

# Mathematics Assessment Program *MS - 1*

## Middle School Mathematics

### Time Allowed

Section A - 40 minutes; Section B - 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:

<b>MS-1</b>	Short Tasks	Baseball Jerseys	Matchsticks	Journey	Memory Game	Taxi Cabs	Candle Box	Total

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

**Section A - 40 minutes**

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## Short Tasks

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1. On average, I sleep about 7 hours 45 minutes each day.

So, during one year, I sleep for

$$7.45 \times 365 = 2719.25 \text{ or about } 2700 \text{ hours.}$$

This calculation is not correct. What is the correct answer?

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2. Find the value of:  $\frac{2.1 \times 10^6}{7 \times 10^3}$

\_\_\_\_\_

3. Sheila works 8 hours per day on Monday, Wednesday and Friday, and 6 hours per day on Tuesday and Thursday. She does not work on Saturday and Sunday. She earns \$324 per week. How much does she earn in dollars per hour?

\_\_\_\_\_

4. A triangle has a perimeter 13. The two shorter sides have integer lengths equal to  $x$  and  $x + 1$ . What could be the lengths of the three sides of the triangle?

\_\_\_\_\_

5.

Number of accidents	0	1	2	3	4	5	6
Number of drivers	14	13	19	4	2	2	1

The table shows the results of a poll which asked drivers how many accidents they had had over the previous 5 years. What is the median number of accidents per driver?

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## Baseball Jerseys

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Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks 2 local companies to give him a price.



1. 'Print It' will charge \$21.50 each for the jerseys.

Using  $n$  for the number of jerseys ordered and  $c$  for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

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2. 'Top Print' has a one off setting up cost of \$70 and then charges \$18 for each jersey.

Using  $n$  to stand for the number of jerseys ordered and  $c$  for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

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3. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to order for the price from 'Top Print' to be less than from 'Print It'.  
Explain how you figured it out.

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4. Bill decides to order 30 jerseys from 'Top Print'.  
How much more would the jerseys have cost if he had bought them from 'Print It'?  
Show all your calculations.

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# Journey

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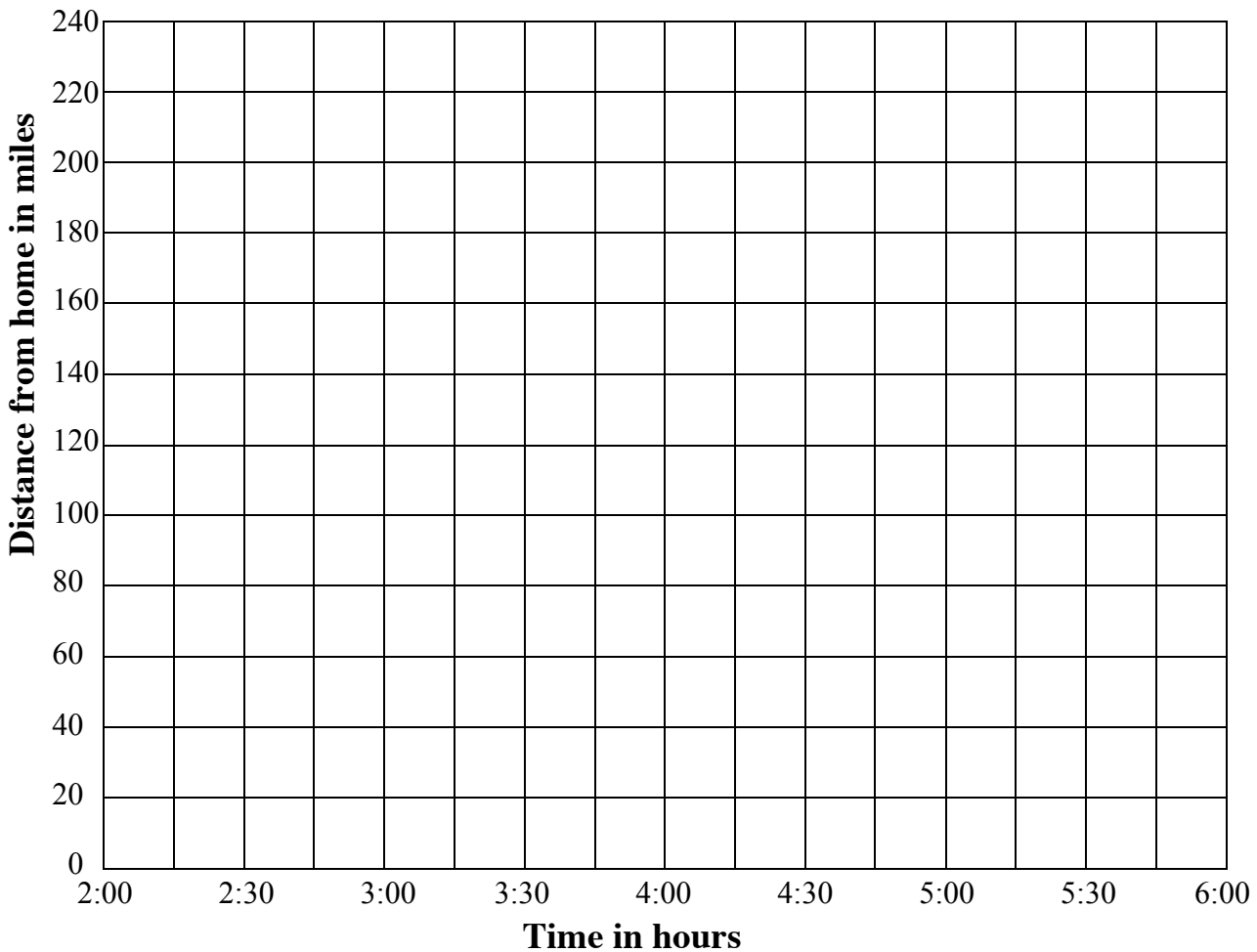
Here is a description of a car journey.

“I left home at 2:00 hours. I traveled for half an hour at forty miles an hour, then for an hour at fifty miles an hour. I had a half hour stop for lunch, then I travelled for two hours at fifty-five miles an hour.”

Complete this table showing the distances traveled by the end of each stage of my journey.

Time in hours	2:00	2:30	3:30	4:00	6:00
Distance from home in miles	0				

1. Draw a distance-time graph for this journey on the grid below.



3. What is the average speed for the whole journey?

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Explain how you figured it out.

\_\_\_\_\_  
\_\_\_\_\_

4. Use your graph to find:

a. How far from home I had traveled by 5:15.

\_\_\_\_\_ miles

b. At what time I had traveled 60 miles from home.

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# Memory Game

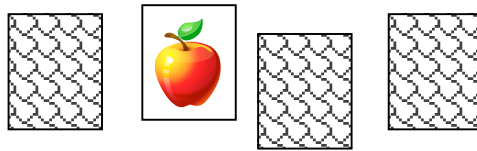
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Ella is teaching her little brother Sammy to play a memory game.



1. She starts with 4 cards, 2 have a picture of an apple on them and 2 have a picture of bananas.

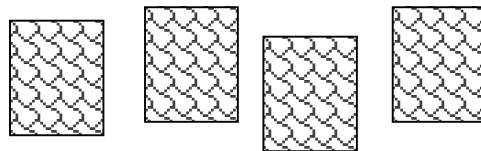
The cards are laid on the table with the pictures hidden, and then mixed up. Ella says 'you can turn over 2 cards and you win if they are the same'.



Sammy turns over 1 card, it has an apple on it, then turns another. What is the probability that the second card has an apple on it? Explain how you figured it out.

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2. Sammy did not get 2 cards the same so Ella turns the cards back over so that the pictures do not show, but she did not mix up the cards.

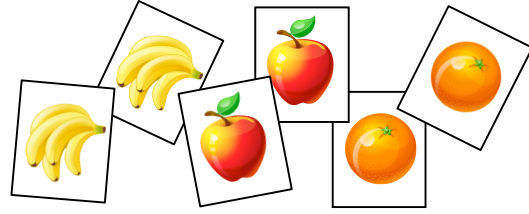


Sammy is good at remembering where things are. He turns over 1 card and then another. How should he choose the first card to turn over so that he can be sure to win?

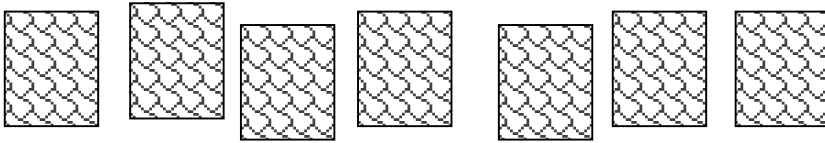
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3. Ella adds 2 cards with pictures of an orange, making 6 cards all together.



She lays all the cards down with the pictures hidden and mixes them up.



Sammy turns over 1 card and then another.

What is the probability that they are both the same?  
Explain how you figured it out.

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\_\_\_\_\_

4. What is the probability that they both have pictures of a banana?  
Show how you figured it out.

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## Matchsticks

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Matchsticks are rectangular prisms of wood measuring approximately.

$\frac{1}{10}$  inch by  $\frac{1}{10}$  inch by 2 inches.



A tree trunk can be thought of as an approximate cone of wood.

The volume of a cone is found using the formula  $\frac{1}{3}\pi r^2 h$ , where  $r$  feet is the radius of the base of the cone and  $h$  feet is the height of the cone.

How many matchsticks can be made from a tree with a trunk with a base radius of 1 foot and a height of 80 feet?

Explain your reasoning, and show all your calculations.

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**Section B - 40 minutes**

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## Taxi Cabs

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Max is organising a trip to the airport for a party of 75 people.

He can use two types of taxi.

A small taxi costs \$40 for the trip and holds up to 4 people.

A large taxi costs \$63 for the trip and holds up to 7 people.

1. a. If Max orders 6 large taxis, how many small taxis will he need?

Show how you figured it out.

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b. How much will the total cost be?

Show all your calculations.

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**Taxi Cabs** continued

2. Max can organize the journey more cheaply than this!

How many taxis of each type should Max order, to keep the total cost as low as possible?

Explain your reasoning, and show all your calculations.

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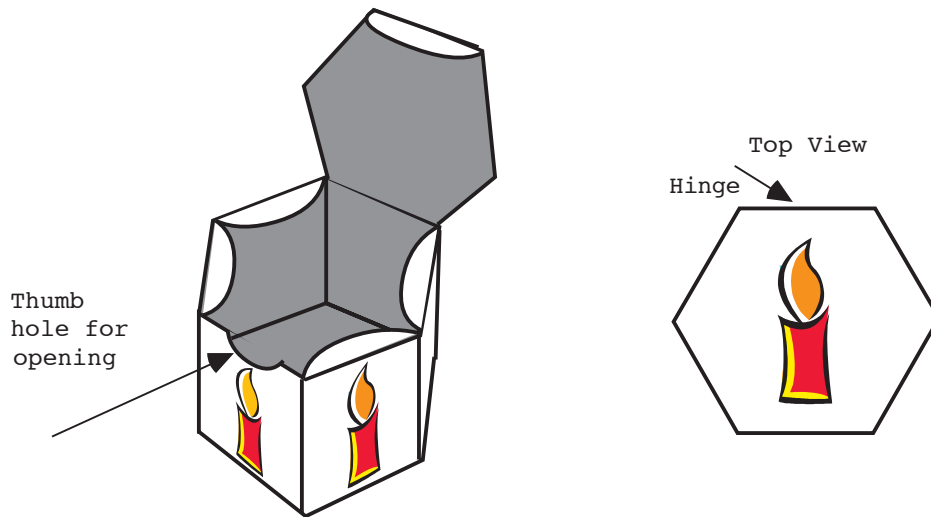
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## Candle Box

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Tom is making a little gift box to hold a candle.

I want the top and the base to be regular hexagons.  
The sides will be rectangles.  
A little candle design will go on each side.  
There will be a thumb hole to help you open the box.



Draw an accurate plan for making the box using the dotted paper provided.

It should be drawn so that when it is cut out it will stay in one piece.

One of the sides has been drawn to start you off.

Make sure that you show:

The flaps needed for gluing the box together.

Shade these in.

The flaps needed for fastening the lid (Do not shade these in),

The thumb hole,

The picture of the Birthday Candle the right way up on each side, and on the lid.

# CANDLE BOX WORKSHEET

Draw your design below:

