

Name: \_\_\_\_\_

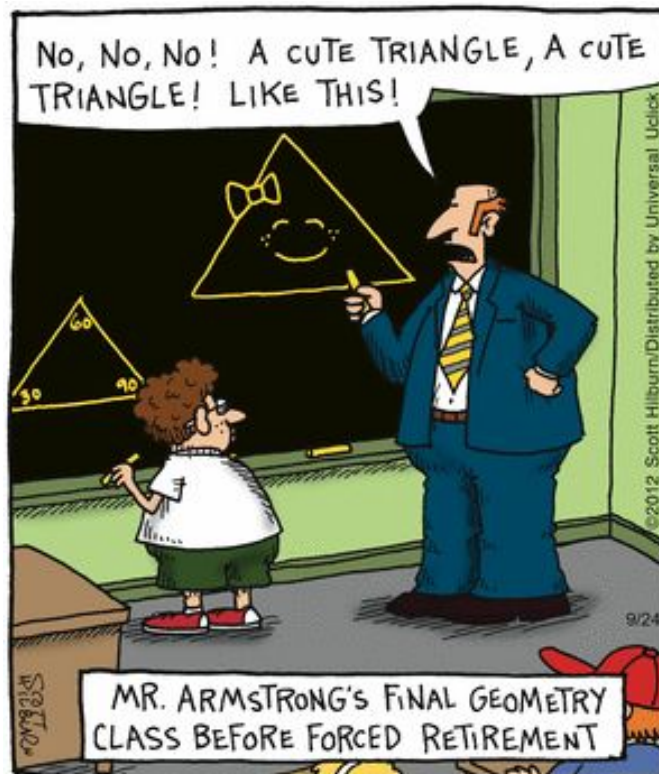
Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Do not start this exam until instructed; you will have 50 minutes to finish the exam. No notes, books, calculators, phones or electronic devices are allowed on this exam. If you have a question, raise your hand; otherwise, there is no talking during the exam.

There are 12 problems on this exam on 6 pages, in addition to this cover page. The point values of each problem vary, but are listed in the questions.

Good luck!



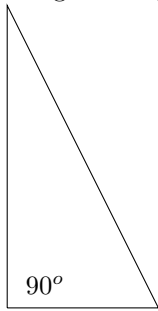
From Argyle Sweater.

1. (2+2+2+2=8 points) For the following problems, no work is necessary - just give the answer.
- (a) Describe the teaching sequence for *area*.
  
  
  
  
  
  
  
  
  
  
  - (b) Name at least 2 polygons that tessellate.
  
  
  
  
  
  
  
  
  
  
  - (c) 3 pairs of congruent sides proves congruence between triangles (SSS congruence).  
If, similarly, there are 4 pairs of congruent sides between two *quadrilaterals* are the two figures necessarily congruent?
  
  
  
  
  
  
  
  
  
  
  - (d) If a square and a rectangle that is not a square have the same perimeter which has the larger area?  
*Hint:* Construct an example.
2. (2+2+2+2=8 points) For the following problems, mark true or false. No work is necessary.
- |   |      |       |
|---|------|-------|
| All parallelograms with a right angle are <i>rectangles</i> .                 | True | False |
| A triangle with sides of lengths 24, 35, 51 units is a <i>right</i> triangle. | True | False |
| A parallelogram with perpendicular diagonals is necessarily a <i>kite</i> .   | True | False |
| Every number can be written as a fraction.                                    | True | False |

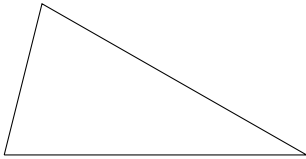
3. (20 points) State and prove the Pythagorean Theorem.

4. (5+7=12 points) Prove the area of a triangle is  $\frac{1}{2}$ base  $\times$  height in the following cases:

(a) A right triangle

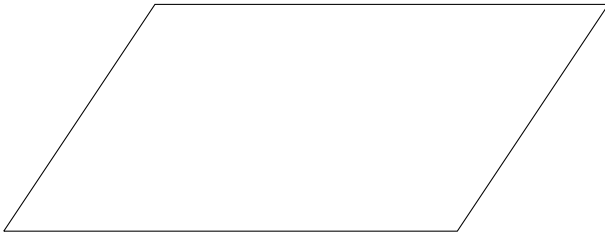


(b) Altitude is on the interior

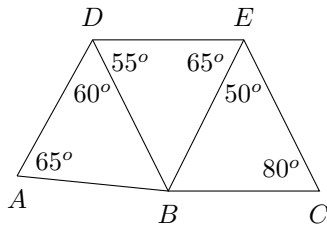


5. (10 points) Find the area of an equilateral triangle with sides of length 1 unit.

6. (5 points) Explain how to find the area of the following parallelogram in 2 different ways. Mark any lengths used in your explanation.



7. (5 points) Which of the triangles in the following figure are congruent?

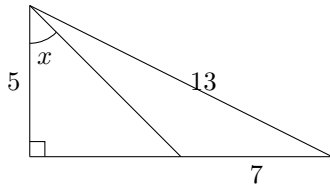


8. (3+2=5 points) Suppose you know the longest side of a triangle is 17 cm and one leg is 8 cm long.

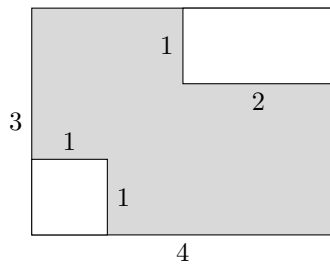
(a) Explain why the area cannot be found.

(b) Find the area if the triangle is a right triangle.

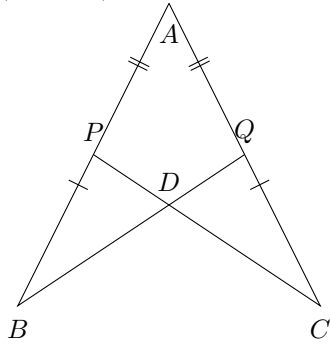
9. (5 points) Find the angle  $x$ .



10. (6 points) Find the area of the shaded region. All lengths are given in inches.



11. (8 points) In the figure,  $AP = AQ$  and  $BP = CQ$ . Show that  $BQ = CP$ .



12. (8 points) In the figure,  $AB = AC$  and  $\overline{AB}$  is parallel to  $\overline{HK}$ . Show that  $HK = HC$ .

