MODEL TEST PAPER SUMMATIVE ASSESSMENT-I
(Solved)

Time: 3hr **Max Marks: 80**

General Instruction –

1. Section A Q.1. to Q.10. carry 1 mark each.
2. Section B Q.11. to Q.20. carry 2 marks each.
3. Section C Q.21. to Q.30. carry 3 marks each.
4. Section D Q.31. to Q.35. carry 4 marks each.
5. All questions are compulsory.

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Section - A

Q.1. The additive Inverse of $\frac{-16}{-7}$ is

(i) $\frac{16}{-7}$ ***(ii)*** $\frac{16}{7}$

(iii) $\frac{7}{16}$ ***(iv)*** $\frac{-7}{-16}$

Q.2. The cube root of (– 1000) is

(i) 10 ***(ii)*** – 10

(iii) 100 ***(iv)*** – 100

Q.3. What is the negative of a negative rational number.

(i) Negative ***(ii)*** positive

Q.4. Every rational number is an integer

(i) True ***(ii)*** False ***(iii)*** not always true

Q.5. For an integer a, a^3 is always positive.

(i) True ***(ii)*** False ***(iii)*** not always true

Q.6. The sum of ab, –bc, ca, –ab, –ca & bc is

(i) –ab ***(ii)*** 0

(iii) ab ***(iv)*** none of these

Q.7. The coefficient of m is $-9mx + 4$ is

(i) – 9 ***(ii)*** 0

(iii) $-9x$ ***(iv)*** $9x$

Q.8. The constant in $x^2 - 3$ is

(i)	-1	*(ii)*	1
(iii)	3	*(iv)*	-3

Q.9. Product of $(\frac{1}{2}a - \frac{1}{5}b)$ and $(\frac{1}{2}a + \frac{1}{5}b)$ is

(i)	$\frac{1}{4}a^2 + \frac{1}{25}b^2$	*(ii)*	$\frac{1}{4}a^2 - \frac{1}{25}b^2$
(iii)	$\frac{1}{25}a^2 - \frac{1}{4}b^2$	*(iv)*	none of these

Q.10. If $x = 3$, which expression has a different value from the other three?

(i)	$x^2 + 9x$	*(ii)*	$2x^2$
(iii)	$12x$	*(iv)*	$x^2 (x - 1)^2$

Section – B

Q.11. Find the square root of $\sqrt{49} \times \sqrt{144}$

Q.12. Is 256 a perfect cube? Show steps.

Q.13. Plot $\frac{-2}{5}$ and $\frac{2}{5}$ on the same number line.

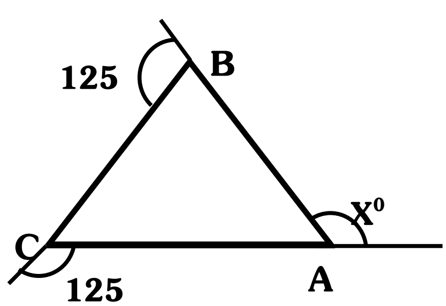
Q.14. Is (6, 9, 11) a Pythagorean triplet? (Show).

Q.15. Express $(2x + 3y^3)^2$ as a trinomial.

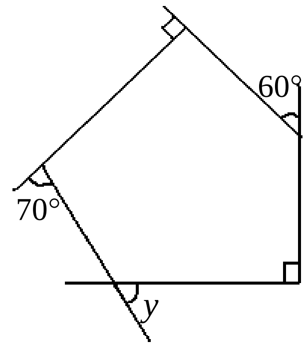
Q.16. Rohan rolls a die. What are the chances of getting a number which is even?

Q.17. Find the number of sides of regular polygon whose each exterior angle has a measure of 45^0.

Q.18. Find the measure of x.



Q.19. Find the measure of y.



Q.20. Solve : $\frac{x^2 - 9}{5 + x^2} = \frac{-5}{9}$

Section – C

Q.21. Evaluate : $\sqrt{9.3025}$

Q.22. The denominator of a rational number is greater than its numerator by 3. If 3 is subtracted from the numerator and 2 is added to its denominator, the new number becomes 1/5. Find the original number.

Q.23. The area of square field is $101\frac{1}{400}$ **m sq. Find the length of its side.**

Q.24. The sum of 2 rational numbers is $\frac{-3}{5}$**. If one of the number is** $\frac{-9}{20}$**, find the other.**

Q.25. Solve : $\frac{x + b}{a - b} = \frac{x - b}{a + b}$

Q.26. The ratio of 2 sides of a parallelogram is 3:5 and its perimeter is 48m. Find the length of the sides of the parallelogram.

Q.27. The volume of a cubical box is 13.824 cubic metres. Find the length of each side of the box.

Q.28. Find the cube root of 438976.

Q.29. Find the smallest four digit number which is a perfect square.

Q.30. Find 3 rational numbers between 1 and – 1.

Section – D

Q.31. Construct the histogram based on the data given below. It represents the number of miles per gallon of gasoline obtained by 40 drivers of compact cars in a large city.

Interval	16-19	20-23	24-27	28-31	32-35	36-39	40-43
Frequency	5	11	8	5	7	3	1

Answer the following questions:

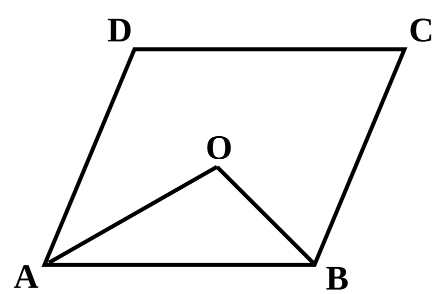
(i) What is the number of cars reporting mileages between 28 and 31 miles per gallon?
(ii) How many cars reported mileages greater than 31 miles per gallon?
(iii) What percent of the cars reported mileages from 24-27 miles per gallon?

Q.32. Construct a quadrilateral PQRS, PQ = 5.5 cm, QR= 4 cm, RS = 4.4 cm, and PS=3.2 cm and $\angle P = 75^0$.

Q.33. Find the product of $\left(y + \frac{2}{7}y^2\right)$ and $(7y - y^2)$ and verify the result for $y = 3$.

Q.34. If $4x^2 + y^2 = 40$ and $xy = 6$. Find the value of $2x + y$.

Q.35. In a parallelogram ABCD, the bisectors of angle A and angle B meet at O. Find angle AOB.



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SOLUTIONS

Q.1. (a)
Q.2. (b)
Q.3. (b)
Q.4. (b)
Q.5. (b)
Q.6. (b)
Q.7. (c)
Q.8. (d)
Q.9. (b)
Q.10. (b)

Section-B

Q.11. $\sqrt{49} \times \sqrt{144}$

$= \sqrt{7 \times 7} \times \sqrt{3 \times 3 \times 4 \times 4}$

$= 7 \times 3 \times 4 = 7 \times 12 = 84$

Q.12. Resolving 256 into prime factors

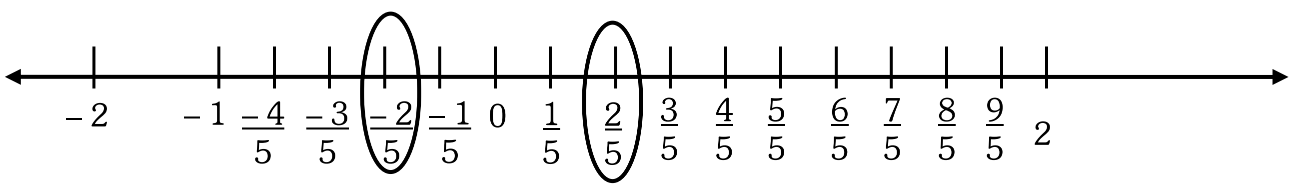
We have

$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

clearly in grouping the factors in triples of equal factors. We are left with two factors

2×2. Therefore 256 is not a perfect cube.

Q.13. $\frac{2}{5}$ and $\frac{-2}{5}$ on the number line.



Q.14. To form a Pythagorean Triplet, the number should be 2m, (m^2-1), (m^2+1)

$(2m)^2 + (m^2-1)^2 = (m^2+1)^2$

$6^2 + 9^2 = 11^2$

$36 + 81 \neq 121$

$\therefore$ 6, 9, 11 does not form a Pythagorean Triplet

Q.15. $(2x + 3y^3)^2$ as a trinomial

Using $(a + b)^2 = a^2 + 2ab + b^2$

$= (2x)^2 + (3y^3)^2 + 2 \times 2x \times 3y^3$

$= 4x^2 + 9y^6 + 12xy^3$

Q.16. Total numbers appearing on the dice = 6

Chances of getting even numbers on a die (2, 4, 6) = $\frac{3}{6} = \frac{1}{2}$

Q.17. Total measure of all exterior angles of a polygon = 360^0

Measure of each exterior Angle = 45^0

$\therefore$ The number of exterior angles = $\frac{360^0}{45^0}$ = 8

The polygon has 8 sides.

Q.18. Since the sum of of the measures of exterior angles of a polygon is 360^0

$\therefore\ 125^0 + x^0 + 125^0 = 360^0$

$\Rightarrow\ 250^0 + x^0 = 360^0$

$\Rightarrow\ x^0 = 360^0 - 250^0 = 110^0$

Q.19. Since the sum of of the measures of exterior angles of a polygon is 360^0

$\therefore\ y^0 + 90^0 + 60^0 + 90^0 + 70^0 = 360^0$

$\Rightarrow\ y^0 + 310^0 = 360^0$

$\Rightarrow\ y^0 = 360^0 - 310^0 = 50^0$

Q.20. $\frac{x^2 - 9}{5 + x^2} = \frac{-5}{9}$

By cross multiplication

$\Rightarrow\ 9(x^2 - 9) = -5(5 + x^2)$

$\Rightarrow\ 9x^2 - 81 = -25 - 5x^2$

$\Rightarrow\ 9x^2 + 5x^2 = -25 + 81$

$\Rightarrow\ 14x^2 = 56$

$\Rightarrow\ x^2 = \frac{56}{14}$ => $x^2 = 4$ => $x^2 = 2^2$ => $x = 2$

Q.21. 3.05

$\sqrt{9.3025}$ = $\sqrt{9.3025} = 3.05$

Q.22. Let the numerator be x.

Then, the denominator = $(x + 3)$

$\therefore\ \frac{x - 3}{(x + 3) + 2} = \frac{1}{5}$

=> $\frac{x-3}{x+5} = \frac{1}{5}$ => $5(x-3) = (x+5)$ => $5x - 15 = x + 5$

=> $4x = 20$ => $x = 5$

Numerator = 5

$\therefore$ Denominator = (5 + 3) = 8

$\therefore$ The required number is $\frac{5}{8}$

Q.23. Let the length of one side of the square field be x metres.

$\therefore$ Area of the field = x^2

Given:

Area of the field = $101\frac{1}{400}$ m^2

$$x^2 = \frac{40401}{400} \text{ m}^2$$

$$\therefore x = \sqrt{\frac{40401}{400}} \quad => \quad x = \frac{\sqrt{40401}}{\sqrt{400}}$$

$$\therefore x = \frac{\sqrt{40401}}{\sqrt{400}} = \frac{201}{20}$$

Hence, the length of one side of the field is $\frac{201}{20}$ m.

Q.24. Given,

Sum of 2 rational numbers $= \frac{-3}{5}$

One of the rational numbers = $\frac{-9}{20}$

Let the other number = x

$$\therefore x + \left(\frac{-9}{20}\right) = \frac{-3}{5}$$

$$\Rightarrow \quad x = \frac{-3}{5} - \left(\frac{-9}{20}\right)$$

$$\Rightarrow \quad x = \frac{-3}{20} + \frac{9}{20} = \frac{-12+9}{20} = \frac{-3}{20}$$

Q.25. $\frac{x+b}{a-b} = \frac{x-b}{a+b}$

By cross multiplication

$\Rightarrow \quad (x + b) \times (a + b) = (x - b) \times (a - b)$

$\Rightarrow \quad x\,(a + b) + b(a + b) = x\,(a - b) - b(a - b)$

$\Rightarrow \quad ax + bx + ab + b^2 = ax - bx - ab + b^2$

$\Rightarrow \quad a\cancel{x} - \cancel{ax} + bx + bx = -ab + \cancel{b^2} - ab - \cancel{b^2}$

$\Rightarrow \quad 2bx = -2ab$

$\Rightarrow \quad x = \frac{-\cancel{2}a\cancel{b}}{\cancel{2}a\cancel{b}} \quad = \quad \therefore \quad x = -a$

Q.26. Let one side of a parallelogram = $3x$ m

& the other side of parallelogram = $5x$ m

Perimeter $= 2\,(l + b)$
$= 2(3x + 5x)$
$= 2 \times 8x = 16x$ m
Given Perimeter = 48m

$\therefore\ 16x = 48 \qquad x = \dfrac{48}{16} \qquad x = 3$ m

Hence the side of the parallelogram are :
$3x = 3 \times 3 = 9$m
$5x = 5 \times 3 = 15$m

Q.27. Given volume of a cubical box = 13.824 m^3
$V = l^3 \quad = \quad l^3 = 13.824$
$l = \sqrt[3]{13.824}$

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$\sqrt[3]{13824} = \underline{2\times2\times2} \times \underline{2\times2\times2} \times \underline{2\times2\times2} \times \underline{3\times3\times3}$

Cube root $= 2 \times 2 \times 2 \times 3$
$= 24$

$\sqrt[3]{13.824} = 2.4$
$\therefore$ Length of each side of the box = 2.4m

Q.28. Cube root of 438976

2	438976
2	219488
2	109744
2	54872
2	27436
2	13718
19	6859
19	361
19	19
	1

$438976 = \underline{2\times2\times2} \times \underline{2\times2\times2} \times \underline{19\times19\times19}$

Cube root $= 2 \times 2 \times 19$
$= 76$

$\sqrt{438976} = 76$

Q.29. Smallest 4 digit no = 1000

	3 1
3	1000
	9
61	100
	61
	39

$(32)^2 - 1000$ should be added to 1000 to make it a perfect square.
1000 + 24 =1024

1024 is the smallest 4 digit number which is a perfect square.

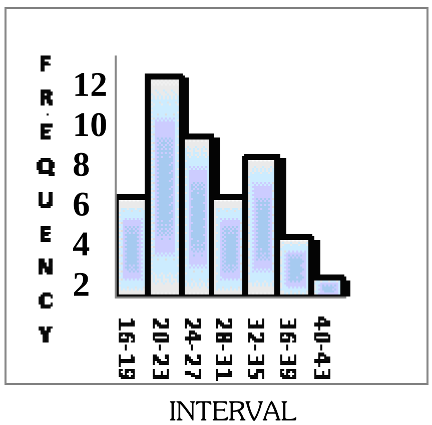
Q.30. $\frac{1}{1} \times \frac{10}{10}$, $\frac{-1}{1} \times \frac{10}{10}$

$\frac{-10}{10}$, , $\frac{-8}{10}$, $\frac{-7}{10}$ ––––––––– $\frac{8}{10}$, $\frac{9}{10}$, $\frac{10}{10}$

$\therefore$ The four rational numbers are:

$\frac{-9}{10}, \frac{-7}{10}, \frac{-6}{10}, \frac{4}{10}$

Q.31.



(i) 5 cars

(ii) 32 – 35 = 7 => 36 – 39 = 3 => 40 – 43 =1

Total= 7+3+1=11

(iii) The interval 24 – 27 has a frequency of 8.
Total frequency for this survey is 40.

Required percentage = $\frac{8}{40} \times 100$ = 20%

Q.32. Given

PQ = 5.5 cm

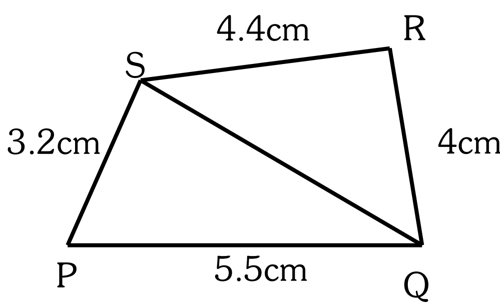
QR = 4cm

RS = 4.4 cm

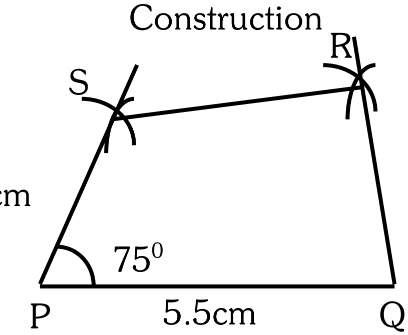
PS = 3.2cm

$\angle P = 75^0$

Rough figure



Construction



Q.33. $(y + \frac{2}{7}y^2) \times (7y - y^2)$

$\Rightarrow \quad y\,(7y - y^2) + \frac{2}{7}y^2\,(7y - y^2)$

$\Rightarrow \quad 7y^2 - y^3 + 2y^3 - \frac{2}{7}y^4$

$\Rightarrow \quad 7y^2 + y^3 - \frac{2}{7}y^4 \quad = \quad$ Given $\quad y = 3$

$\Rightarrow \quad$ L.H.S. $\left(y + \frac{2}{7}y^2\right) \times (7y - y^2)$

$\Rightarrow \quad (3 + \frac{2}{7} \times 3^2) \times 7 \times 3 - (3)^2$

$\Rightarrow \quad (3 + \frac{2}{7} \times 9) \times (21 - 9)$

$\Rightarrow \quad (3 + \frac{18}{7}) \times 12$

$\Rightarrow \quad \frac{21 + 18}{7} \times 12$

$\Rightarrow \quad \frac{39}{7} \times 12 = \frac{468}{7}$

R.H.S: $\quad 7y^2 + y^3 - y^4$

$\Rightarrow \quad$ Given $y = 3$

$\Rightarrow \quad 7 \times 3^2 + 3^3 - \frac{2}{7} \times 3^4$

$\Rightarrow \quad 7 \times 9 + 27 - \frac{2}{7} \times 81$

$\Rightarrow \quad 63 + 27 - \frac{162}{7}$

$\Rightarrow \quad => \quad 90 - \frac{162}{7}$

$\Rightarrow \quad \frac{630 - 162}{7} = \frac{468}{7}$ $\qquad$ Hence proved L.H.S = R.H.S.

Q.34. $(2x+y)^2 = (2x)^2 + y^2 + 2 \times 2x + y$

$\Rightarrow \quad (2x+y)^2 = (4x^2 + y^2) + 4xy$

$\Rightarrow \quad (2x+y)^2 = 40 + 4 \times 6$

$\Rightarrow \quad (2x+y)^2 = 64$

$a^2 + b^2 = a^2 + b^2 + 2ab$

Using $4x^2 + y = 40$ and $\quad xy = 6$

$\Rightarrow \quad (2x+y) = \sqrt{64} \quad => \quad 2x+y = 8$

Q.35. OA and O B are bisectors of angle A and angle B

$\therefore \angle OAB = \frac{1}{2} \angle A, \qquad \angle OBA = \frac{1}{2} \angle B$

In ΔAOB, using ASP

$\angle OAB + \angle AOB + \angle OBA = 180°$

$\frac{1}{2} \angle A + \angle AOB + \frac{1}{2} \angle B = 180°$

$\angle AOB = 180° - \frac{1}{2} (\angle A + \angle B)$

$\angle AOB = 180° - \frac{1}{2} (180°)$

[∠A and ∠B are adjacent angles of parallogram ABCD]

$\angle AOB = 180° - 90° = 90°$

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