ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

Second Term Examination - 2018

Class : 9

Sub :Mathematics F.M.:75

DURATION:2 Hrs30Mins DATE:01.08.2018

GROUP : A

1. **Select the correct alternatives:-** [1 x 5 = 5]

a. The number $\sqrt{7}$

a) lies number 1 and 2 b) lies between 2 and 3

c) lies number 3 and 4 d) lies between 6 and 7

b. If $(10)^{2x} = 25$; then the value of $(10)^{x}$ is

a) $\frac{1}{5}$ b) $\frac{1}{25}$ c) 5 d) $\frac{1}{4}$

c. There is a 5% loss if an article is sold at Rs 22.80. The cost price of the article is

a) Rs 20 b) Rs 24 c) Rs 26 d) Rs 28

d. The length of the class 1 - 5, 6 - 10,.....etc. is

a) 3 b) 4 c) 5 d) 4.5

e. In the triangle ABC, D,E and F are the mid points of the sides BC, CA and AB. If the perimeter of the sides BC, CA and AB. If the perimeter of the triangle ABC is 18cm; the perimeter of the DDEF is

a) 4.5 cm b) 8 cm c) 9 cm d) 10 cm

2. **Fill in the blanks:-** [1 x 5 = 5]

a. If $\frac{a}{b} + \frac{b}{a} + 1 = 0$ then the value of $a^3 - b^3$ is _____.

b. If f(x) = 2x + 3 then the value of f(x) + f(-x) is _____.

c. The simplified value of $\sqrt{50} + \sqrt{98} - \sqrt{128} + \sqrt{8}$ _____.

d. $\frac{7}{3}$ is a _____ decimal numbers.

e. If an article is purchased at Rs 72 and sold at Rs 63 then the percentage of loss is 90% _____.

3. **State whether the following statements are True or False :-** [1 x 4 = 4]

a. $\sqrt{x} + 1$ is linear polynomial.

b. Each rational number is an integer.

c. If the ratio of C.P. and S.P. is 25 : 26; then the percentage of profit is 4%.

d. In a frequency distribution table the mid value of a class is 10 and the length of each class is 5. Then the upper limit of the class is 12.5

Group-B

1. Answer the following questions: 2 x 8=16

a) If $4^x = 8^y$ then what is the value of x/y-1?
b) What is the sum of the factors of $x^3 - 1/x$?
c) What will be the remainder if the polynomial $8x^3 - 4x^2+4x+5$ is dividend by 2x+1?
d) If the ratio of cost price and selling price is 25:26 then what is the percentage of profit?
e) Height (cm): 90-92 93-95 96-98 99-101 102-104
No. of students: 8 27 42 18 5
Find the range from the above table.

f) In the rhombus ABCD the length of the side AB is 4 cm and <BCD =60^0. Find the length of the diagonal BD.
g) In the triangle ABC, P and Q are the two points on AB and AC such that AP=1/4 AB and AQ = ¼ AC. Find PQ?
a) ½ BC, b)1/4 BC, c)1/8 BC, d) 1/6 BC.
h) In the parallelogram ABCD, DE is perpendicular on AB from D and BF is perpendicular on AD from B. If AB =12 cm, AD=10 cm and DE = 5 cm then what is the length of BF?

Group C

Q5. Answer any nine questions. 5 X 9 =45

i. To prepare 2000 copies of a book, a publisher spends Rs. 3875 on paper, Rs. 3315 on printing and Rs. 810 on binding. Now after allowing 20% commission to the book seller, the publisher wants to retain 20% profit then what should be the marked price of each book?

ii. In what ratio should the Darjeeling tea at Rs.320 per kg be mixed with Assam tea at Rs. 250 per kg so that there is an overall profit of 20% after selling the mixed tea at Rs.324 per kg?

iii. The frequency distribution of the daily wages of the workers of a factory is given in the following table. Express the given data with the help of histogram.

Daily wages (Rs.).	120-130	130-140	140-150	150-160	160-170
No. of workers.	50	150	200	100	50

iv. The line joining the midpoints of two sides of a triangle is parallel and half of the third side.

v. If $f(x) = \frac{p(x-q)}{p-q} + \frac{q(x-p)}{q-p}$, $(p \neq q)$ then show that f(p) +f(q) =f(p+q)

vi. Find the value of $\{(32^{-3/2})^{3/4}\}^{4/5}$.

vii. Draw the line of the equation 2x +3y = 7

vii. If x =3t and $y = \frac{2t}{3} - 1$, then for what value of t, x=3y.

viii. Prove that the diagonals of a parallelogram bisect each other.

ix. AB II DC of a trapezium ABCD and E is the mid point of BC. Prove that the area of region AED is equal to half of area of trapezium ABCD.

x. In the trapezium ABCD, ABII DC and AB > DC ; the mid points of two diagonals AC and BD are E and F respectively. Prove that $EF = \frac{1}{2}(AB - DC)$.

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ST. LAWRENCE HIGH SCHOOL

2nd Term Examination- 2018

Sub: Mathematics solution **Class: IX** **F.M.: 75**

Date: 01.08.2018

Group A

1. a) b b)a c)b d)c e)c
2. a)0 b)6 c)$6\sqrt{2}$ d) recurring e)12.5%
3. a)False b) False c) True d)True

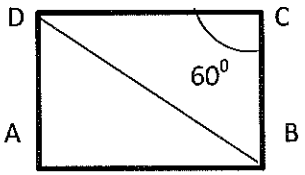
Group B

4 a) $4^x = 8^y$

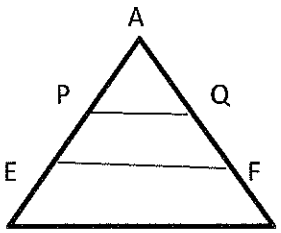
or, $2^{2x} = 2^{3y}$
or, $2x=3y$
or, $x/y = 3/2$.
Or, $x/y - 1 = 3/2 - 1 = ½$ (Ans)

b) $x^3 - 1/x = x(x^2 - 1/x^2) = x(x+1/x) (x-1/x)$
Therefore sum of factors = $x+x+1/x +x-1/x = 3x$ (Ans.)
c) Let $f(x) =8x^3 -4x^2 +4x+5$
if f(x) is divided by 2x+1, then the remainder will be
$f(-1/2) = 8 (-1/2)^3 - 4 (-1/2)^2 + 4 (-1/2) + 5$
$=-1 -1-2+5 = 1$ (Ans)
d) Let $64^x = 48^y = 36^z =k$
or, $64 = k^{1/x}$, $48 = k^{1/y}$, $36 = k^{1/z}$
Again, $64 \times 36 = 8^2 \times 6^2 = (48)^2$
Or, $k^{1/x} \times k^{1/z} = (k^{1/y})^2$
Or, $1/ x + 1/z = 2/y$ [Proved]
e) Range = (104.5 – 89.5) =15 cm.

f) In triangle BCD, BC=CD [each side of rhombus is equal]
Therefore, < BDC = <CBD = 60^0
Therefore, BD = BC =CD



Therefore, BD =AB or, BD = 4 cm (Ans).
g) In triangle ABC, EF II BC and EF = ½ BC
Therefore, AB = 2AE and AC = 2AF.
Again, AP = ¼ AB = ½ AE.
Therefore, P is the mid-point of AE.
Similarly Q is the mid-point of AF
Therefore, PQ II EF and PQ = ½ EF = ¼ BC (Ans)

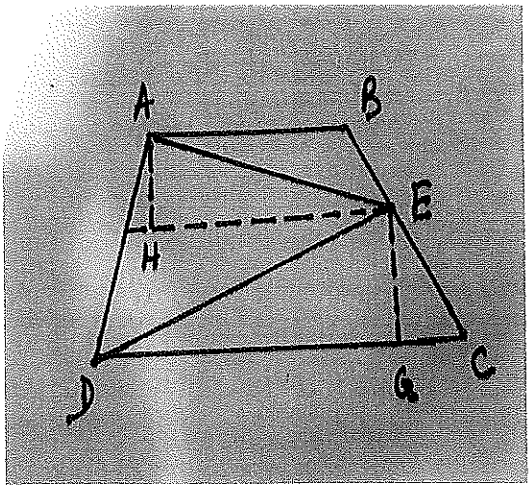


B C

h) Area of ABCD = AB x DE = AD x BF
Therefore, 10 cm x BF = 12 cm x 5 Cm
Or, BF = 6 cm (Ans).
Group C
i. Total expenditure of publisher for 2000 copies of book = Rs. (3875 + 3315 + 810)
=Rs. 8000.
Therefore, CP of 1 book = 8000 / 2000 = Rs.4
SP of 1 book Rs. ($\frac{120}{100}$ x 4) = Rs. 4.80.
To allow 20% commission, when SP = Rs. 80 marked price = Rs. 100
When SP = Rs. 4.80, marked price = Rs ($\frac{100}{80}$ x 4.80) = Rs. 6 (Ans)

ii. Let with x kg of Darjeeling tea 1 kg assam tea is mixed
So, total quantity of mixed tea = (x+1) kg
CP of mixed tea is Rs. 320 x + 250
SP of mixed tea is Rs. (x+1) x 324
Again to get 20% profit,
SP of mixed tea = Rs. (120/ 100) x (320 x+ 250)
B.T.P, (x +1) x 324 = (320 x + 250) x (12 / 10)
Therefore, x = 2/5.
The required ratio , 2:5 (Ans)

iii. Draw the histogram by taking class boundaries along X-axis and frequencies along Y-axis. And draw the bars on the respective classes.
iv. Page no 148 .Theorem 20.
v. $f(x) = \frac{p(x-q)}{(p-q)} + \frac{q(x-p)}{(q-p)}$
Therefore, f(p) =p
f(q) =q
And f(p+q) = p+q
Therefore, f(p) + f(q) = f(p+q) [Proved]
vi. 5X(-3/2) X (3/4) X(4/5) = (- 9/2). Ans = $2^{(-9/2)}$
vii. t = $3(\frac{2t}{3} - 1)$,ie, t=-3.
viii. Class 9 text book page 217. Theorem 23.
ix. Construction: Through E a straight line is drawn parallel to DC as FE.
Area of (triangle FED + triangle AFE) = ½ FE * (GE + AH)
Area of ABCD = ½ FE * (GE + AH)*2
Hence proved.



x. PF = ½ AB .....(1)

PE = ½ CD .....(2)

½ (AB – CD) = PF – EQ =EF