



ST. LAWRENCE HIGH SCHOOL
3rd Term Examination – 2018



Sub: Arithmetic
Duration: 2 hrs 30 mins

Class: 8
Model answers

F. M. : 80
Date: 12.11.18

Indranil Ghosh
15.11.18

Group A

1. Answer all the questions (M.C.Q) $1 \times 5 = 5$

i) Which of the following is not correct?

a) $\sqrt{0.4096} = 0.64$ b) $\sqrt{40.96} = 6.4$ c) $\sqrt{0.04096} = 0.064$ d) $\sqrt{4096} = 64$

Ans: c) $0.064 \times 0.064 = 0.004096$

ii) An item when sold for ₹ 1690 earned 30% profit on the cost price. The cost price is

a) ₹ 1300 b) ₹ 1200 c) ₹ 1000 d) ₹ 1100

Ans: C.P = $(S.P \times 100) / (100 + \text{Profit}\%) = (1690 \times 100) / (100 + 30) = \text{Rs. } 1300$

iii) If $A = \{4, 6, 9, 15, 20, 21\}$, then $n(A)$ is

a) 5 b) 6 c) 4 d) 0

Ans: b) 6

iv) The money borrowed or lent is called the

a) interest b) amount c) principal d) none of them

Ans: c) principal

v) If A can complete $\frac{1}{6}$ of a work in 1 day, then the number of days to complete the work is

a) 12 b) 3 c) 18 d) 6

Ans: d) 6

2. Fill in the blanks

$1 \times 5 = 5$

i) The ratio of cost price and selling price is 10:11, the profit percentage is _____.

Ans: Let C.P = $10x$, S.P = $11x$. So Profit% = $(\text{Profit} / \text{C.P}) \times 100$

$$\text{Profit}\% = (11x - 10x / 10x) \times 100 = 10\%$$

ii) Length of diagonal of cube of side 'a' units is _____.

Ans: $a\sqrt{3}$ units

iii) The perimeter of a rectangle is 98 cm and its breadth is 9 cm, then the length of rectangle is _____.

Ans: $2(\text{length} + \text{breadth}) = 98$.

$$2(\text{length} + 9) = 98$$

$$\text{length} + 9 = 49$$

$$\text{length} = 49 - 9 = 40 \text{ cm}$$

iv) S.P - Profit = _____.

Ans: C.P

v) The volume of a cube is 64 cubic cm. its total surface area is _____.

Ans: let length of side of a cube be 'a' units. So $a^3 = 64$.

$$a = 4 \text{ cm. Total surface area of cube} = 6a^2 = 6 \times 4 \times 4 = 96 \text{ sq. cm}$$

3. State TRUE or FALSE

$$1 \times 5 = 5$$

i) The area of an equilateral triangle of side 'a' units is $\frac{\sqrt{3}}{4} a^2$ sq. units

Ans: True

ii) Loss or gain is always calculated on the cost price

Ans: True

iii) Area of a square = $\frac{1}{2} (\text{diagonal})^2$

Ans: True.

iv) The radius of the circular base is called the radius of the cylinder.

Ans: True

v) The arithmetic mean of the numbers 1, 6, 0, -2, 4, 7, 5 is 4

Ans: False. Arithmetic mean = $(1 + 6 + 0 + (-2) + 4 + 7 + 5) / 7 = 3$

GROUP - B

Answer the following questions:-

(5 X 2 = 10)

4(1) Find the mean of first ten prime numbers

Ans: First 10 prime numbers are 2,3,5,7,11,13,17,19,23,29

Hence reqd mean = $120/10 = 12.9$

(2) Is there any difference between 2cm square and 2 square cm?

Explain

Ans: 2cm square means a square whose each side is 2cm. But 2 square cm means an area of any enclosed surface

(3) What is the volume of a cube whose diagonal measures $4\sqrt{3}$ cm?

Ans: Diagonal of a cube = $a\sqrt{3}$, where a = side

Hence $a\sqrt{3} = 4\sqrt{3}$, or $a = 4$ cm

Hence volume of a cube = $a^3 = 4^3 = 64$ cm³

(4) If the ratio of the cost price of an article to its selling price is 6.5, then what is the loss percent?

Ans: Let the common variable be x

Hence C.P = Rs. $6x$ and S.P = Rs. $5x$

Hence Loss% = $\frac{6x-5x}{6x} \times 100 = 16\frac{2}{3} \% = 16.6\%$

(5) Find the perimeter of a square field whose area is 13689m²?

Ans: Area = $a^2 = 13689$, where a is the side of a square

Hence $a = \sqrt{13689} = 117$ m

Or Perimeter of a square field = $4a = 4 \times 117 = 468$ m

5) Answer any Five questions

(5 X 3 = 15)

(1) Let $A = \{ \text{factors of } 16 \}$ and $B = \{ \text{factors of } 24 \}$. Find $A \cup B$?

Ans : $A = \{ 1,2,4,8,16 \}$, $B = \{ 1,2,3,4,6,8,12,24 \}$

Hence $A \cup B = \{ 1,2,3,4,6,8,12,16,24 \}$

(2) An article is sold for Rs. 300 at a profit of 20%. Had it been sold for Rs. 235, what would have been the loss percent?

Ans: C. P = $\frac{300 \times 100}{120} = \text{Rs. } 250$

Hence S.P = Rs. 235

Therefore Loss = Rs. 15

Hence Loss % = $\frac{15}{250} \times 100 = 6\%$

(3) In what time will Rs. 1860 amount to Rs. 2641.20 at simple interest of 12% per annum?

Ans: S.I = Rs. $(2641.20 - 1860) = \text{Rs. } 781.20$

Hence time taken = $\frac{781.20 \times 100}{1860 \times 12} = 3.5$ years.

(4) Aryan can do a piece of work in 20 days and Pramathesh in 25 days. They work together for 10 days and then Aryan goes away. In how many days will Pramathesh finish the remaining work?

Ans: In 1 day Aryan and Pramathesh can do = $\frac{1}{20} + \frac{1}{25} = \frac{9}{100}$ th part

Hence in 10 days they can do = $\frac{9}{100} \times 10 = \frac{9}{10}$ th part

Hence remaining part of the work = $1 - \frac{9}{10} = \frac{1}{10}$ th part

Time taken to complete $\frac{1}{25}$ th part = 1 day

Hence time taken to complete $\frac{1}{10}$ th part = $1 \times 25 \times \frac{1}{10} = 2\frac{1}{2}$ days

(5) How many tiles of area 15cm^2 will be needed to cover a floor of 5.85m by 6.9m ?

Ans: Req'd. no of tiles = $\frac{585 \times 690}{15} = 26910$ tiles.

(6) If the difference between the circumference and diameter of a circle is 30cm , then what is the radius of the circle?

Ans: $2\pi r - 2r = 30$

Or, $2r(\pi - 1) = 30$

Or, $r\left(\frac{22}{7} - 1\right) = 15$

Or $r = 7\text{ cm}$

(7) Raj secures 73, 86, 78 and 75 marks in four tests. What is the least number of points he can secure in the next test if he is to have an average of 80?

Ans: By the problem $\frac{73+86+78+75+x}{5} = 80$, where x = least req'd number

Solving $312+x = 400$

Or $x = 88$

Group – C

(For this group explanations and diagrams are needed where applicable)

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

8x5=40

1. 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 sum be x.

$$S.I = (x \times 10 \times 4) / 100 = 2x/5$$

By the problem. $7700 = 2x/5 + x$

$$\text{So, } x = (5 \times 7700) / 7 = 5500$$

2. 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:C.P of 1 pencil = Rs. $2/3$

S.P of 1 pencil = Rs. $3/2$

$$\text{Profit} = 3/2 - 2/3 = \text{Rs. } 5/6$$

$$\text{Profit}\% = (5/6 \div 2/3) \times 100 = 125\%$$

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

Ans:A, s 1 day work = $1/6$.

B, s 1 day work = $1/30$. C, s 1 day work = $1/60$

$$\text{Work done in 3 days} = 3 \times \frac{1}{20} + \frac{1}{30} \times 1 + \frac{1}{60} \times 1 = \frac{12}{60} = 1/5$$

The job will be finished in $3 \times \frac{5}{1} \text{ days} = 15 \text{ days}$

Or

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

Ans:A, s 1 day work = $1/20$, B, s 1 day work = $1/4$.

Work done by A in 2 days = $1/6 \times 2 = 1/3$. Work left $1 - 1/3 = 2/3$

So, (A+B), s 1 day work = $1/6 + 1/4 = 5/12$

$5/12$ work is done by A and B in 1 day

$2/3$ work is done in $1 \div \frac{5}{12} \times \frac{2}{3} = \frac{8}{5}$ days

4. 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:

Area of one path = $60 \times 3 = 180$ sq.m. Area of another path = $45 \times 3 = 135$ sq.m

Area of common space = $3 \times 3 = 9$ sq.m.

Total area of two cross roads = $180 + 135 - 9 = 306$ sq.m

Or

The height of a cylinder is thrice its radius. If its volume is 3434cm^3 , determine its height.

Ans: $h = 3r$. $\pi r^2 h = 3434$.

So, $\pi r^2 \times 3r = 3434$. So $r^3 = (3434 \times 7) / 66$

$h = 3\sqrt[3]{r}$ cm

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

Ans:

Radius of outer circle = $21 + 7 = 28$ m

Area of path = $\pi(28^2 - 21^2) = 1078$ sq.m

6. 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:

Ages	2	2	2	2	2	3	3	3	3	4	4	4	5
	1	3	5	6	8	2	3	5	7	0	1	3	0
Frequenc y	3	2	2	1	3	1	2	1	2	2	2	1	3

Mean = $(21 \times 3 + 23 \times 2 + 25 \times 2 + 26 \times 1 + 28 \times 3 + 32 \times 1 + 35 \times 1 + 37 \times 2) / 25 = 831 / 25 = 33.24$

7. 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: External volume = $14 \times 10 \times 8 = 1120$ cubic cm

Internal dimensions of box: length = $14 - 3 = 11$ cm, breadth = $10 - 3 = 7$ cm, height = $8 - 3 = 5$ cm.

Internal volume = $11 \times 7 \times 5 = 385$ cubic cm = required volume of water

Volume of wood = $1120 - 385 = 735$ cubic cm

8. 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: $n(A) = 6$ $n(B) = 4$ $A \cup B = \{4, 6, 9, 15, 20, 21, 23\}$

$A \cap B = \{6, 15, 20\}$ $n(A \cap B) = 3$ $n(A \cup B) = 7$

$$\text{L.H.S} = 6 + 4 = 10 = \text{R.H.S} = 3 + 7 = 10$$