

# Mathematics Assessment Program *CCR-B1*

## College and Career Readiness Mathematics

Time allowed: 90 minutes

These tasks give you a chance to show what you know and how you reason, and to solve mathematical problems.

Please show your work and reasoning in the spaces provided. Explain any assumptions you make.

**Try as many tasks as you can in the time given.  
If you get stuck on a task, move on to the next task.**

Name: _____	Male	Female
School: _____	City: _____	
Teacher: _____	Grade: _____	
Date: _____		

Do not write in the box below:

<b>CCR-B1</b>	Short Tasks	Yogurt	Hopewell Geometry	Security Camera	Sidewalk Stones	Sugar Prices	Total
<b>11</b>							

These tests were developed with support from the Bill and Melinda Gates Foundation

## Short Tasks

1. Write the least and the greatest in this set of numbers.

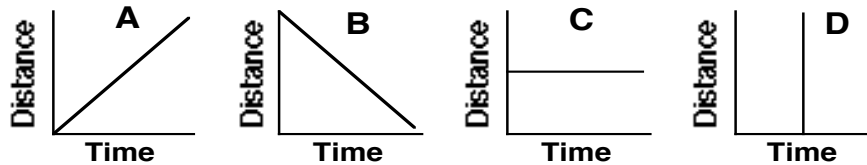
$$\sqrt[5]{7}, \sqrt[3]{7}, \sqrt[4]{7}, \sqrt{7}, \sqrt[6]{7}$$

\_\_\_\_\_

2. Expand and simplify  $(x^3 + 3x^2 - 2x + 5)(x - 7)$ .

\_\_\_\_\_

3.



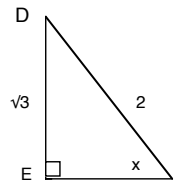
These graphs show the distances traveled from home.

Which graphs go with each of the following statements?

Statements	Answers
The car is not moving	Graph _____
The car is traveling at a steady speed	Graphs _____ and _____

4. In triangle DEF,  $DE = \sqrt{3}$  and  $DF = 2$ .

What is the value of  $\tan x$ ?



\_\_\_\_\_

5. Aaron, Benjamin and Claude try to see who can make the closest estimate of 30 seconds.

One person starts a stopwatch.

One of the others tries to guess when 30 seconds has passed and says 'Stop'.

The timekeeper writes down the time when the watch is stopped.

Here are the results. All times are given in seconds.

Aaron's guesses	31	25	32	27	28
Ben's guesses	37	19	40	36	22
Claude's guesses	32	38	24	32	32

Using the median, who do you think is best at estimating 30 seconds?

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# Yogurt

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A food company produces yogurt in half-cup tubs.



$2 \text{ cups} = 1 \text{ pint}$ $2 \text{ pints} = 1 \text{ quart}$ $4 \text{ quarts} = 1 \text{ gallon}$
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1. The tubs of yogurt are sold for 75¢ each.

Twenty percent of this is profit for the food company.

How much profit does the company make on each tub? \_\_\_\_\_

Show your work.

The machine that fills the half-cup tubs with yogurt runs 10 hours a day for 5 days a week.  
It fills 1600 tubs an hour.

2. How many gallons of yogurt are needed to fill 1600 tubs? \_\_\_\_\_

Show your calculations.

3. How many gallons of yogurt are needed each week? \_\_\_\_\_

Show your work.

4. What is the percent increase in production if the machine runs for 7 days a week instead of 5 days a week? \_\_\_\_\_

Show how you figured it out.

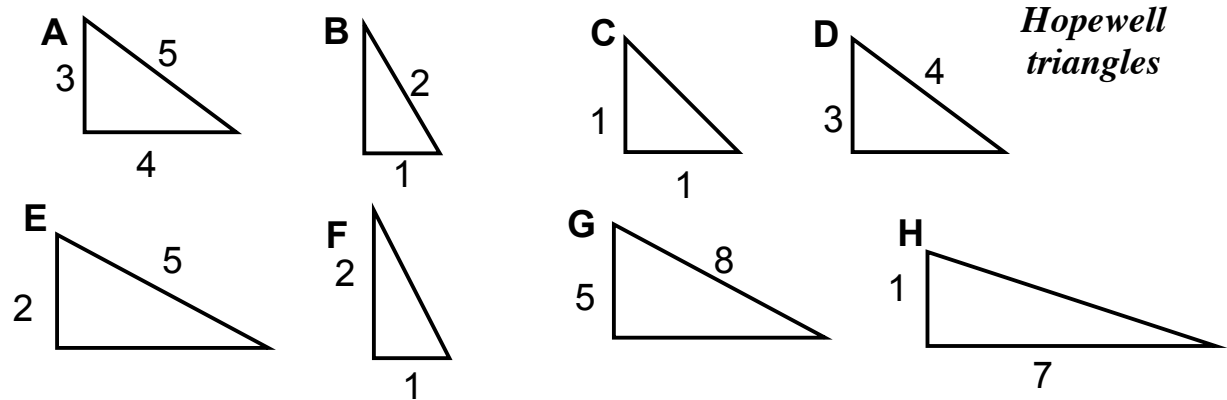
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# Hopewell Geometry

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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.

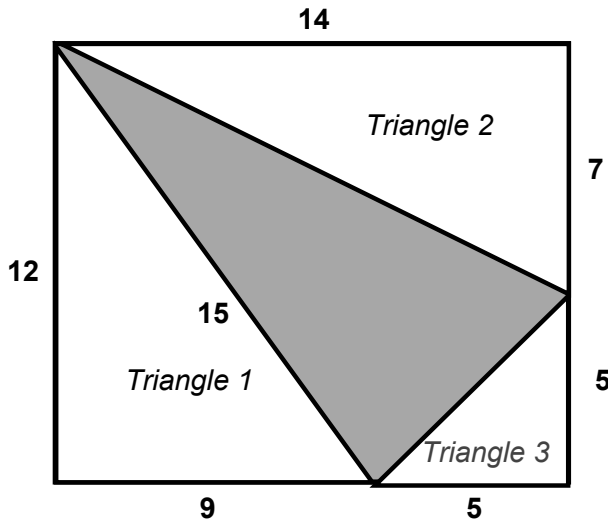
2. What is the size of the smallest angle in Triangle A?

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.

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4. Is the shaded triangle a right triangle? \_\_\_\_\_

Prove your answer.

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# Security Camera

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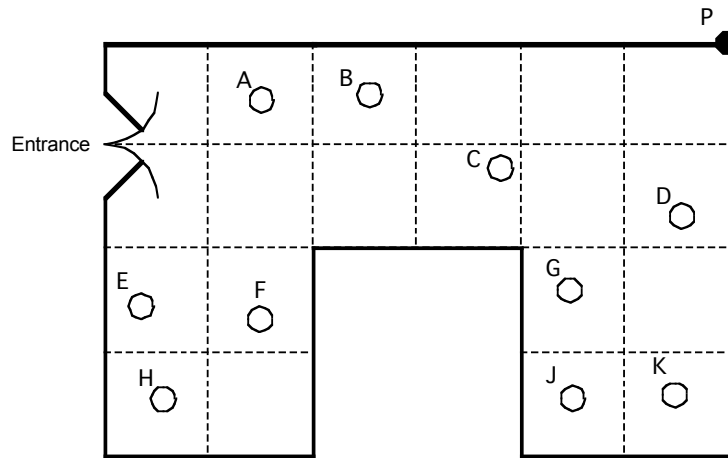
A shop owner wants to prevent shoplifting.

He decides to install a security camera on the ceiling of his shop.

The camera can turn right round through  $360^\circ$ .

The shop owner places the camera at point P, in the corner of the shop.

Plan view of the shop



1. The plan shows ten people who are standing in the shop.

These are labelled A, B, C, D, E, F, G, H, J, K.

Which people cannot be seen by the camera at P? Tell how you know.

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**Please continue your work on the page opposite.**

**Security Camera (continued)**

2. The shopkeeper says that "15% of the shop is hidden from the camera"  
Show clearly that he is right.

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3. Show the best place for the camera, so that the it can see as much of the shop as possible.  
Explain how you know that this is the best place

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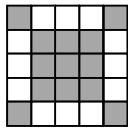
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# Sidewalk Stones

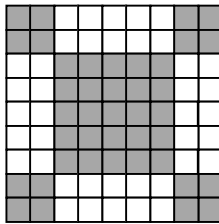
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In Prague some sidewalks are made of small square blocks of stone.

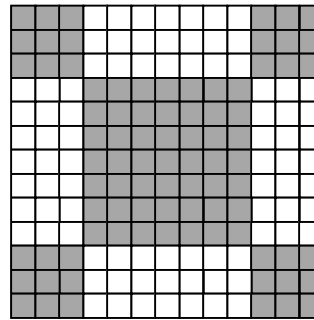
The blocks are in different shades to make patterns that are in various sizes.



Pattern #1



Pattern #2



Pattern #3

How many blocks of each kind will pattern # $n$  need?

Which pattern has a total of 841 gray blocks?

\_\_\_\_\_

How many white blocks has that pattern?

\_\_\_\_\_

Explain your work and show your calculations.

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**Please continue your work on the page opposite**

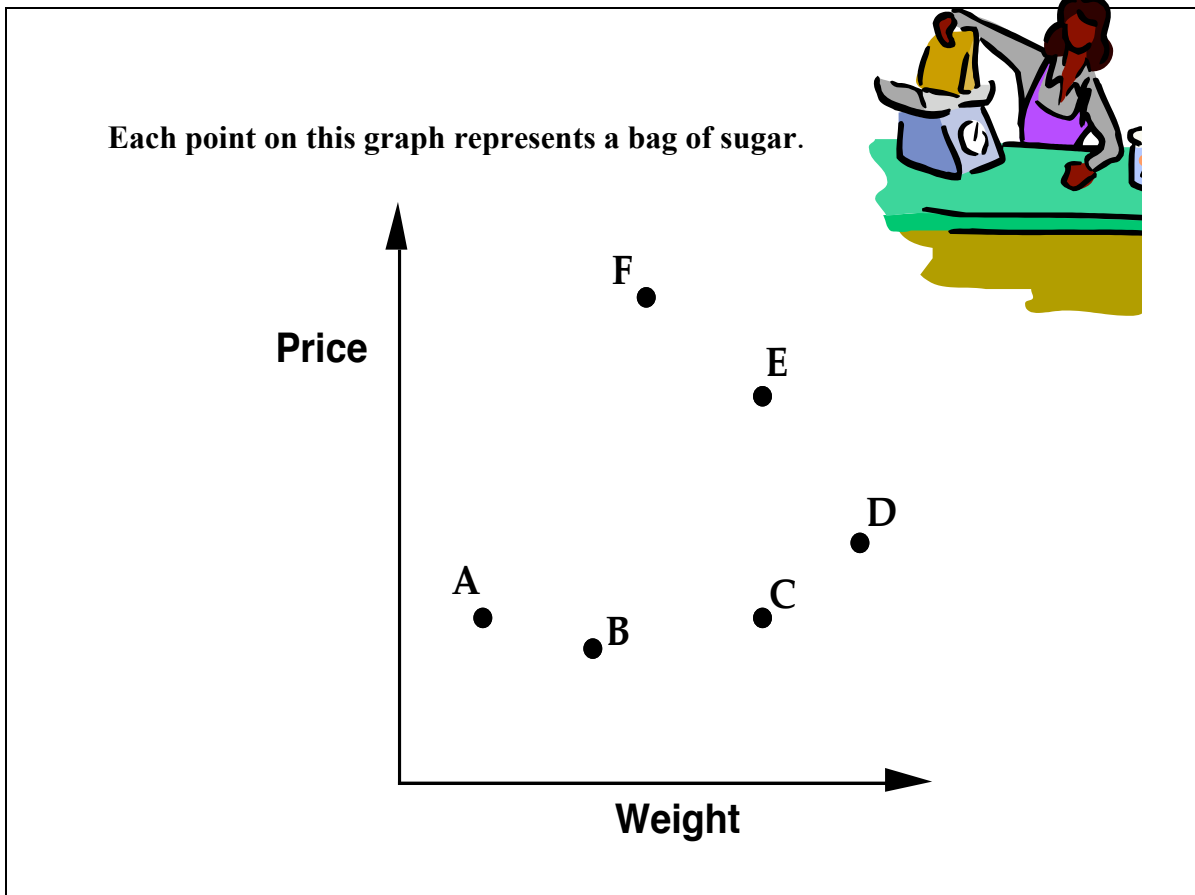


## Sidewalk Stones (continued)

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# Sugar Prices

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1. Which point shows the heaviest bag? \_\_\_\_\_
2. Which point shows the cheapest bag? \_\_\_\_\_
3. Which points show bags with the same weight? \_\_\_\_\_
4. Which points show bags with the same price? \_\_\_\_\_
5. Which of F or C gives the best value for money?  
How can you tell? \_\_\_\_\_

