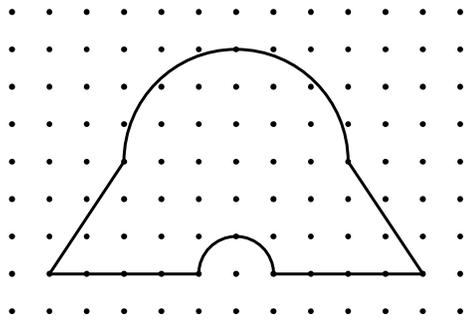


**Math 247 Final exam topics and practice, Spring 2017**

1. Find the perimeter. Show your work clearly. Leave answers in exact (square root and  $\pi$  form)



Full credit notes: Label and show your steps for each part (diagonal, horizontal, arc).

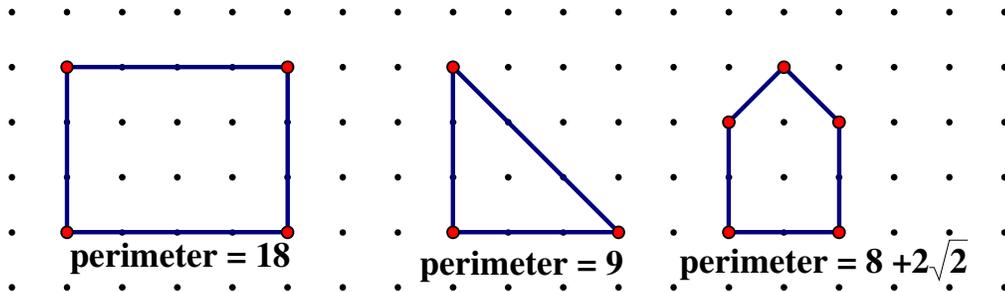
Know how to combine two of the same square roots

Know how to add, multiply and simplify fractions with  $\pi$

Make sure you are using the right formulas (circumference vs area)

Don't try to combine lengths by grouping and subtracting: add the pieces together.

2. What common misconceptions might lead to these wrong answers when finding the perimeter of these shapes:



3. Are these shapes similar?

<p>a. Which pair(s) of these triangles are similar?</p>	<p>Are these similar?</p>	<p>Are these similar?</p>
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**Find lengths, areas and volumes using scale factors:**

<p>4. These shapes are similar. Find the length of the missing side</p>	<p>5.</p> <p>a. what is the length of the beak of the larger bird?</p> <p>b. what is the length of the tail of the smaller bird?</p> <p>c. what is the area of the smaller bird?</p>
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6. Tara makes stuffed dragons. She wants to make a larger, proportional (similar), dragon to display in the shop window. Her regular dragons are  $1\frac{1}{2}$  ft. long. She plans to make a display dragon that is 6 ft long.

a. Regular dragons are 8 inches high. How tall will the larger dragon be?

b. It takes  $12\text{ ft}^2$  to make a regular dragon. How much square feet of fabric should she buy to make the larger dragon?

c. The fabric she buys is 1-yard (3 ft) wide, how many feet long should the 1-yard wide fabric be to get the correct amount of fabric?

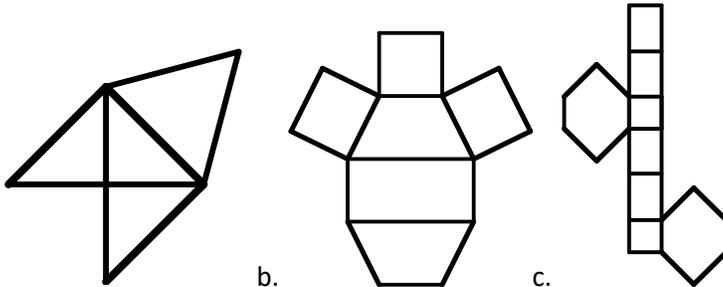
d. It takes 2 lbs. of stuffing to fill the regular dragons. How much stuffing should she buy for the large dragon?

6'. I took a picture of a heart that was  $6 \text{ cm}^2$  and stretched it so it was 3 times as wide and  $1 \frac{1}{2}$  times as high. What is the area of this new heart?



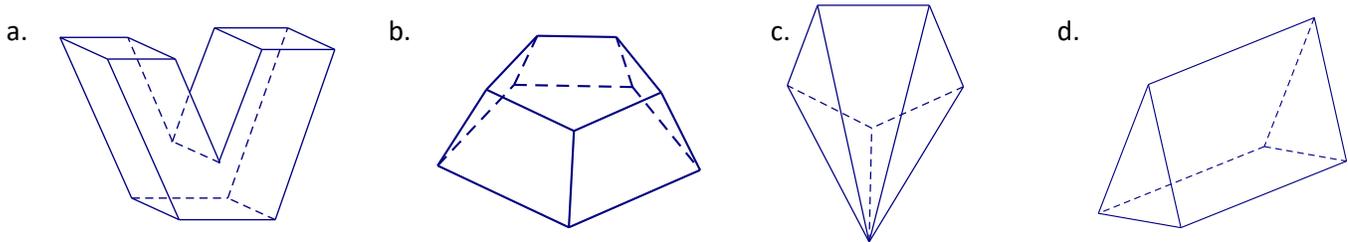
**Prisms and pyramids, nets and surface area**

7. Describe/name the polyhedron that would be constructed from this net

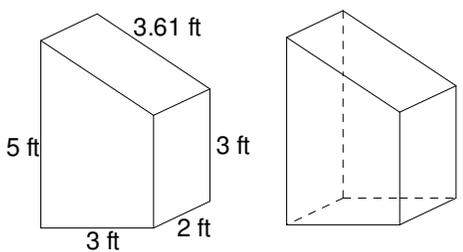


a. b. c.

8. For each of these, tell if it is a pyramid, a prism or neither. If it is a pyramid or prism, shade a/the base.



9. a. Sketch a net for the bin (label the lengths on your sketch)



b. Sarah wrote the following as her work for finding the surface area of the bin. Tell whether she is correct or not, and if she is incorrect, make corrections to her work.

Sarah: the front of the bin is a square and a triangle so the area is  $3 \times 3 + \frac{1}{2}(3 \times 2)$   
 the top is a rectangle:  $3.61 \times 2$  and the side is a rectangle:  $2 \times 3$ .  
 Multiply by 2 for the hidden sides, so the surface area is  $2 \times 25.22 = 50.44$

**Graphing data: bar graphs, picture graphs, line plots, histograms and box plots; mean, mean absolute deviation, median and quartiles.**

- 10. For a given set of category data, make a (scaled) bar graph or picture graph.
- 11. For a given set of number of measurement data, make a line plot.
- 12. For a sorted set of number data given for several categories or populations: find the median and quartiles, and make a box plot comparing the data between the categories. Write an summary and conclusion that compares the data in the different categories.

**Other topics:**

**Ratios:**

13. Starting from the ratio information, the ratio of hardback to paperback books on my bookshelf is 3:5, express this same relationship in several ways:

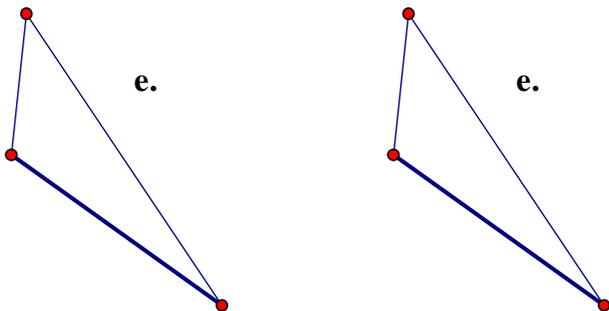
- a. Draw a bar diagram
- b. Write a multiplicative comparison description
- c. Write a part-whole fraction description.

14. There are  $\frac{2}{3}$  as many male teachers as female teachers in a school. If there are 30 teachers altogether, how many more female teachers than male teachers are there?

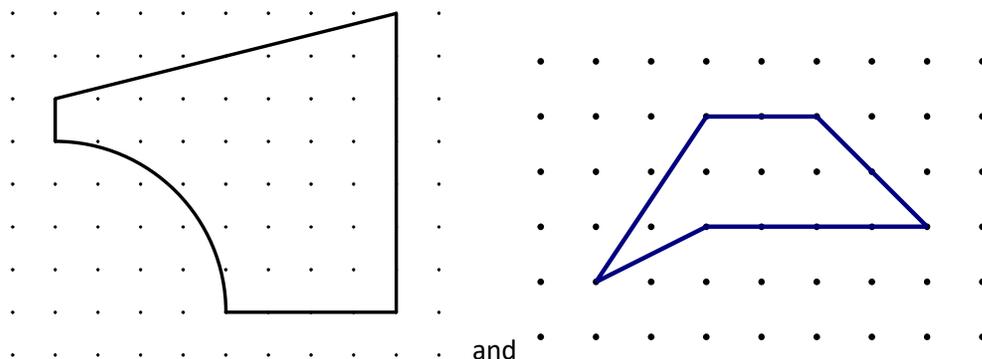
15. At the pet store the ratio of mongrels to pure-breds is two to seven. Two more pure-bred dogs and two more mongrels are brought in. If there are 8 mongrels after the new dogs arrive, how many dogs are there now?

**Area**

16. For this triangle, draw in the height, using the bold side as the base, and draw in a parallelogram with twice the area that shares the bold side as a base:



17. Find the area of:



**Fraction representations, fraction comparison, fraction addition, subtraction, multiplication and division.**

18. If  shows 1 whole, how much shows  $\frac{2}{3}$ ?

19. Give good (complete) comparison answers using an appropriate choice of the strategies we have been studying (same denominator, same numerator, transitive or residual). You do not need to give the name of your strategy.

- a.  $\frac{3}{8}$  and  $\frac{3}{10}$
- b.  $\frac{3}{8}$  and  $\frac{5}{8}$

20. How do we know that fifteenths are bigger than sixteenths?

**Problems from the second quiz topics that might be on the exam:**

21. Explain how to add  $\frac{2}{3} + \frac{3}{4}$  by making a visual model and multiplying

(for example: you could use fractions squares to show the fractions and visually find equivalent fractions with the same denominator by splitting; then use the fraction squares to explain how to find the numerical value of the equivalent fractions by multiplying)

22. Show how to solve  $\frac{3}{4} \times \frac{5}{6}$  using a square area diagram. Explain how to get the multiplication steps  $\frac{3 \times 5}{4 \times 6}$  from your diagram.

23. . Which equation matches each question (note, some equations may be used twice, and others not at all)

a. A full box of crackers holds $\frac{5}{4}$ lb of crackers. How many lbs of crackers is in $\frac{2}{3}$ of a box of crackers?	i. $\frac{5}{4} + \frac{2}{3}$
b. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If my friends eat $\frac{2}{3}$ of the box, how many lbs of crackers be left?	ii. $\frac{5}{4} - \frac{2}{3}$
c. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If my friends eat $\frac{2}{3}$ lb of crackers, how many lbs of crackers will be left?	iii. $\frac{5}{4} \times \frac{2}{3} = \frac{2}{3} \times \frac{5}{4}$
d. A full box of crackers holds $\frac{5}{4}$ lb of crackers. How many lbs of crackers is in 4 boxes of crackers?	iv. $\frac{5}{4} \div \frac{2}{3}$
e. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have 4 lbs of crackers, how many boxes is that?	v. $\frac{2}{3} \div \frac{5}{4}$
f. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have $\frac{2}{3}$ lbs of crackers, how many boxes is that?	vi. $4 \times \frac{5}{4} = \frac{5}{4} \times 4$
g. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have a box of crackers and another $\frac{2}{3}$ of a box of crackers, how many lbs of crackers do I have?	vii. $4 \div \frac{5}{4}$
h. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have a box of crackers and another $\frac{2}{3}$ lbs of crackers, how many lbs of crackers do I have?	viii. $\frac{5}{4} \div 4$
i. A blue box of crackers holds $\frac{5}{4}$ lb of crackers. A red box of crackers holds $\frac{2}{3}$ lbs of crackers. How many more lbs of crackers are in a blue box than a red box.	ix. $\frac{5}{4} + \left(\frac{5}{4} \times \frac{2}{3}\right)$
j. I have $\frac{2}{3}$ of a box of crackers. My crackers weigh $\frac{5}{4}$ lb. How much does a full box of crackers weigh?	x. $\frac{5}{4} - \left(\frac{5}{4} \times \frac{2}{3}\right)$

24. Know how to make a diagram to solve: 23 a, c, e, h, j