Total number of printed pages : 4 *NB-N/M/1*

2021

CLASS-IX(Phase I)

MATHEMATICS

Total marks : 40 Time : 1½ hours

General Instructions:

i) Approximately 8 minutes is allotted to read the question paper and revise the answers.

ii) The question paper consists of 11 questions.

iii) All questions are compulsory.

iv) Internal choice has been provided in some questions.

v) Marks allocated to every question are indicated against it.

N.B: Check to ensure that all pages of the question paper is complete as indicated on the top left side.

Section - A

1. **Choose the correct answer from the given alternatives.**

(a) A rational number between $\frac{1}{4}$ and $\frac{1}{2}$ is **1**

(i) $\frac{3}{4}$ (ii) $\frac{3}{8}$ (iii) $\frac{3}{5}$ (iv) $\frac{2}{3}$

(b) When $p(x)$ is divided by $(ax+b)$, then the remainder is **1**

(i) $p(a+b)$ (ii) $p\left(\frac{-b}{a}\right)$ (iii) $p\left(\frac{b}{a}\right)$ (iv) $\frac{-b}{a}$

(c) The equation of the line whose graph does not pass through the origin is **1**

(i) $x+y=0$ (ii) $x-y=0$ (iii) $x+2y=0$ (iv) $x-2y=1$

(d) Which of the following points lie on the y-axis? **1**

(i)(0, 5) (ii)(5, 0) (iii) (5, 5) (iv) (–5, 0)

(e) An isosceles right triangle has area 8 cm^2. The length of its hypotenuse is **1**

(i)$8\sqrt{2}$ cm (ii) $6\sqrt{2}$ cm (iii) $4\sqrt{2}$ cm (iv) $4\sqrt{3}$ cm

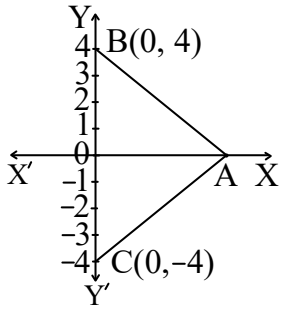
(f) The probability of getting a whole number when a die is thrown is **1**

(i) 1 (ii)$\frac{1}{6}$ (iii) 0 (iv)–1

Section - B

2. Find the value of : $\dfrac{1}{\left(1^3+2^3+3^3\right)^{-\frac{3}{2}}}$ **2**

3. In the figure given below, ABC is an equilateral triangle. Write the coordinates of A.



2

Section - C

4. **a.** Simplify $\dfrac{4+\sqrt{5}}{4-\sqrt{5}} + \dfrac{4-\sqrt{5}}{4+\sqrt{5}}$ by rationalising the denominator.

Or **3**

b. Locate $\sqrt{7}$ on the number line.

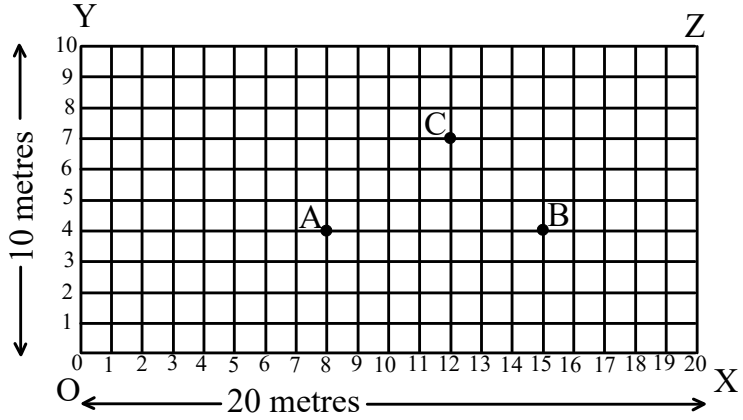
5. **a.** Using remainder theorem, find the remainder when $p(x)=9x^3-3x^2+x-5$ is divided by $q(x)=3x-2$

Or **3**

b. If $(x+2)$ is a factor of $x^3-2ax^2-5x+6a$, then find the value of a.

6. Verify that: $x^3+y^3+z^3-3xyz=\dfrac{1}{2}(x+y+z)\left[(x-y)^2+(y-z)^2+(z-x)^2\right]$ **3**

7. **Case Study based question:**



Three balls are placed on a rectangular lawn OXZY (as shown in the figure), whose length and breadth are 20 m and 10 m respectively. Anjo was asked to collect the ball placed at A. He was asked to select another ball placed either at B or C, such that he has to walk the shortest distance from point A. Anjo collected the two balls as per the instruction.
Based on the given information, choose the correct answer in questions (a) to (c): **3**

(a) What are the coordinates of the position of the ball at A, with respect to the point O?
(i) (4, 8) (ii) (8, 4) (iii) (12, 4) (iv) (6, 8)

(b) What are the coordinates of the position of the second ball Anjo collected, with respect to O?
(i) (7, 12) (ii) (12, 7) (iii) (15, 4) (iv) (4, 15)

(c) What is the shortest distance walked while collecting the second ball?
(i) 5 m (ii) 7m (iii) 12 m (iv) 15 m

8. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of flour (in kg): **3**
4.97 5.05 5.08 5.03 5.00 5.06 5.08 4.98 5.04 5.07 5.00
Find the probability that any of these bags chosen at random contains:
(i) More than 5 kg flour.
(ii) Less than 5 kg flour.
(iii) Exactly 5 kg flour.

Section – D

9. **a.** The polynomials $x^3 + ax^2 - 3x + 4$ and $ax^3 - x^2 + 7$ when divided by $(x-1)$, leave the remainders R_1 and R_2 respectively. If $R_2 = 2R_1$, then find the value of *a*.

Or **5**

b. Without actual division, prove that $(x-2)$ is a factor of the polynomial $(3x^3 - 13x^2 + 8x + 12)$. Also, factorise it completely.

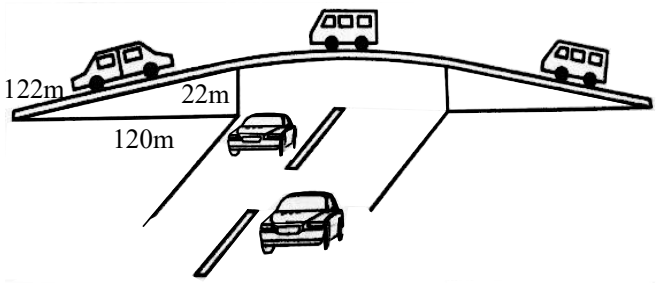
10. **a.** Draw the graph of the following linear equations on the same axes: $x + y = 3$, $3x - 2y = 4$. Also, shade the region formed by their graphs and the *y*-axis.

Or **5**

b. In countries like USA and Canada, temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius: $F = \left(\frac{9}{5}\right)C + 32$

Draw the graph of the linear equation above using Celsius for x-axis and Fahrenheit for y-axis. Also, from the graph, find the corresponding temperature in Fahrenheit when the temperature in Celsius is 30°

11. **a.** The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (as shown in the figure below). The advertisements yield an earning of ₹5000 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay?



Or **5**

b. A park, in the shape of a quadrilateral ABCD, has ∠C = 90°, AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy? [Use $\sqrt{35}$ = 5.92]

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