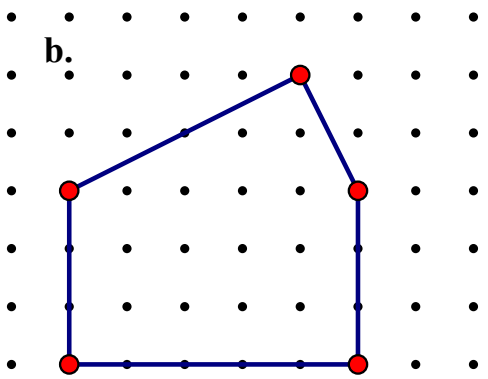


3. I have two similar/proportional pictures of a bus. If the smaller bus has area 15 cm^2, and the area of the large bus is 60cm^2, what is the (length) scale factor that compares the large one to the small one?

4. Maya painted a tiger that was 12 inches high, and it used 1/2 oz of paint. If she wants to enlarge her picture (proportionately) to make a mural 6 feet high, how much paint will she need? (this one is extra tricky)

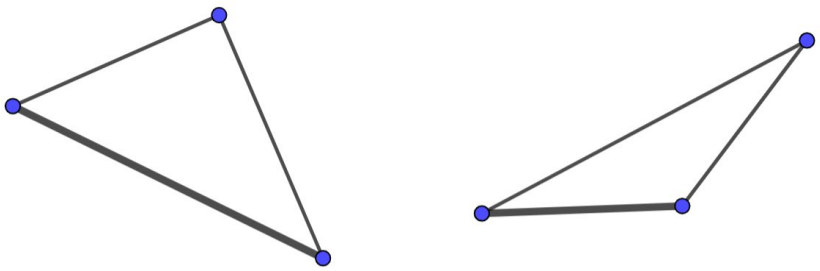
5. Figure out the side lengths and find each of these perimeters. Show your work in a neat, easy to follow way (assume a 1-cm grid size).





6. Find the areas of the shapes in #5

7. Draw the heights that correspond to the bold base in these triangles:



8. For the word problems below:

- Draw a bar diagram (or similar bar diagram)
- Solve the problem by multiplying and dividing by whole numbers
- Write a fraction multiplication expression for the solution

a. In a bag of M&Ms there are 3/5 as many red M&Ms as green M&Ms. There are 15 red M&Ms. How many green M&Ms are there?
b. In a bag of M&Ms there are 3/5 as many red M&Ms as green M&Ms. There are 15 green M&Ms. How many red M&Ms are there?
c. Mike has 3/4 of a quart of juice. Jane has 3/5 as much juice as Mike. How much juice does Jane have?
d. Jane has 3/4 of a quart of juice. Jane has 3/5 as much juice as Mike. How much juice does Mike have?

9. Explain (using a diagram) how to simplify 12/15

10. For the problem: $\frac{7}{8}-\frac{2}{3}$

a. Write a word problem
b. Show how to solve it with a diagram
c. Show how to solve it with a numerical algorithm
d. Explain how the diagram work matches the number work.

11. For the problem: $1\frac{3}{8}\times\frac{3}{4}$

a. Write a word problem
b. Show how to solve it with a diagram
c. Show how to solve it with a numerical algorithm
d. Explain how the diagram work matches the number work.

12. For the problem: $1\frac{3}{8}\div\frac{2}{3}$

a. Write a word problem
b. Show how to solve it with a diagram
c. Show how to solve it with a numerical algorithm
d. Explain how the diagram work matches the number work.