

Mathematics Assessment Program *CCR-B2*

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:

CCR-B2	Short Tasks	T-shirt Sale	Glasses	Table Tiling	Temple Geometry	Cross Totals	Total
11							

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

Short Tasks

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

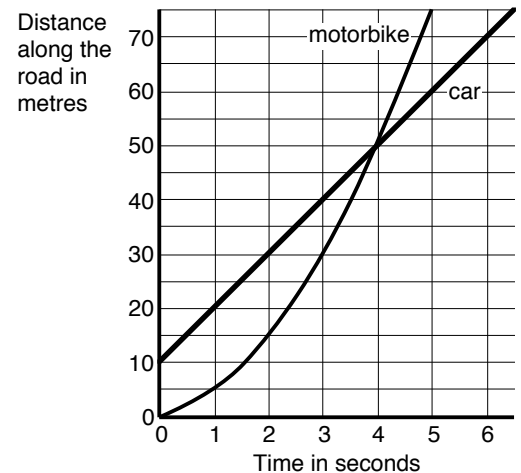
2. If x is positive and $x \neq 1$, simplify $\frac{\sqrt{x}}{x^3}$.

3. Jane, Maria, and Ben each have a collection of marbles. Jane has 15 more marbles than Ben, and Maria has 2 times as many marbles as Ben. All together they have 95 marbles. Find how many marbles Maria has.

4. If x and y are integers and $x + y < 11$, and $x > 6$. What is the smallest possible value of $x - y$?

5. This graph shows the journey of a motorbike and a car. Find the distance between the motorbike and the car at $t = 0, 1, 2, 3, 4, 5$ seconds.

Sketch a graph of the separation over time.



T-shirt Sale

T-shirt Sale
Any 3 T-shirts for \$14.50



1. Tom bought these three T-shirts at the sale price of \$14.50.
How much money did he save compared to the original total price of the T-shirts?
Show your calculations. \$ _____

2. What percentage of the original total price did Tom save? _____ %
Show your work.

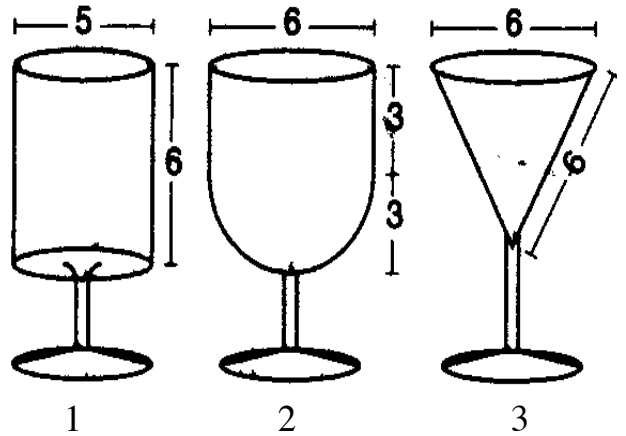
3. Harry also paid \$14.50 for three T-shirts at the sale. The sale price saved Harry 30% of the original price of the three T-shirts.
What is the original total price of his three T-shirts? \$ _____
Show your calculations.

Glasses

This diagram shows three glasses (not drawn to scale).

The measurements are all in centimeters.

The volume of a cylinder = $\pi r^2 h$
The volume of a sphere = $\frac{4\pi r^3}{3}$
The volume of a cone = $\frac{\pi r^2 h}{3}$



The bowl of glass 1 is cylindrical. The diameter is 5 cm and the height is 6 cm.

The bowl of glass 2 is a cylinder with a hemispherical bottom. The diameter is 6 cm and the height of the cylinder is 3 cm.

The bowl of glass 3 is an inverted cone. The diameter is 6 cm and the slant height is 6 cm.

1. Find the vertical height of the bowl of glass 3. Show your work.

_____ cm.

2. Calculate the volume of the bowl of each of these glasses. Show your work.

a. Glass 1

_____ cm³

b. Glass 2

_____ cm³

c. Glass 3

_____ cm³

3. Find the height of liquid in Glass 2 when it is half full. Show your calculations.

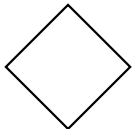
_____ cm

Table Tiling

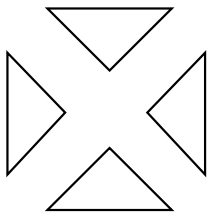
Maria makes square tables, then sticks tiles to the top.



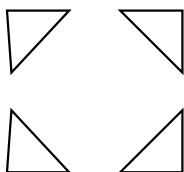
She uses three types of tiles:



whole tiles



half tiles

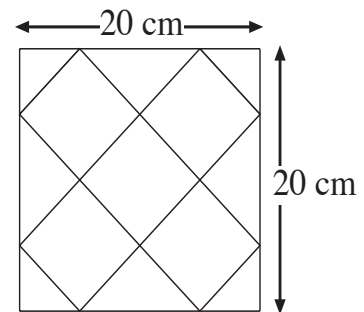


quarter tiles

The sizes of the square tabletops are all multiples of 10 cm.

Maria only uses quarter tiles in the corners and half tiles along the edges of the table.

Here is one tabletop:



This square table uses:

5 whole tiles, 4 half tiles, 4 quarter tiles.

1. How many tiles of each type will she need for a 40 cm by 40 cm square?

2. Describe a method for quickly calculating how many tiles of each type she needs for larger, square tabletops.

Please show your work on the page opposite.

Temple Geometry

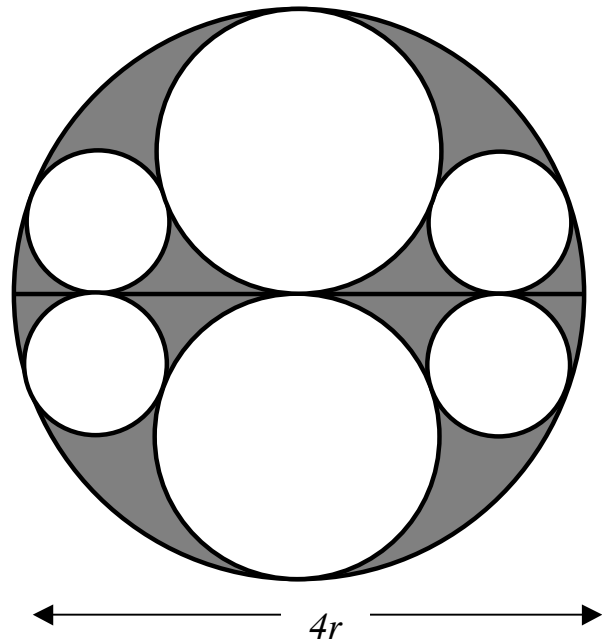
During the Edo period (1603-1867) of Japanese history, geometrical puzzles were hung in the holy temples as offerings to the gods and as challenges to worshippers.

This is one such problem.

Inside a large circle with radius $2r$, two circles of radius r are drawn.

Four smaller circles, of radius p , are drawn to touch the large circle and the circles of radius r .

The following questions will help you to find the relationship between r and p



1. In the right triangle DOB , explain why the length of OD is $2r - p$



2. Use the Pythagorean theorem in triangle DOB to find an expression for OB^2 .

3. In the right triangle ADE, explain why the length of AE is $r - p$.

4. Use the Pythagorean theorem in triangle ADE to find an expression for ED^2 .

5. Use your results from questions 2 and 4, and the fact that $OB = ED$ to show that $r = 2p$

6. Show that the shaded area of the diagram has area πr^2 .
