



**St. Lawrence High School)**  
 A JESUIT CHRISTIAN MINORITY INSTITUTION  
**3<sup>rd</sup> Term Examination – 2019**



**Model Answer**

**Sub: Arithmetic**

**Class: VIII**

**F.M: 80**

**Duration: 2 Hour 30 minutes**

**Group – A**

**1. select the correct alternatives.**

1x5=5

- i. If the radius of a cylinder is doubled and height is tripled, then the ratio between the new volume and the previous volume is – a. 2:1      b. 1:2      c. 2:3      d. None of these
- ii. If a rectangular piece of paper of size 44cm x 20 cm is rolled to form a cylinder of height 20cm, then the radius of base is : a. 7cm      b. 14cm      c. 22cm      d. None of these
- iii. out of 100 numbers 20 were 4s, 40 were 5s, 30 were 6s and the remaining were 7s. The arithmetic mean of the numbers is : a. 5.3      b. 5.4      c. 4.8      d. None of these
- iv. A bag holds 26 tiles, each marked with different letter. The probability that one tile chosen at random is not a vowel is : a.  $\frac{21}{26}$       b.  $\frac{5}{26}$       c.  $\frac{25}{26}$       d. None of these
- v. A tap can empty a tank in 45 min. A second tap can empty it in 30 mins. If both the taps operate simultaneously, the time needed to empty the tank is :  
 a. 18 mins      b. 20mins      c. 40 mins      d. None of these.

**2. Write True or False.**

1x5=5

- i. The circumference of a circle of diameter 42cm is 264cm. – **False.**
- ii. Two disjoint sets have at least one common element. – **False.**
- iii. 100% of any number is the number itself. – **True.**
- iv. The probability of an event is greater than 1. – **False.**
- v. The sum of opposite angles of a parallelogram is  $360^\circ$ . – **False.**

**3. Fill in the blanks.**

1x5=5

- i. Manu can do a piece of work in 24 days and Riju can do it in 30 days. If they work together, time taken by them to finish the work will be  $\frac{40}{3}$  or  $13\frac{1}{3}$  dys.
- ii. In 5 years the simple interest be  $\frac{2}{5}$  of the principal at 8% per annum interest.
- iii. The base of a triangle measures 32 cm and its altitude is 45 cm. Then its area will be 720  $\text{cm}^2$ .
- iv. The mode of 3,8,9,10,4,3,7,8,11,12,8 is 8.
- v. The diagonals of a parallelogram is intersecting or bisecting each other.

**Group B**

**4. Answer the following questions**

2 x 5 = 10

**4.1. A bag contains 4 red marbles, 7 blue marbles and 4 green marbles. Find the probability of selecting a red marble.**

Ans: Probability  $P(E) = \frac{\text{Total number of favourable outcomes}}{\text{Total number of possible outcome}} = \frac{4}{4+4+7} = \frac{4}{15}$

**4.2. Find the mean of the following set of numbers**

-6, -2, -1, 0, 1, 2, 5, 9

Ans: Mean =  $\frac{\text{Total of the data}}{\text{frequency}} = \frac{-6+(-2)+(-1)+0+1+2+5+9}{8} = \frac{8}{8} = 1$

**4.3. Priya takes 4 hours in walking a distance of 20 km. What distance would she cover in 7 hours?**

Ans: In 4 hour Priya walks 20 km

In 1 hour she walks  $20/4 \text{ Km} = 5 \text{ Km}$

In 7 hours she walks  $5\text{Km} \times 7 = 35 \text{ Km}$

**4.4. A can do  $\frac{3}{4}$  of the work in 12 days. In how many days can he complete  $\frac{1}{8}$  of the work?**

Ans: A can do  $\frac{3}{4}$  of the work in 12 days.

A can do whole of the work in  $12 \div \frac{3}{4} = 16 \text{ days.}$

A can do  $\frac{1}{8}$  of the work in  $16 \times \frac{1}{8} \text{ days} = 2 \text{ days}$

**4.5. The price of 7 pens is Rs 42. Find the price of 13 such pens.**

Ans: 7 pens cost Rs 42

1 pen costs  $\text{Rs } 42 \div 7 = \text{Rs } 6$

13 pens cost  $\text{Rs } 6 \times 13 = \text{Rs } 78$

5. Answer the following questions (any 5)

3 x 5 = 15

5.1. If  $\frac{1}{3}$  of a number exceeds its  $\frac{2}{7}$  by 1, find the number.

Ans: The number =  $1 \div (\frac{1}{3} - \frac{2}{7}) = 21$  days

5.2. Find the greatest number of 3 digits that is a perfect square number.

Ans: The greatest number of 3 digits = 999

Taking the square root by division method:

$$\sqrt{999} = 31.61$$

Therefore the greatest three digit perfect square number =  $31 \times 31 = 961$

5.3. A tap can fill a cistern in 15 minutes and another can empty it in 18 minutes. Find how many minutes the tank will be filled up if both taps are kept open.

Ans: A tap can fill a cistern in 15 minutes

In one minute it can fill  $\frac{1}{15}$  of the tank.

A tap can empty the cistern in 18 minutes.

In one minute it can empty  $\frac{1}{18}$  of the tank.

In one minute they together fill  $(\frac{1}{15} - \frac{1}{18})$  of the tank =  $\frac{1}{90}$  of the tank.

Therefore they together fill the tank in  $1 \div (\frac{1}{90})$  minutes = **90 minutes**

5.4. 12 men can repair a road in 25 days. How long will 30 men take to do so?

Ans: 12 men can repair a road in 25 days

One man can repair the road in  $12 \times 25$  days.

30 men can repair the road in  $12 \times 25 / 30$  days = **10 days**

5.5. The simple interest on a sum of 5 years is one fourth of the sum. What is the rate of interest per annum?

Ans: Let the Principal be P, Simple interest (I) =  $P/4$ , Time (T) = 5 years

$$\text{Rate (R)} = \frac{I \times 100}{P \times T} = \frac{100}{4 \times 5} = 5\%$$

5.6.  $A = \{4, 6, 9, 15, 20, 21\}$  and  $B = \{6, 15, 20, 23\}$  Find  $A' \cup B$  and  $A \cap B'$  when  $\xi = \{1, 2, 3, \dots, 25\}$

Ans:  $A = \{4, 6, 9, 15, 20, 21\}$

$A' = \{1, 2, 3, 5, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, 22, 23, 24, 25\}$

$B = \{6, 15, 20, 23\}$

$B' = \{1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 24, 25\}$

$A' \cup B = \{1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25\}$

$A \cap B' = \{4, 9, 21\}$

5.7. A normal die is rolled. Calculate the probability that the number on the uppermost face when it stops rolling will be

(i) an odd number,

(ii) a prime number,

(iii) an even prime number.

Ans: Ans Total number of Probable outcomes = 6

(i) Set of favourable outcomes =  $\{1, 3, 5\}$

$$\text{Probability } P(E) = \frac{\text{Total number of favourable outcomes}}{\text{Total number of possible outcome}} = \frac{3}{6} = \frac{1}{2}$$

(ii) Set of favourable outcomes =  $\{2, 3, 5\}$

$$\text{Probability } P(E) = \frac{\text{Total number of favourable outcomes}}{\text{Total number of possible outcome}} = \frac{3}{6} = \frac{1}{2}$$

(iii) Set of favourable outcomes =  $\{2\}$

$$\text{Probability } P(E) = \frac{\text{Total number of favourable outcomes}}{\text{Total number of possible outcome}} = \frac{1}{6}$$

Group - C

Answer the following questions. (Alternatives are to be noted)

8 x 5 = 40

6. Samyak invested a sum of money at an annual simple interest 10%. At the end of 4 years, the amount received by him was Rs. 7700. What was the sum invested by Samyak.

Ans: Let the amount he invested be x.

ATP,

$$SI = 7700 - x, \quad R = 10\%, \quad T = 4\text{yrs}$$

$$\text{Hence, } 7700 - x = \frac{x \times 10 \times 4}{100}$$

$$\text{Or, } 770000 - 100x = 40x$$

$$\text{Or, } x = \frac{770000}{140} = 5500$$

So, he has invested Rs.5500.00 (Ans)

7. A man bought pencils at the rate of 6 for Rs. 4 and sold them at the rate of 4 for Rs. 6. Has he gained or lost? What is his gain or loss percentage?

Ans: ATP, the CP of one pen =Rs.  $\frac{4}{6}$  and the SP of one pen is Rs.  $\frac{6}{4}$

$$\text{Now } SP - CP = \frac{6}{4} - \frac{4}{6} = \frac{18-8}{12} = \frac{10}{12}$$

As SP - CP is positive, so there is a gain.

$$\text{Gain in percentage} = \frac{\text{gain}}{CP} \times 100\% = \frac{\left(\frac{10}{12}\right)}{\left(\frac{4}{6}\right)} \times 100 = \frac{10}{12} \times \frac{6}{4} \times 100 = 125\%$$

8. A can do a job in 20days, B in 30days and C in 60days. If A is helped by B and C on every third day, then in how many days will the job be finished?

Ans: In first three consecutive days, the amount of work done will be

$$= \left(3 \times \frac{1}{20}\right) + \left(\frac{1}{30} + \frac{1}{60}\right) = \frac{12}{60} = \frac{1}{5} \text{ part.}$$

So,  $\frac{1}{5}$  part of the work is done in 3 days

And whole work will be done in  $\frac{3}{\left(\frac{1}{5}\right)}$  days = 15 days.

Or

A and B can do a piece of work in 6days and 4days respectively. A started the work and worked for 2days and then B joins. Find the total time taken to finish the work.

Ans: The work done by A in first 2 days will be =  $2 \times \frac{1}{6} = \frac{1}{3}$  part

And the rest of the work is done by A and B together.

$$\text{The rest part of the work is} = 1 - \frac{1}{3} = \frac{2}{3} \text{ part}$$

Now, A and B together can do  $\frac{1}{6} + \frac{1}{4} = \frac{5}{12}$  part in one day.

So, they can complete 1 part in  $\frac{1}{\left(\frac{5}{12}\right)}$  days =  $\frac{12}{5}$  days

So they can complete rest work i.e.  $\frac{2}{3}$  part in  $\frac{12}{5} \times \frac{2}{3}$  days =  $\frac{8}{5}$  days =  $1\frac{3}{5}$  days.

Hence the total time needed to finish the whole work will be =  $2 + 1\frac{3}{5} = 3\frac{3}{5}$  days.

9. Find the area of the cross-roads at right angle to each other through the centre of the rectangular field whose length is 60m and breadth is 45m. The width of the cross-roads are 3m.

Ans: The figure for this problem will be as shown here.

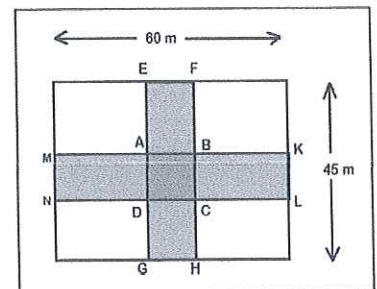
So, the area of the cross road

= Area of rectangle EFHG + Area of rectangle MNLK

- Area of the square ABCD

$$= (3 \times 45) + (3 \times 60) - (3 \times 3) m^2$$

$$= 306 m^2 \text{ (Ans)}$$



Or

The height of a cylinder is thrice its radius. If its volume is  $3434\text{cm}^3$ , determine its height.

Ans: ATP, if the radius is  $r$  then the height will be  $h = 3r$ .

Now the volume =  $\pi r^2 h = \pi r^2 \cdot 3r = 3434$

$$\text{Or, } r^3 = \frac{3434}{3\pi} = \frac{3434 \times 7}{3 \times 22} = \frac{12019}{33} = 364 \text{ (Approx)}$$

Or,  $r = 7$  (approx)

So, height =  $3 \times 7$  cm = 21cm (approx)

10. A 7m wide path is constructed all around and outside a circular garden of radius 21m. Find out the area of that path.

Ans: The radius of the outer circle (including the path outside garden) will be  $(21+7)$  m = 28m.

So the area of the circular path = area of the entire circle – area of the inner circle.

$$= \pi(28^2 - 21^2) m^2 = \frac{22}{7} \cdot 343 m^2 = 1078 m^2$$

11. The ages of all the workers in a certain company are given as follows –

23, 28, 25, 21, 40, 50, 50, 21, 40, 50, 33, 28, 41, 25, 33, 37, 23, 26, 41, 37, 21, 43, 28, 32 and 35 years. Prepare a frequency distribution table and calculate the mean age of the workers.

Ans: From the above data, we can prepare the following table –

So, the mean age =  $\frac{\sum f \cdot x}{\sum f} = \frac{831}{25} = 33.24$  yrs

Age (x)	Frequency (f)	f.x
21	3	63
23	2	46
25	2	50
26	1	26
28	3	84
32	1	32
33	2	66
35	1	35
37	2	74
40	2	80
41	2	82
43	1	43
50	3	150
	$\sum f = 25$	$f \cdot x = 831$

12. The outer dimensions of a closed wooden box are 14cm by 10cm by 8cm. Thickness of wood is 1.5cm. Find out the volume of the wood used to make the box and the volume of the water the box can contain.

Ans: So the inner dimensions will be –

∴ Length =  $14 - 1.5 - 1.5 \text{ cm} = 11 \text{ cm}$ ,

∴ Breadth =  $10 - 1.5 - 1.5 \text{ cm} = 7 \text{ cm}$       and

Height =  $8 - 1.5 - 1.5 \text{ cm} = 5 \text{ cm}$

Hence the volume of the wood used

$$= \text{outer volume} - \text{inner volume} = [(14 \times 10 \times 8) - (11 \times 7 \times 5)] \text{ cm}^3 = 735 \text{ cm}^3$$

The volume of water it can contain is = inner volume =  $11 \times 7 \times 5 \text{ cm}^3 = 385 \text{ cm}^3$

13. Two sets are given as – Set A = {4, 6, 9, 15, 20, 21} and set B = {6, 15, 20, 23}. Find  $A \cup B$  and  $A \cap B$ . Hence verify that,  $n(A) + n(B) = n(A \cup B) + n(A \cap B)$ .

Ans:  $A \cup B = \{4, 6, 9, 15, 20, 21, 23\}$       and       $A \cap B = \{6, 15, 20\}$

Now L.H.S

$$= n(A) + n(B)$$

$$= 6 + 4 = 10$$

Also, R.H.S =  $n(A \cup B) + n(A \cap B)$

$$= 7 + 3 = 10$$

Hence Proved.