

# Mathematics Assessment Program *MS - 2*

## 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-2</b>	Short Tasks	25% Sale	Buying Chips and Candy	Suzi's Company	Fencing	Smoothie Box	Spinner Bingo	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. How many numbers between 200 and 400 begin or end with 3?

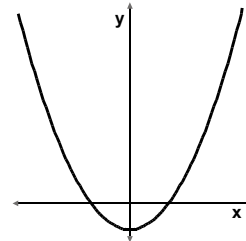
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2.. Find the value of  $(3 \times 10^4) + (2 \times 10^2) + (4 \times 10)$ .

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3. Draw a ring around the equation of this graph.

$$\begin{aligned}y &= 3x - 2 \\y &= x^3 - 2 \\y &= -2x^2 - 2 \\y &= 3x^2 - 2 \\y &= \frac{3}{x} - 2\end{aligned}$$



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4. If one leg of a right triangle is 8 inches long, and the other leg is 12 inches long, how many inches long is the triangle's hypotenuse?

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5. In a shipment of 1,000 bulbs,  $\frac{1}{40}$  of the bulbs were defective.

What is the ratio of defective to nondefective bulbs?

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## 25% Sale

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In a sale, all the prices are reduced by 25%.



1. Julie sees a jacket that cost \$32 before the sale.  
How much does it cost in the sale?

\$ \_\_\_\_\_

Show your calculations.

In the second week of the sale, the prices are reduced by 25% of the previous week's price.  
In the third week of the sale, the prices are again reduced by 25% of the previous week's price.  
In the fourth week of the sale, the prices are again reduced by 25% of the previous week's price.

2. Julie thinks this will mean that the prices will be reduced to \$0 after the four reductions because  $4 \times 25\% = 100\%$ .

Explain why Julie is wrong.

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3. If Julie is able to buy her jacket after the four reductions, how much will she have to pay?

\$ \_\_\_\_\_

Show your calculations.

Julie buys her jacket after the four reductions.  
What percentage of the original price does she save?

\_\_\_\_\_ %

Show your calculations

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## Buying Chips and Candy

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Ralph and Jody go to the shop to buy potato chips and candy bars.



Ralph buys 3 bags of potato chips and 4 candy bars. He spends \$3.75.

Jody buys 4 bags of potato chips and 2 candy bars. She spends \$3.00.

Later Clancy joins Ralph and Jody and asks to buy one bag of potato chips and one candy bar from them. They need to work out how much he should pay.

Ralph writes

$$3p + 4b = 375$$

1. If  $p$  stands for the cost, in cents, of a bag of potato chips and  $b$  stands for the cost, in cents, of a candy bar, what does the 375 in Ralph's equation mean?

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2. Write a similar equation, using  $p$  and  $b$ , for the items Jody bought.

\_\_\_\_\_

3. Use the two equations to figure out the price of a bag of potato chips and the price of a candy bar.

potato chips \_\_\_\_\_

candy bar \_\_\_\_\_

Show your work.

4. Clancy has just \$1. Does he have enough money to buy a bag of potato chips and a candy bar?

Explain your answer by showing your calculation.

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## Suzi's Company

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Suzi is the chief executive of a small company, TechScale, which makes technical instruments. Fifteen people, including Suzi, work in the company. The table shows the jobs and their annual salaries.

<i>Job Title</i>	<i>Number of people</i>	<i>Annual salary</i>	<i>Total</i>
Chief Executive	1	\$100 000	\$100 000
Marketing Manager	1	\$80 000	
Production Manager	1	\$80 000	
Technician	3	\$50 000	\$150 000
Office worker	2	\$40 000	\$80 000
Assembly worker	5	\$30 000	
Cleaner	2	\$20 000	
<i>Total</i>	<b>15</b>	<i>Total</i>	

1. a. Complete the final column of the table to find the total annual salary bill for TechScale.  
  
b. Use your answer to question 1a to calculate the mean annual salary for the 15 employees in the company. Give your answer correct to the nearest \$.

\$ \_\_\_\_\_

Show your calculations.

2. John looks at the table and says, “The mode of the salary at TechScale is eighty thousand dollars a year.”

a. What mistake has John made?

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b. What is the correct mode of the salary?

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3. a. What is the median annual salary at TechScale?

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b. Explain how you figured it out.

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4. Which of the three averages, mean, median or mode, would you use to show that the average wage at TechScale is very good?

Explain your answer.

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5. Last year, TechScale did not do very well so Suzi decided not to pay herself any salary for a year.

a. Which of the averages (mean, median and mode) will **not** change?

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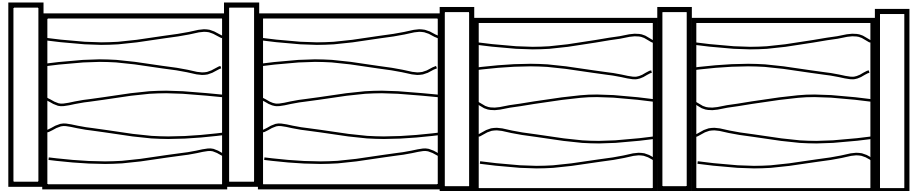
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# Fencing

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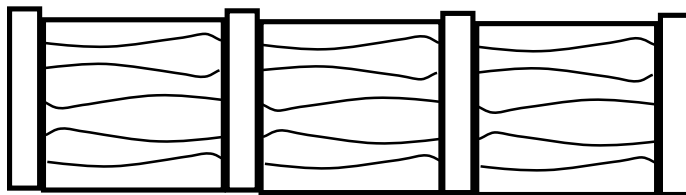
Jon buys fencing for his yard.

He pays \$122 for 5 fence posts and 4 fence panels.



He pays \$570 for 21 fence posts and 20 fence panels.

How much does he pay for 4 fence posts and 3 fence panels? \_\_\_\_\_



Explain your reasoning, and show how you figured it out.

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**Section B - 40 minutes**

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## Smoothie Box

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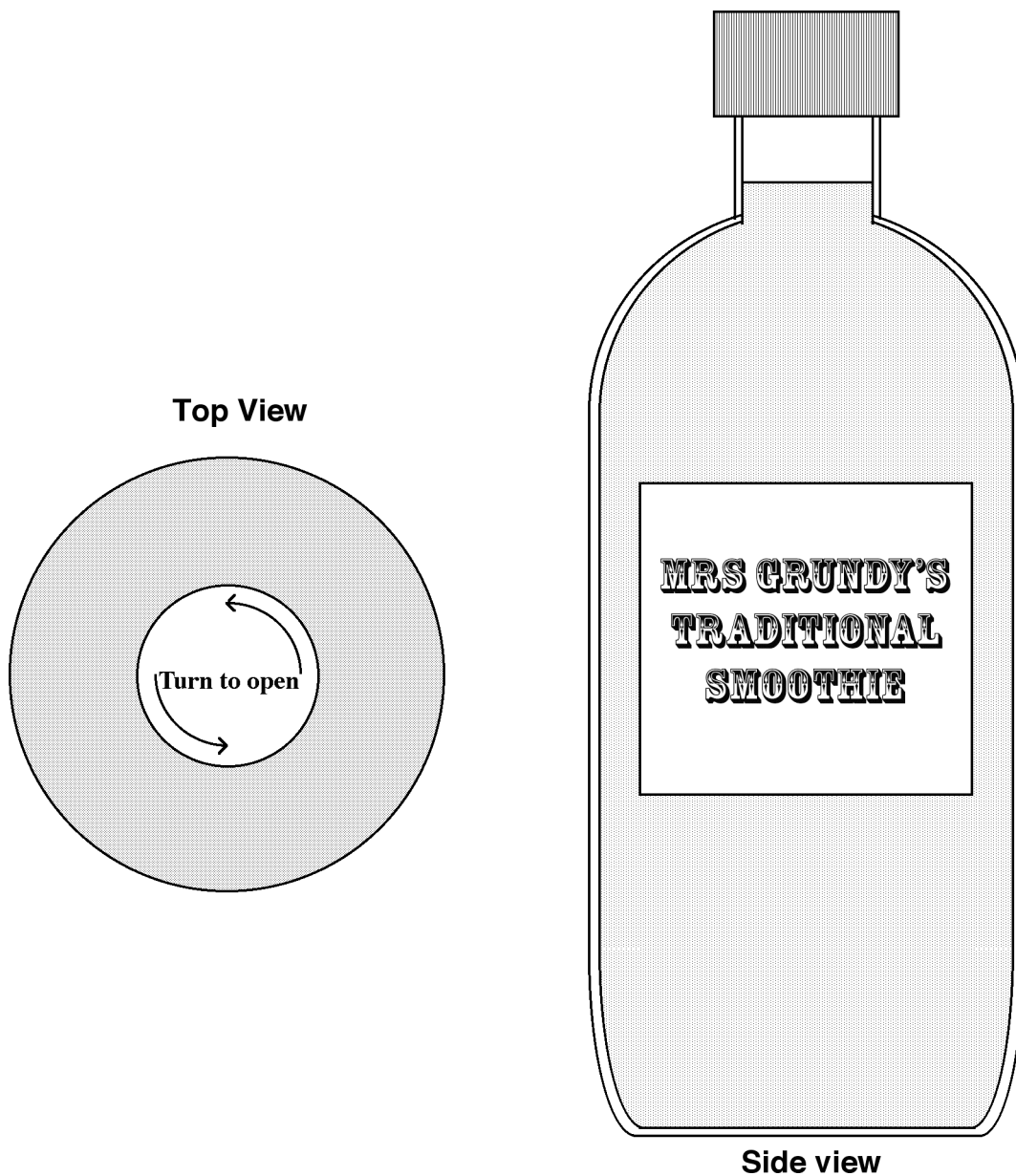
Mrs. Grundy is planning to package and sell her special home made smoothies.

These pictures show the top and side views of the type of bottle she plans to use. They are drawn accurately, full size.

Design a net for a box that will hold **twelve** bottles.

The box should be a tight fit, so that the bottles will not rattle about.

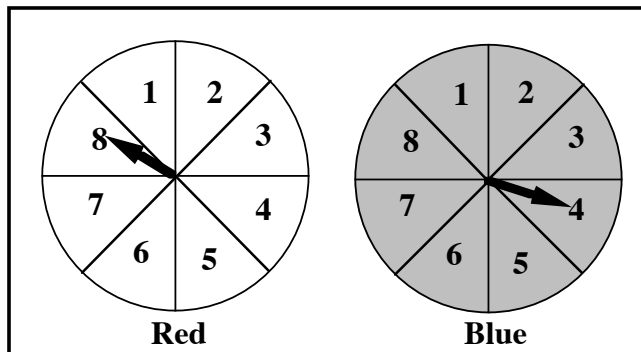
You do not have to draw the net accurately,  
but you must label your net to show all the measurements you need.



## Smoothie Box continued

# Spinner Bingo

Sally has made a Spinner Bingo game for for her class.



Here are three Bingo cards the players made

Write nine **different** numbers on your card.  
 I will spin both spinners and add the two numbers I get.  
 If you have that total on your Bingo card, you cross it off.  
 The first person to cross off all the numbers wins the prize.



4	13	5
12	9	6
8	11	15

Card A

14	6	17
7	10	4
1	15	12

Card B

5	15	4
14	3	16
2	13	10

Card C

- Which of these cards has the best possible chance of winning?  
 Give reasons for your answer.

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## SPINNER BINGO WORKSHEET

2. On this worksheet, fill in a card so that it has the best chance of winning.

**YOU ONLY NEED TO FILL IN ONE CARD.**



3. Explain how you chose the numbers for your card

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