



St. Xavier's Sr. Sec. School

Delhi-54

Summative Assessment II in **MATHEMATICS – Std. 9**
29-2-2016

M. Marks : 90
Time : 3 hrs.

Roll No:

Total printed pages :	06
Total printed questions :	31

General Instructions:

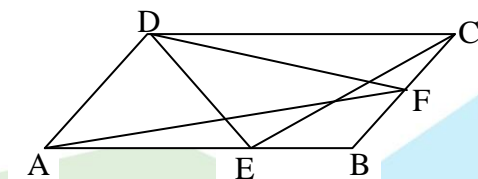
- All questions are compulsory.
- The question paper consists of 31 questions.
- Section – A consists of 4 questions of 1 mark each.
- Section – B consists of 6 questions of 2 marks each.
- Section – C consists of 8 questions of 3 marks each.
- Section – D consists of 10 questions of 4 marks each.
- Section – E OTBA of 10 marks.

Section – A

- In parallelogram ABCD, if $\angle A = 70^\circ$, then find $2 \angle D$.
- If the mean of 6, 4, 7, p and 10 is 8, find the value of p.
- Find the area of parallelogram whose base is 12cm and altitude is 4cm.
- In a cricket match, a batsman hits a boundary 5 times out of 30 balls he plays. Find the probability that he does not hit a boundary.

Section – B

- The opposite angles of a parallelogram are $(3x-3)^\circ$ and $(5x-67)^\circ$. Find all the angles of the parallelogram.
- Prove that equal chords of a circle subtend equal angles at the centre.
- Find the curved surface area of right circular cone, whose slant height is 25cm and radius of the base is 7cm.
- Show that the median of a triangle divides it into two triangles of equal area.
- The height of a cylinder is 18cm and the circumference of its base is 44cm. Find its curved surface area.
- In a parallelogram ABCD, E and F are any two points on the sides AB and BC respectively. Show that $\text{ar}(\text{ADF}) = \text{ar}(\text{DCE})$.





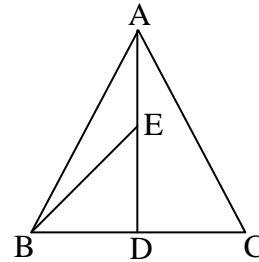
St. Xavier's Sr. Sec. School

Delhi-54

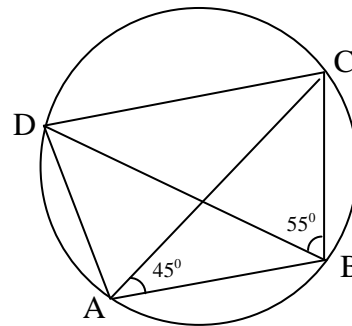
Section – C

11. Construct a triangle ABC in which $BC = 6.8\text{cm}$, $AB - AC = 2\text{cm}$ & $\angle C = 60^\circ$.
12. If the volume of two spheres are in the ratio 8:27, then find the ratio of their surface areas.

13. In triangle ABC, E is the midpoint of median AD. Show that $\text{ar}(\text{BED}) = \frac{1}{4}\text{ar}(\text{ABC})$.



14. ABCD is a cyclic quadrilateral in which AC & BD are its diagonals. If $\angle DBC = 55^\circ$ and $\angle BAC = 45^\circ$, find $\angle BCD$.



15. Fifty seeds were selected at random from each of 5 bags of seeds and were kept for germination. After 20 days, the number of seeds which had germinated were counted.

Bag	1	2	3	4	5
No. of seeds	45	47	41	38	35

What is the probability of germination of

- i) more than 45 seeds in a bag. ii) 50 seeds in a bag.
- iii) more than 35 seeds in a bag.
16. A 20 m deep well with diameter 7m is dug and earth from digging is spread evenly to form platform 22m X 14m. Determine the height of the platform.
17. Show that the line segments joining the midpoints of the opposite sides of a quadrilateral bisect each other.
18. Calculate the mean, median and mode of the marks (out of 5):
2, 3, 1, 4, 5, 2, 3, 4, 5, 2, 2, 4, 3, 1, 4, 2.



St. Xavier's Sr. Sec. School

Delhi-54

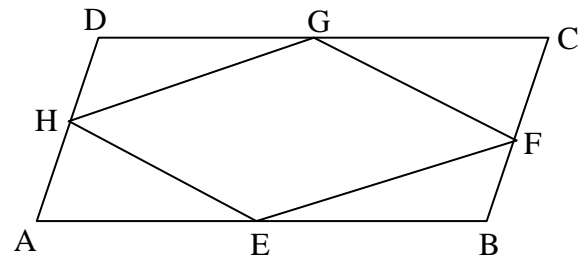
Section – D

19. A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin plating it on the inside at the rate of Rs.16 per 100cm^2 .
20. Show that the bisectors of angles of a parallelogram form a rectangle.
21. If two non-parallel sides of a trapezium are equal, prove that it is cyclic.
22. The length, breadth and height of a room are 8m, 6m and 4m respectively. Find the cost of whitewashing the walls and the ceiling of the room at the rate of Rs.15 per m^2 .
23. Amit donates blood to needy patients after every six months. Past record says that the dates of donation were as follows.

6	7	21	16	18	29	6	5	4
21	18	5	5	20	29	7	6	4
21	7	18	21	20	20	7	1	8

- i) Construct a grouped frequency distribution table with classes 0 – 5, 5 – 10 etc.
- ii) What is the range of this data?
- iii) What value is depicted by Amit in doing so?

24. If E, F, G and H are respectively the midpoints of sides AB, BC, CD & DA of parallelogram ABCD, then show that $\text{ar}(\text{EFGH}) = \frac{1}{2}\text{ar}(\text{ABCD})$.



25. The ages (in years) of workers of a factory are as follows:

Age (in years):	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 & above
No. of workers:	5	40	26	15	8	6

If a worker is selected at random, find the probability that the worker is

- i) 30 years or more
 - ii) below 50 years
 - iii) having age from 10 – 19 years
 - iv) below 10 years
26. A conical tent is 10m high and the radius of its base is 24m. Find
 - i) the slant height of the tent.
 - ii) cost of the canvas required to make the tent if the cost of 1m^2 canvas is Rs. 70.

27. The monthly profits (in Rs) of 100 shops are distributed as follows:

Profits per shop	No. of shops
0 – 50	12
50 – 100	18
100 – 150	27



St. Xavier's Sr. Sec. School

Delhi-54

150 – 200	20
200 – 250	17
250 – 300	6

Draw a frequency polygon using histogram for the above data.

28. Construct a triangle having perimeter 10cm and base angles 60° & 30° .

Section – E

Theme-1: Childhood Obesity in India

Abstract

The text given in this article will help teachers to sensitize the students about the importance of healthy food habits. They will be able to monitor and mentor the impact of the kind of food they intake. Now a day's being on diet is fad amongst adolescents. Sometimes to remain slim and trim they start following wrong practices. Using mathematical knowledge, they can analyse their diet programmes and the consequences. Youth today is also more inclined towards the junk food and electronic gadgets and is moving away from playing or taking regular exercises. This is resulting in growing childhood obesity and related health problems. All health professionals have a deep concern about the issue as the health of youth determines the health of a nation. Case study given below is based on use of linear equations. With the knowledge gained in class IX about linear equations, its graphical representation and its application; students can be made to understand the rising threat to children's health in the form of increasing childhood obesity cases in India.

According to the Oxford Dictionary, 'Healthy' is defined as 'the state of being free from illness or injury'. Indian parents have a myth that the child who is chubby and cheeky is healthy. So they shower their love by over feeding the children. Child grows with understanding that over consumption is normal and it is a way of life.

Growing up years is the foundation of adult health. Children from age one onwards grows taller and heavier till they reach adolescence at a whopping rate of about 2-2.3 kg every year for weight and 2 to 3 inches for height.

During the growing up years the fat cells increase in number and size due to faulty eating practices. Once the extra fat cells have been formed, they stay. All efforts to reduce weight can only reduce the size of the fat cells but not the number. Overweight children generally grow as overweight adults.

Rajat is studying in class IX. He feels hurt as well as confused when teased by his friends for being obese. He was admired as most cute and chubby guy of class. He decided to be on diet to control weight.

He started skipping meals and fasting. After some weeks he realized that instead of losing the weight he is running out of energy and is not able to focus on the studies. Rajat's parents discussed the issue with their family doctor. She calmed them down and told them that before starting any diet programme one must check his/her BMI in order to see the category in which the person falls – Normal or Overweight or Obese.

Being overweight means having more body weight than is considered normal or healthy for one's age or build. On the other hand, Obesity is the condition of being obese, i.e., excess amount of body

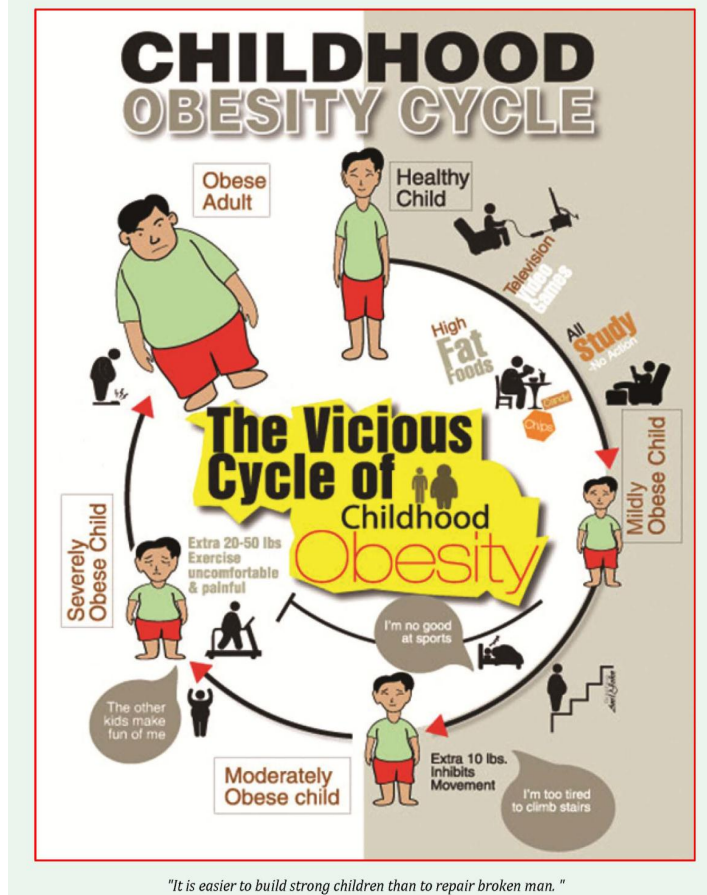
fat. While an overweight person will carry excess weight, he/she may or may not have excess accumulation of fat.

Doctor shared with them that child obesity is a major concern among all health professionals nowadays and appreciated the parent's concern about their child's sentiments and weight issues.



St. Xavier's Sr. Sec. School

Delhi-54





St. Xavier's Sr. Sec. School

Delhi-54

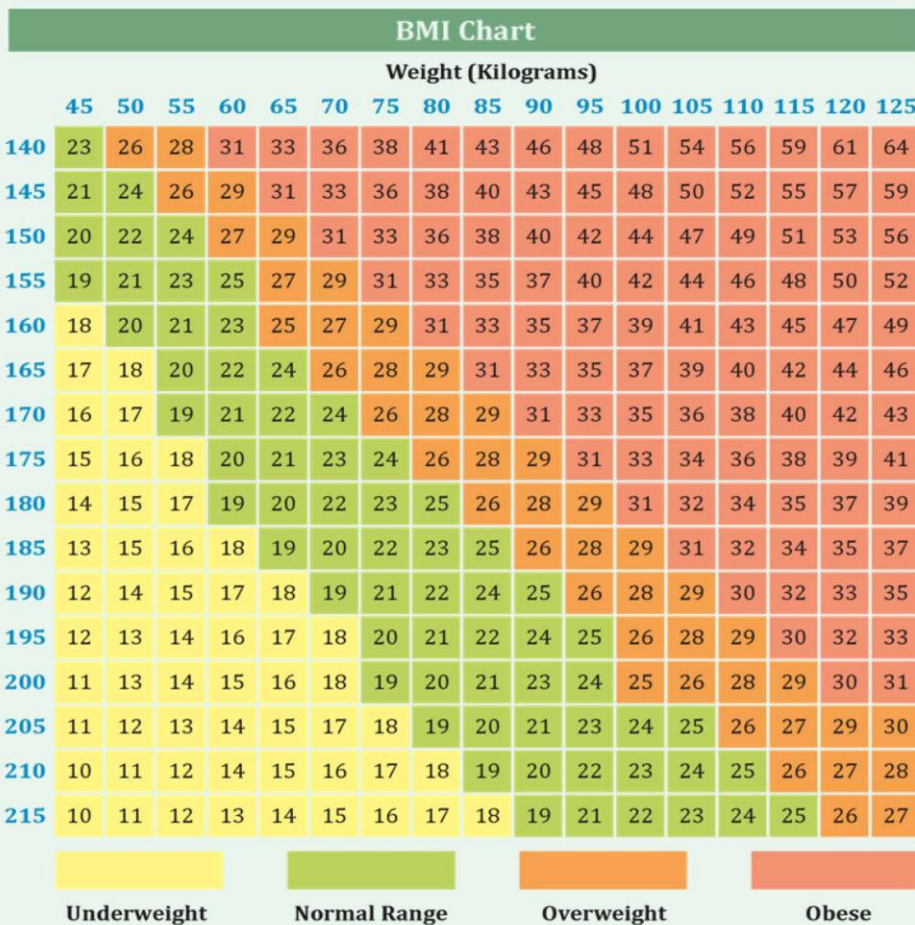
But to fight against it, one should have the clear idea of factors controlling the weight and shall adopt just the right combination of physical activity and balanced diet.

Rajat asked the doctor to explain BMI in detail.

What is BMI?

Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. For children and adolescent, BMI is age- and sex-specific and is often referred to as BMI-for-age.

BMI	Health Status
18.5-25	Healthy
25-30	Overweight
30-35	Obese
Above 35	Severely Obese





St. Xavier's Sr. Sec. School

Delhi-54

After explaining BMI, doctor asked Rajat to calculate his BMI. Rajat quickly used the weighing machine and height chart at clinic and found that his weight is 60 kg and height is 150 cm. As per the chart shown above his BMI is 27, so he lies in overweight category.

Doctor took a sigh of relief and said. "Thank God. You are not in obese category." Rajat asked "Why obesity is such a serious issue."



Child obesity: A major concern

Doctor replied, "The World Health Organization (WHO) has labelled childhood obesity as the most serious public health problem of the twenty first century as it contributes towards 44% of diabetes, 23% of heart disease and 7-41 % of certain cancers. WHO estimates that world wide 2.8 million people die each year as a result of being overweight and obese".

Risks of heart disease, stroke, type 2 diabetes and cancer increase steadily with increasing body mass index (BMI).

Obesity is defined as a 20% excess of calculated ideal weight for age, sex and height of a child. A child is said to be obese when there is an excess of accumulated fat in the subcutaneous tissue (below the skin) and other areas of the body.

Today, childhood obesity is on the rise and is considered as a major public health problem. Globally, in 2010 there were estimated to be over 42 million overweight children below the age of 5.



St. Xavier's Sr. Sec. School

Delhi-54

Studies show that in India, nearly 15% to 20% of children are overweight and 30% are in the risk of falling in this category. It is these statistics that ring major alarm bells in India.

Prevalence of Childhood Obesity in India

- Do you know the number of children who are obese in India?
- **One in four** school children in Indian metros is overweight.
- **One in six in non-metro cities** is overweight.
- **Around 20%** of children show signs of obesity.



Factors responsible for obesity

- Consumption of energy-dense, nutrient-poor foods and lack of physical activity contributes to an increase in calories as compared to the requirement. Calorie is a measure of the energy derived from a food source. The calories derived from fruits and vegetables are superior to the calories derived from fast foods and soda, even though the number of calories may be same in both foods.
- A diet low on nutrients and high in salt, sugar and fat is commonly referred to as junk food. It is dangerous for health, as it lacks nutrition and is loaded with only calories. Children eat nearly twice as many calories (770) at restaurants as they do during a meal at home (420).
- Watching television and consuming junk foods are associated with a higher prevalence of being overweight.
- Unavailability of open spaces leave the children not much of a choice but to be home and spend hours watching television or be with the gadgets. On an average a city child is spending 4-5 hours in front of media machines.

Controlling Obesity

To control obesity in children it is essential to

- **Keep them physically active** in order to burn extra calories and to keep metabolism geared towards using food for energy instead of storing it for fat.

Nature of Physical Activity	Calorie Burnt (k. cal/min)
Home activities	3
Walking	4
Jogging	6
Running	8
Running up stairs	10

You can make linear equations to plan your workout schedule.

For example

You want to burn 150 kilo calories in a day and you can work out at the most for 30 minutes. Also you feel that walking and jogging are most convenient ways to carry out your plan.

From above table you can observe that walking burns 3 kilo calories per minute and jogging burns 6 kilo calories per minute.



St. Xavier's Sr. Sec. School

Delhi-54

Suppose you walk for x minutes and jog for y minutes.

To burn 150 kilo calories, fitness schedule can be followed according to linear equation

$$3x + 6y = 150$$

You can draw graph of this linear equation and identify suitable time to invest in walking and jogging.

- **Take balance food intake**

Recommended calorie intake for boys and girls per day is as follows:

For children, boys, girls	2200 calories
For active boys and girls	2800 calories

Recommended calorie intake from different nutrients is as given below:

Nutrient	Recommended Calorie intake from nutrients/Amount per day
Fat	15%-30%
Carbohydrate	55%-75%
Protein	10%-15%
Salt	5-6gm/day
Sugar	20-25gm/day

- During the growing up phase, children are able to burn calories due to their high metabolism and activity levels. However, the taste for salty and sugary food, once developed, continues well into adult life. The result is that these kids grow into obese adults.
- **Be cautious of deceiving labels**

Sometimes the labels like cholesterol-free food, sugar free, multigrain, diet food etc. used as marketing tactics are very deceiving as such products may have low fat but excess salt and sugar which simply means intake of high calories. Decoding food labels is an essential exercise. For instance a bag of masala peanuts states that 100 gm of the product contain 610 calories. And the 50 gm fat in the packet of same product claims to provide 450 calories. Thus 450 calories out of 610 calories comes from fat, which is whopping 73%. Although the dietary recommendation is that only 30% of calories should come from fat.
- Avoid eating fast food as you can end up taking 47% more calories than traditional Indian food.



St. Xavier's Sr. Sec. School

Delhi-54

Have a look at the following chart showing the effort required to burn the specific amount of calorie obtained after eating junk food.

Junk food	Calorie value	How to burn it.
1 Slice pizza	250	Bicycling for 90 minutes
1 Cheese burger	330	Swimming for 60 minutes
1 Medium French fries	300	Jogging for 30 minutes
1 Pastry	500	Tennis for 90 minutes
1 Samosa	150	Dancing for 30 minutes
200 ml cola	110	Jumping rope for 15 minutes

Why Fasting is not good for weight loss?

Fasting is popular because it can provide dramatic weight- loss but it is primarily water loss rather than fat. Lost water is regained quickly when eating is resumed.

After getting this information Rajat understood how to reduce the weight and he charted his diet plans with the help of his parents which of course was right blend of physical exercises, control over excess technology hours and vigilant intake of food with nutrients, salt and sugar in appropriate proportions.

You too can make one for yourself.

29. Doctor has suggested Hema to be fit by burning 100 Kilo calories in a day. She preferred walking and running. Form a linear equation in two variables by taking x minutes of walking and y minutes of running and draw the graph. (4)
30. Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. Taking the height as 170 cm, form a linear equation in two variables by taking BMI as x and weight as y Kg. Draw its graph also. (3)
31. It is stated that : "Children from age one onwards grow heavier till they reach adolescence at a whopping rate of about 2 kg every year."
Form a linear equation in two variables by taking the weight as 'w' and age in years as 'a', if the weight at age 1 is 6 kg. From the equation, find
 - (i) The weight of a child, when he reaches at 5 years.
 - (ii) The weight of a child, when he reaches at 10 years.

-X-X-X-X-X-X-