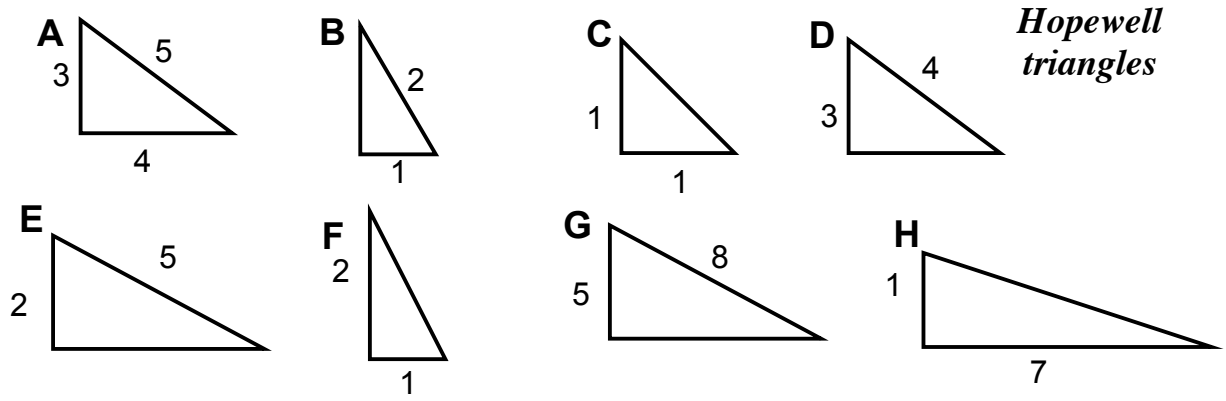
Hopewell Geometry

The Hopewell people were Native Americans whose culture flourished in the central Ohio Valley about 2000 years ago.

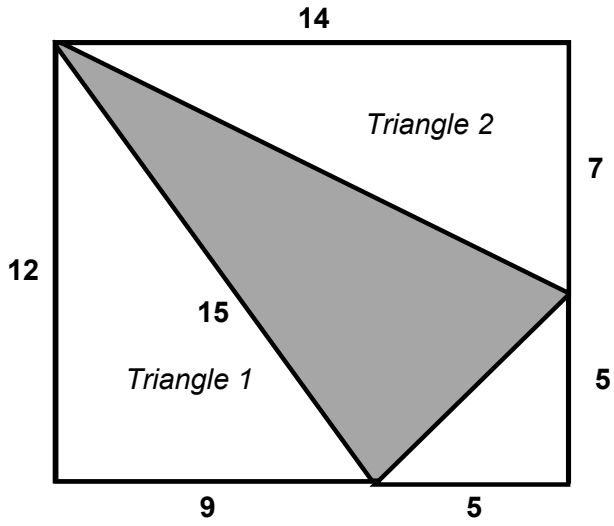
The Hopewell people constructed earthworks using right triangles, including those below.



1. What is the length of the hypotenuse of Triangle H?
   Give your answer correct to one decimal place. _____
   Show your calculations.

2. What is the size of the smallest angle in Triangle A?
   Give your answer correct to one decimal place. _____
   Show your calculations.

The diagram on the next page shows the layout of some Hopewell earthworks. The centers of the Newark Octagon, the Newark Square and the Great Circle were at the corners of the shaded triangle.



Not drawn to scale

The three right triangles surrounding the shaded triangle form a rectangle measuring 12 units by 14 units.

Each of these three right triangles is similar to one of the Hopewell triangles on the previous page.

For example, Triangle 3 above is similar to Hopewell Triangle C.

3. Which Hopewell triangle is similar to Triangle 1? _____

   Explain how you decided.

   _____

   _____

   _____

4. Is the shaded triangle a right triangle? _____

   Prove your answer.

   _____

   _____

   _____

Hopewell Geometry		Rubric
	Points	Section points
1. Gives correct answer: **7.1** (accept 7 or $5\sqrt{2}$) Shows correct work such as: $\sqrt{(1^2 + 7^2)}$	1 2	3
2. Gives correct answer: **36.8º to 36.9º** Shows correct work such as: $\sin^{-1}\frac{3}{5}$ or $\cos^{-1}\frac{4}{5}$ or $\tan^{-1}\frac{3}{4}$	1 1	2
3. Gives correct answer: Triangle **A** Gives correct explanation such as: Triangle 1 is an enlargement of Triangle A by a scale factor of 3.	1 1	2
4. Gives correct answer: **No** **and** Gives a correct explanation such as finds the lengths of all three sides, ($\sqrt{225}$, $\sqrt{50}$, $\sqrt{245}$), and shows they don't satisfy the Pythagorean Rule. $245 \neq 225 + 50$. *Accept other methods including:* • Uses trigonometry to find the angles (71,6, 81.9, 25.5) • Triangle 3 is isosceles ∴ it has two 45° angles. Triangles 1 and 2 are not isosceles ∴ they do not have 45° angles. Angle in shaded triangle = 180° - 45° - non 45° angle ∴ ≠ 90° *Partial credit* Gives a partially correct explanation.	3 (1)	3
Total Points		**10**