Mathematics Assessment Program *CCR-A1*

College and Career Readiness Mathematics

Time allowed: 40 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:

CCR-A1	Short Tasks	Sale!	Functions	Proofs of the Pythagorean Theorem	Total
11					

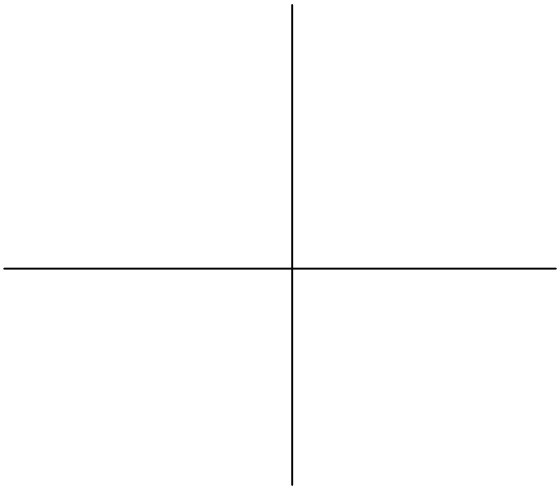
These tests were developed with support from the Bill and Melinda Gates Foundation

Short Tasks

1. Simplify $(3\sqrt{5} - 2\sqrt{3})(3\sqrt{5} + 2\sqrt{3})$

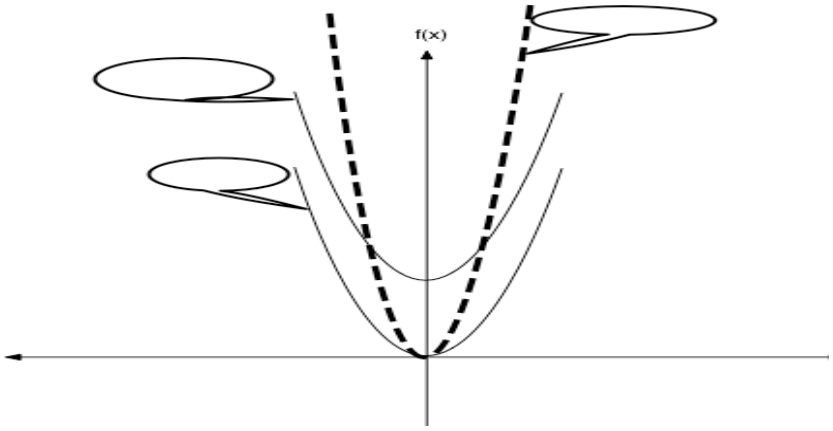
2. Identify the zeros of $f(x) = -x^2 - 3x + 4 = -(x + 4)(x - 1)$.

Sketch a rough graph of f(x).



3. If $x^2 - y^2 = 55$, and $x - y = 11$, find the value of y.

4. These three graphs show the functions $y = x^2$. $y = x^2 + 3$. $y = 3x^2$.
Label the three graphs.



5. Find the equation of a circle with centre (2, 1) radius 5.

Sale!

The following price reductions are available.

Two for the price of one	**Buy one and get 25% off the second**
Buy two and get 50% off the second one	**Three for the price of two**

1. Which of these four different offers gives the biggest price reduction?

Explain your reasoning clearly

2. Which of these four different offers gives the smallest price reduction?

Explain your reasoning clearly.

Functions

On the grid are eight points from two different functions.

A certain linear function passes through exactly four of the points shown.

A certain quadratic function passes through the remaining four points.

For the **linear** function:

1.Write the coordinate pairs of its four points.

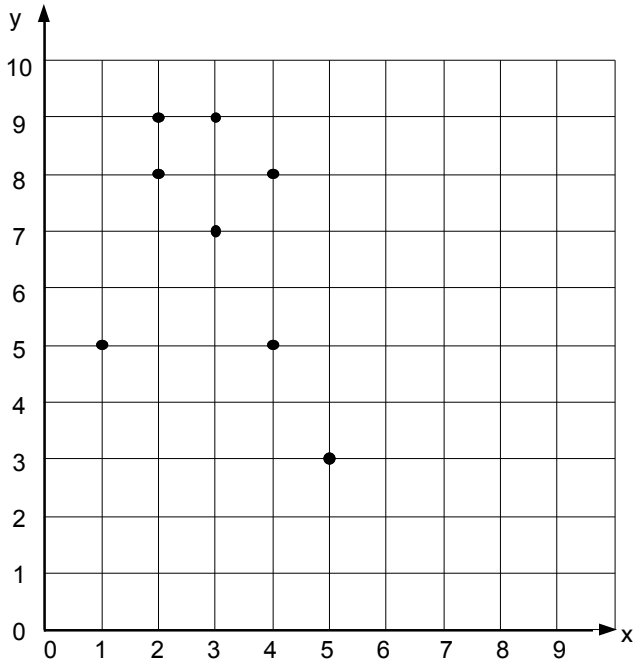
_____

_____

_____

_____

Draw the line on the grid.



2.Write an equation for the function.

Show your work.

_____

For the **quadratic** function:

3. Write the coordinate pairs of its four points.

_____ _____ _____ _____

Draw the graph of the function on the grid.

4. Write an equation that fits the quadratic function. _____
Show your work.

Proofs Of The Pythagorean Theorem?

Here are three attempts to prove the Pythagorean theorem.

Look carefully at each attempt. Which is the best 'proof' ?

Explain your reasoning as fully as possible.

Attempt 1:

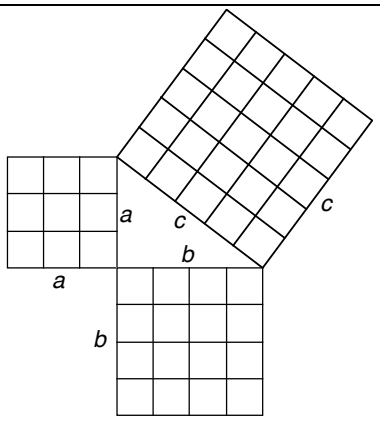
Suppose a right triangle has sides of length a, b and c

Draw squares on the three sides as shown.

Divide these squares into smaller squares.

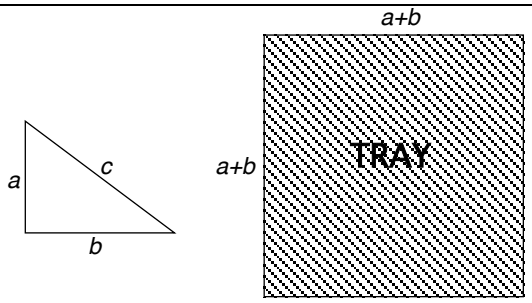
You can see that the number of squares on the two shorter sides add up to make the number of squares on the longest side.

So: $a^2+b^2=c^2$



Attempt 2

Suppose that you start with **four** right triangles with sides of length a, b and c and a square tray with sides of length $a+b$.



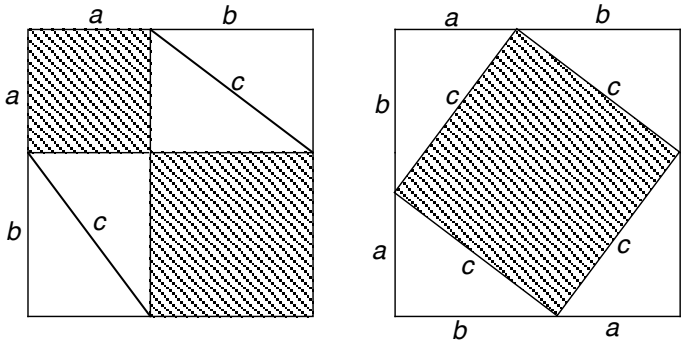
You can arrange the triangles into the tray in two different ways as shown here.

In the first way, you leave two square holes. These have a combined area of $a^2 + b^2$.

In the second way you leave one large square hole. This has an area of c^2.

Since these areas are equal

$a^2 + b^2 = c^2$

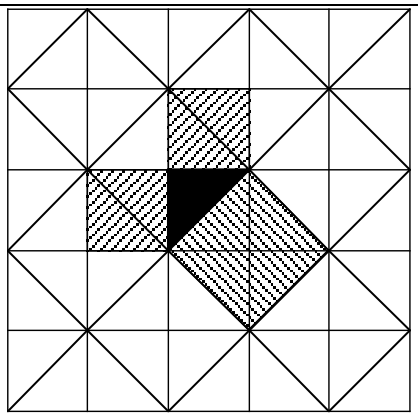


Attempt 3:

The proof of the Pythagorean theorem is clear from this diagram.

The squares on the two shorter sides of the black triangle are each made from two congruent triangles.

These fit together to make the square on the longest side- the hypotenuse.



The best proof is attempt number _____

This is because:

_____

_____

_____

_____

_____

My criticisms of the other proofs are:

_____

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