

IIST

IIT FOUNDATION

Integrated Syllabus

TEACHER'S HAND BOOK



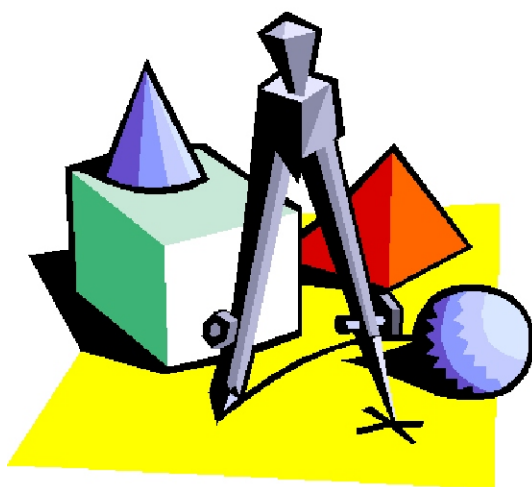
MATHEMATICS

CLASS VII

INDIAN INSTITUTE OF SOFTWARE TECHNOLOGY

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Exercise - 1



I. Choose the correct answer.

- Ans: 1) II 2) $P \cap Q = P$ 3) 100 4) {3, 5, 7, 8}
5) $P' \cap Q$ 6) {1, 2, 3} 7) {2}

II. Concept questions

- Ans: 1) Represent sets graphically 2) The number of elements of a set
3) A $\cap$ B 4) B $\cap$ A 5) A

Application Skill Achiever



I. Solve the following problems

- Ans: 1) 5 2) 5 3) {5, 8, 9, 11} 4) 45
5) 6 6) 6, 3 7) 20 8) 20 9) 400

Exercise - 2



I. Choose the correct answer.

- Ans: 1) rational 2) negative 3) $<$ 4) 8 5) 1
6) 4 7) irrational 8) 3 9) 5 10) 2.9

II. Concept questions.

- Ans: 1) rational 2) Both A and B 3) 2
4) irrational 5) rational 6) always a real number

III. Find the biggest fraction

- Ans: 1) $\frac{11}{12}$ 2) $\frac{10}{11}$ 3) $\frac{15}{19}$ 4) $\frac{21}{22}$ 5) $\frac{12}{2}$

Application Skill Achiever



I. Solve the following problems.

- Ans: 1) $\frac{1}{4}$ 2) $\frac{1}{5}$ 3) 9 4) $\frac{2}{9}$ 5) -1

Exercise - 3



I. Choose the correct answer.

- 1) The LCM of 16, 24, 36, 54 is 432

$10000 \div 432$, quotient is 23 and remainder is 64,
so the required number $= 432 \times 24 = 10368$

2) $\frac{3}{1400}$

- 3) 13

- 4) 7

- 5) $2352 = 2 \times 2 \times 2 \times 2 \times 3 \times 7 \times 7$

So the answer is 3.

- 6) the HCF of $3x$ and $4x$ is x

And the LCM of $3x$ and $4x$ is $12x$

So if $\text{HCF} = x = 4$ then $\text{LCM} = 12x = 12 \times 4 = 48$

- 7) 84, 96

- 8) let the numbers are $2x$ and $3x$

The $\text{LCM} = 6x$

But $\text{LCM} = 48 = 6x$

So $6x = 48$ $x = 48 \div 6 = 8$

The numbers are 16 and 24

The sum of the numbers is 40

- 9) let the numbers are x and $4x$

$\text{LCM} = 4x = 84$ so $x = 21$

$\text{HCF} = x = 21$

The bigger number is $4 \times x = 4 \times 21 = 84$

- 10) let the $\text{HCF} = x$

The $\text{LCM} = 45x$

Sum of LCM and $\text{HCF} = 45x + x = 46x$

$46x = 1150$

$x = 1150 \div 46 = 25$

One of the number is $= 125$

the other number is $= \frac{45 \times x \times x}{125} = \frac{45 \times 25 \times 25}{125} = 225$

Exercise - 4



I. Choose the correct answer.

1) $CP = 2090.42$

$SP = 2602.58$

$\text{Profit} = 2602.58 - 2090.42 = 512.16$

$\text{Profit \%} = \frac{512.16}{2090.42} \times 100 = 25\%$

2) $CP = \frac{100}{100 - \text{loss \%}} \quad SP = \frac{100}{100 - 20} \times 9$

$SP = \frac{100}{100} \times \frac{\text{gain \%}}{100} \quad CP = \frac{100}{100} \times \frac{5}{100} \times \frac{100}{20} \times 9 = 11.81$

3) Let the sell price of 1 note book = x

Sp of 12 note books = $12x$

Sp of 4 note books = $4x$

Cp of 12 note books = $8x$

$\text{Gain \%} = \frac{\text{gain}}{\text{cp}} \times 100 = \frac{4x}{8x} \times 100 = 50\%$

4) cp of 2 kg groundnuts at Rs. 50 = $50 \times 2 = \text{Rs. } 100$

cp of 4 kg groundnuts at Rs. 20 = $20 \times 4 = \text{Rs. } 80$

cp of 3 kg groundnuts at Rs. 30 = $30 \times 3 = \text{Rs. } 90$

CP of the above 9 kg groundnuts = $\text{Rs. } 100 + \text{Rs. } 80 + \text{Rs. } 90 = \text{Rs. } 270$

CP of the above 1 kg groundnuts = $\text{Rs. } 270 \div 9 = \text{Rs. } 30$

SP of 1 kg groundnut = $\text{Rs. } 33$

$\text{Gain \%} = \frac{\text{gain}}{\text{cp}} \times 100 = \frac{3}{30} \times 100 = 10\%$

5) CP for A = $100x$

CP for B = $120x$

CP for C = $120x \times \frac{25}{100} = 120x \times 0.25 = 30x$

$150x = 225 \quad x = \frac{225}{150} \quad 100x = \frac{225}{150} \times 100 = \text{Rs. } 150$

The cost price of the bicycle for A is Rs. 150.

6) $5\% = 10$

$$100\% = \frac{10}{5} \times \frac{100}{100} \times 200$$

cost of the article is Rs. 200.

7) let CP = 100

$$SP = x$$

$$\text{Profit} = x - 100$$

Again:

$$Sp = 2x$$

$$\text{Profit} = 2x - 100$$

$$\text{But profit is } 3(x - 100)$$

$$\text{So } 2x - 100 = 3(x - 100)$$

$$2x - 3x = -300 + 100$$

$$x = 200 = SP$$

$$\text{Profit \%} = \frac{SP - CP}{CP} \times 100 = \frac{200 - 100}{100} \times 100 = 100\%$$

8) $CP = 375 \times 20 = \text{Rs. } 7500$

$$SP = 33 \times 240 = \text{Rs. } 7920$$

$$\text{Gain} = 7920 - 7500 = \text{Rs. } 420$$

$$\text{Gain \%} = \frac{\text{gain}}{cp} \times 100 = \frac{420}{7500} \times 100 = 5.6\%$$

9) let the CP of 40 articles = Rs. 100

$$\text{The CP of 50 articles} = \frac{100}{40} \times 50 = \text{Rs. } 125$$

$$Sp \text{ of 50 articles} = cp \text{ of 40 articles} = \text{Rs. } 100$$

$$\text{Loss \%} = \frac{CP - SP}{CP} \times 100 = \frac{125 - 100}{125} \times 100 = 20\%$$

10) let CP of 1 kg goods = Rs. 100

$$\text{So SP of 800 gm goods} = \text{Rs. } 100$$

$$SP \text{ of 1000 gm goods} = (\text{Rs. } 100 \div 800) \times 1000 = \text{Rs. } 125$$

$$\text{Gain \%} = 125 - 100 = 25\%$$

11) let the CP = 100x; Loss = 12.5x

$$Sp = 100x - 12.5x = 87.5x$$

$$\text{Next SP} = 106x$$

$$\text{Difference} = 106x - 87.5x = 18.5x$$

$$18.5x = 51.80 \quad x = \frac{51.80}{18.50}$$

$$CP = 100x = 100 \times = \text{Rs. } 280$$

12) CP of the cycle = Rs. 1400

$$\text{Loss \%} = 15\%$$

$$SP = \frac{100 - \text{loss\%}}{100} \times CP = \frac{85}{100} \times 1400 = \text{Rs. } 1190$$

13) SP = 7x; CP = 5x;

$$\text{Profit} = 2x \quad \text{Ratio of profit and CP} = 2x : 5x = 2 : 5$$

14) CP = 100; Profit = 320

$$SP = 100 + 320 = 420$$

$$\text{New CP} = 100 + 25 = 125$$

$$\text{New profit} = 420 - 125 = 295$$

$$\text{Profit\%} = \frac{\text{profit}}{CP} \times 100 = \frac{295}{125} \times 100 = 236\% \text{ nearly } 250\%$$

$$15) \text{Discount\%} = \frac{\text{No Of Free Boxes}}{\text{Total Boxes}} \times 100 = \frac{12}{72} \times 100 = 16\frac{2}{3}\%$$

16) CP of 26 kg rice at Rs 20 per kg = $26 \times 20 = \text{Rs. } 520$

$$\text{CP of 30 kg rice at Rs 36 per kg} = 30 \times 36 = \text{Rs. } 1080$$

$$\text{CP of total 56 kg rice} = 520 + 1080 = \text{Rs. } 1600$$

$$\text{Sp of 56 kg rice at Rs. 30 per kg} = 56 \times 30 = \text{Rs. } 1680$$

$$\text{Profit} = 1680 - 1600 = \text{Rs. } 80$$

$$\text{Profit \%} = \frac{\text{profit}}{CP} \times 100 = \frac{80}{1600} \times 100 = 5\%$$

II. Concept questions:

1) A loss occurs when cost price is more than sale price.

2) A profit occurs when the sale price is more than the cost price.

3) SP - CP 4) $\frac{\text{gain}}{CP} \times 100$ 5) no profit no loss

Application Skill Achiever



I. Solve the following problems.

- 1) let the original price of the microwave oven = Rs. 100

cost price for sumanth = $100 - 10 = \text{Rs. } 90$

Profit = 30%

$$SP = \frac{100 + 30\%}{100} \times CP = \frac{130}{100} \times 90 = \text{Rs. } 117$$

Gain % on original price = $117 - 100 = 17\%$

- 2) If the cp of total cloth = Rs. 100

So cp of half of the clothes = Rs. 50

Again cp of half of the remaining cloth = $50/2 = \text{Rs. } 25$

$$SP \text{ of first half cloth} = \frac{100 + 20\%}{100} \times 50 = \text{Rs. } 60$$

$$SP \text{ of second half of remaining cloth} = \frac{100 + 20\%}{100} \times 25 = \text{Rs. } 30$$

Sp of rest of the cloth = Rs. 25

Total sp = Rs. 60 + Rs. 30 + Rs. 25 = Rs. 115

gain % = 15%

- 3) The labeled price = Rs. 1400

Reduction = 20%

$$\text{Sale price} = \frac{100 - 20\%}{100} \times M.P. = \frac{80}{100} \times 1400 = \text{Rs. } 1120$$

Additional reduction = 10%

$$\text{So CP of the briefcase for Gouri} = \frac{100 - 10\%}{100} \times 1120 = \frac{90}{100} \times 1120 = \text{Rs. } 1008$$

- 4) Let the bill amount = x

$$\text{After 35\% discount } SP = \frac{100 - 35\%}{100} \times x = \frac{65x}{100}$$

In second transaction

$$\text{After 20\% discount } SP = \frac{100 - 20\%}{100} \times \frac{65x}{100} = \frac{52x}{100}$$

$$\text{Again 20\% discount after } SP = \frac{100 - 20\%}{100} \times \frac{52x}{100} = \frac{41.6x}{100}$$

But according to question the difference is Rs. 22

$$\text{So } \frac{65x}{100} - \frac{64x}{100} = \text{Rs. } 22$$

$$x = \text{Rs. } 22 \times 100 = \text{Rs. } 2200$$

The bill amount is Rs. 2200

- 5) Let the labeled price of the suitcase = x

Discount = 15%

$$\text{CP for Kamal} = \frac{100 - 15}{100} \times \frac{85x}{100}$$

Profit = 20%

$$\text{SP for Kamal} = \frac{100 + 20}{100} \times \frac{85x}{100} = \frac{51x}{50}$$

But according to question the SP for Kamal is Rs. 2880

$$\frac{51x}{50} = 2880 \quad x = 2880 \times \frac{50}{51} = \text{Rs. } 2840$$

CP for Kamal is Rs. 2400.

- 6) SP of the TV = Rs. 17940

Discount = 8%

$$\text{Labeled price} = \frac{100}{100 - \text{Discount}\%} \times \text{SP} = \frac{100}{100 - 8} \times 17940 = \text{Rs. } 19500$$

Profit = 19.6%

$$\text{CP} = \frac{100}{100 + 19.6} \times 17940 = \text{Rs. } 15000$$

If it is sold with out discount

$$\text{Total profit} = 19500 - 15000 = \text{Rs. } 4500$$

$$\text{Gain \%} = \frac{\text{gain}}{\text{CP}} \times 100 = \frac{4500}{15000} \times 100 = 30\%$$

- 7) let the labeled price = Rs. 100

Discount = Rs. 5

$$\text{SP} = 100 - 5 = \text{Rs. } 95$$

Profit = 23.5%

$$\text{CP} = \frac{100}{100 + 23.5} \times 95 = \text{Rs. } 76.92$$

If it is sold without discount the profit = 100 - 76.92 = 23.08

$$\text{Gain\%} = \frac{23.08}{76.92} \times 100 = 30\%$$

8) Let the CP = Rs. 100

Gain = Rs. 14.28

SP = Rs. 114.28

Labeled price = x

Discount = 11.11%

$$SP = \frac{100 - \text{discount}\%}{100} \times \text{Labeled Price} = \frac{100 - 11.11}{100} \times x$$

$$\frac{100 - 11.11}{100} \times x = 114.28$$

$$x = \frac{114.28 \times 100}{88.89} = \text{Rs. } 128.56$$

The marked price is 28.56% more than the cost price.

9) SP of the first watch = Rs. 300

Profit = 10%

$$CP = \frac{100}{100 + \text{g}\%} \times SP = \frac{100}{110} \times 300 = \frac{3000}{11}$$

In second watch loss = 10%

$$CP = \frac{100}{100 - \text{Loss}\%} \times SP = \frac{100}{90} \times 300 = \frac{3000}{9}$$

$$CP \text{ of the two watches} = \frac{3000}{11} + \frac{3000}{9} = \frac{60000}{99} = \text{Rs. } 606$$

Net loss = 606 - 600 = Rs. 6

$$\text{Loss}\% = \frac{\text{Loss}}{CP} \times 100 = \frac{6}{606} \times 100 = \frac{100}{101}\%$$

10) SP of 1 liter mixture = Rs. 75

Profit = 37.5%

$$CP = \frac{100}{100 + \text{g}\%} \times SP = \frac{100}{137.5} \times 75 = \text{Rs. } 54.5$$

For Rs. 60 spirit = 1 liter

$$\text{For Rs. } 54.5 \text{ spirit} = \frac{1}{60} \times 54.5 = .9 \text{ liter}$$

Ratio of spirit and water = 9:1

Exercise - 5



I. Choose the correct answer.

- Ans: 1) 15 km 2) 2 minute 5 second 3) 8 hrs 4) 475 km
 5) 3 hr. 18 min. 6) 25 km. 7) 2.5 seconds 8) 31.5 km
 9) 1.35 km. 10) 3.1 km. 11) 4.2 km. 12) 90 km.
 13) none of these

II. Concept questions.

- 1) speed = distance/time
- 2) total distance covered/total time taken
- 3) both A and B
- 4) the moving body covers unequal distance in equal interval of time
- 5) none of these

Application Skill Achiever



I. Solve the following problems.

- 1) $84 \text{ km} \times 5 = 420 \text{ km}.$
- 2) $\frac{60}{48}$ 1hr.15minutes
- 3) in 55 minute mike drives = 60km.
 In one hour mike drives = $\frac{60}{55} \times 60 = 65.45 \text{ km}$
 Average speed is 65.45 km/hr.
- 4) time taken to go first 24 km = $\frac{24}{64} = \frac{3}{8} \text{ hr}.$
 Time taken to go second 50 km. = $\frac{50}{80} = \frac{5}{8} \text{ hr}.$
 Total time taken for the trip = $\frac{3}{8} \text{ hr} + \frac{5}{8} \text{ hr} = 1 \text{ hr}.$
- 5) the car travelled in first $1 \frac{1}{2} \text{ hr} = 65 \text{ km} \times 1 \frac{1}{2} = 97.5 \text{ km}.$
 The car travelled in next 45 minutes = $\frac{80}{60} \times 45 = 60 \text{ km}.$
 The vehicle covered 157.5 km.

6) Time taken to go first 24 km = $\frac{24}{64} \times \frac{3}{8} \text{ hr.}$

Time taken to go second 50 km. = $\frac{50}{80} \times \frac{5}{8} \text{ hr.}$

Total time taken for the trip = $\frac{3}{8} \text{ hr.} + \frac{5}{8} \text{ hr.} = 1 \text{ hr.}$

Its average speed = $\frac{\text{Total Distance}}{\text{Total Time}} = \frac{24 + 50}{1} = 74 \text{ km/hr}$

7) Mary's car travelled in first $1 \frac{1}{2} \text{ hr.} = 65 \text{ km} \times 1 \frac{1}{2} = 97.5 \text{ km.}$

The car travelled in next 45 minutes = $\frac{80}{60} \times 45 = 60 \text{ km.}$

Her car covered 157.5 km. in $1 \text{ hr.} 30 \text{ min.} + 45 \text{ min.} = 2 \text{ hr.} 15 \text{ min.} = 2 \frac{15}{60} = 2 \frac{1}{4} \text{ hr.}$

Her average speed = $\frac{\text{Total Distance}}{\text{Total Time}} = \frac{157.5}{2 \frac{1}{4}} = 157.5 \times \frac{4}{9} = 70 \text{ km/hr}$

8) Distance covered in 3 hrs. = $50 \times 3 = 150 \text{ km}$

Distance covered in next 2 hrs. = $60 \times 2 = 120 \text{ km}$

Distance covered in next 4 hrs. = $70 \times 4 = 280 \text{ km}$

Distance covered in total 9 hrs. = $150 + 120 + 280 = 550 \text{ km}$

The average speed = $550 \text{ km} \div 9 = 61.11 \text{ km/hr.}$

9) Let the distance is x km.

Time taken to go to Washington in $45 \text{ km/hr} = \frac{x}{45} \text{ hr.}$

Time taken to go to Newyork in $55 \text{ km/hr} = \frac{x}{55} \text{ hr.}$

Average speed = $\frac{2x}{\frac{x}{45} + \frac{x}{55}} = \frac{2x \times 45 \times 55}{100} = 49.5 \text{ km/hr.}$

10) The total distance = 18 mile

Total time taken by walking = 10 hrs

Time taken to go half way by walking = $10/2 = 5 \text{ hrs.}$

Total time taken by riding = 8 hrs

Time taken to go half way by riding = $8/2 = 4 \text{ hrs.}$

Total time taken = $5 \text{ hr} + 4 \text{ hr.} = 9 \text{ hr.}$

Average speed = $18/9 = 2 \text{ km/hr.}$

11) let the distance from A to B = x

Speed from A to B = y km/h

$$\text{Time taken} = \frac{x}{y} \text{ hr.}$$

Coming time speed = 2y km/hr

$$\text{Time taken} = \frac{x}{2y} \text{ hr.}$$

$$\text{Average speed} = \frac{\frac{2x}{\frac{x}{y}} + \frac{2x}{\frac{x}{2y}}}{\frac{2x}{3x} + \frac{2y}{3}} = \frac{4y}{3} \text{ km/hr.}$$

$$\frac{4y}{3} \text{ km/hr} = 80 \text{ km/hr.}$$

$$y = \frac{80 \times 3}{4} = 60 \text{ km/hr.}$$

The speed from A to B is 60 km/hr.

12) Speed from A to B = 60 km/hr.

Time = 3 hr.

Total distance = $60 \times 3 = 180$ km.

$$\text{Speed from B to C} = 60 + 60 \times \frac{50}{100} = 90 \text{ km/hr.}$$

Time = 2 hrs.

Distance covered = $90 \times 2 = 180$ km.

Total distance covered = $180 + 180 = 360$ km.

Total time taken = $3 + 2 = 5$ hrs.

Average speed = $360 \div 5 = 72$ km/hr.

13) Distance from A to B = $40 \times 5 = 200$ km.

$$\text{Speed from B to A} = 40 + 40 \times \frac{25}{100} = 50 \text{ km/hr.}$$

Time taken = $200 \div 50 = 4$ hrs.

$$\text{Average speed} = \frac{200}{5} = \frac{200}{4} = 44.44 \text{ km/hr}$$

14) Distance from A to B = 200 km; Speed from A to B = 40 km/hr

Time taken = $200 \div 40 = 5$ hrs.

Distance from B to C = 300 km.

$$\text{Speed from B to C} = 40 + 40 \times \frac{50}{100} = 60 \text{ km/hr.}$$

Time taken = $300 \div 60 = 5$ hrs.

Distance from B to C = 540km.

Speed from B to C = $60 + 40 \times \frac{50}{100}$ 90 km/hr .

Time taken = $540 \div 90 = 6$ hrs.

Total time taken to go from A to D = $5 + 5 + 6 = 16$ hrs.

The average speed = $(200 + 300 + 540) \div 16 = 65 \text{ km/hr}$.

15) Total distance = 800 km.

Speed for first 400 km = 900 km/hr

Time taken = $\frac{400}{900}$ $\frac{4}{9} \text{ km/hr}$

Speed for second 400 km = 760 km/hr

Time taken = $\frac{400}{760}$ $\frac{10}{19} \text{ km/hr}$

Total time taken for the trip = $\frac{4}{9} + \frac{10}{19} = \frac{166}{171} \text{ hr}$. approximately 58 minutes

Exercise - 6



I. Choose the correct answer.

$$1) \quad P = \frac{100 \times I}{rt} = \frac{100 \times 235.20}{14 \times 3} \quad \text{Rs.560}$$

$$2) \quad r = \frac{100 \times I}{PT} = \frac{100 \times 19.20}{64 \times 2} \quad 15\%$$

$$A = P \left(1 + \frac{rt}{100} \right)^n = 86 \left(1 + \frac{15 \times 4}{100} \right)^{1.60} = 86 \quad \text{Rs.137.60}$$

$$3) \quad 850 = P \left(1 + \frac{rt}{100} \right)^n \quad P = \frac{100 \times 850}{100 \times 3r}$$

$$925 = P \left(1 + \frac{rt}{100} \right)^n \quad P = \frac{100 \times 925}{100 \times 4r}$$

$$\frac{100 \times 850}{100 \times 3r} = \frac{100 \times 925}{100 \times 4r} \quad 85000 = 3400r \quad 92500 = 2775r$$

$$3400r = 2775r \quad 92500 = 85000$$

$$625r = 7500$$

$$r = 12\%$$

$$P = \frac{100 \times 925}{100 \times 4r} = \frac{100 \times 925}{100 \times 4 \times 12} \quad \text{Rs.625}$$

$$4) \quad 702 = P \left(1 + \frac{rt}{100} \right)^n \quad P = \frac{100 \times 702}{100 \times 2r}$$

$$783 = P \left(1 + \frac{rt}{100} \right)^n \quad P = \frac{100 \times 783}{100 \times 3r}$$

$$\frac{100 \times 702}{100 \times 2r} = \frac{100 \times 783}{100 \times 3r} \quad 70200 = 2106r \quad 78300 = 1566r$$

$$2106r = 1566r \quad 78300 = 70200$$

$$540r = 8100$$

$$r = 15\%$$

$$5) \quad r = \frac{I \times 100}{P \times t} = \frac{151.20 \times 100}{360 \times 3} \quad 14\%$$

$$A = P \left(1 + \frac{rt}{100} \right)^n = 700 \left(1 + \frac{14 \times 5}{100} \right)^7 = 700 \times \frac{170}{100} \quad \text{Rs.1190}$$

6) The total sum = 2540

Let the sum for 12% interest = x

And the sum for 12 ½ % interest = 2540 - x

$$\text{The interest at 12\%} = \frac{x \cdot 12 \cdot 1}{100}$$

$$\text{The interest at 12 ½ \%} = \frac{(2540 - x) \cdot 25 \cdot 1}{100 \cdot 2}$$

$$\frac{x \cdot 12 \cdot 1}{100} - \frac{(2540 - x) \cdot 25 \cdot 1}{100 \cdot 2} = 311.60$$

$$\frac{24x - 25x + 2540}{200} = 311.60$$

$$x = 62320 - 63500$$

$$x = 1180$$

Rs. 1180 is given for 12% interest

7) the total sum = 2600

Let the sum for 10% interest = x

And the sum for 9 % interest = 2600 - x

$$\text{The interest at 10\% for 5 years} = \frac{x \cdot 10 \cdot 5}{100}$$

$$\text{The interest at 9 \% for 6 years} = \frac{(2600 - x) \cdot 9 \cdot 6}{100}$$

$$\frac{x \cdot 10 \cdot 5}{100} - \frac{(2600 - x) \cdot 9 \cdot 6}{100}$$

$$50x = 140400 - 54x$$

$$x = \frac{140400}{104} = 1350$$

The sum lent out at 10% is Rs. 1350.

$$8) I = \frac{P}{9}$$

Rate of interest = r

Time period = r

$$P \cdot \frac{\frac{P}{9} \cdot 100}{r \cdot r} = P \cdot \frac{100P}{9r^2}$$

$$r^2 = \frac{100}{9} \quad r = \frac{10}{3} \% = 3\frac{1}{3} \%$$

The rate of interest $3\frac{1}{3} \%$ is per annum

$$\begin{aligned}
 9) \quad & p \frac{(1260 - p) 100}{r \cdot 2} \\
 & p \frac{(1350 - p) 100}{r \cdot 5} \\
 & \frac{(1260 - p) 100}{r \cdot 2} - \frac{(1350 - p) 100}{r \cdot 5} \\
 & \frac{1260 - p}{2} - \frac{1350 - p}{5} \\
 & 6300 - 5p - 2700 + 2p \\
 & 3p - 3600
 \end{aligned}$$

$$p = 1200$$

$$I = 1260 - 1200 = 60$$

$$R = \frac{I}{p} \cdot \frac{100}{t} = \frac{60}{1200} \cdot \frac{100}{2} = 2.5\%$$

Rate of interest 2.5%

$$\begin{aligned}
 10) \quad & \frac{600 - r \cdot 2}{100} - \frac{150 - r \cdot 4}{100} = 90 \\
 & 12r - 6r = 90 \\
 & r = 5\%
 \end{aligned}$$

$$11) \quad I = \frac{prt}{100} - \frac{prr}{100}$$

$$\text{But } I = \frac{9p}{16}$$

$$\frac{9p}{16} = \frac{pr^2}{100}$$

$$16r^2 = 900$$

$$r^2 = \frac{900}{16} \quad r = \frac{30}{4} = 7\frac{1}{2}\%$$

The time is $7\frac{1}{2}$ years.

$$12) \quad A - p \left(1 + \frac{rt}{100}\right) = p \left(1 + \frac{r \cdot 16}{100}\right)$$

$$2p - p \left(\frac{100 + r \cdot 16}{100}\right)$$

$$200p - p(100 + 16r)$$

$$16r = 100 - 200$$

$$r = \frac{100}{16} = 6\frac{1}{4}\%$$

The rate of interest is $6\frac{1}{4}\%$ per annum.

$$13) A = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 15}{100} \right)$$

$$3p = p \frac{100 + r \cdot 15}{100}$$

$$300p = p(100 + 15r)$$

$$15r = 100 - 300$$

$$r = \frac{200}{15} = 13\frac{1}{3}\%$$

The rate of interest is $13\frac{1}{3}\%$ per annum.

14) 20 years

$$15) p = 800; A = 920; T = 3$$

$$I = 920 - 800 = 120$$

$$R = \frac{100}{p} \cdot \frac{I}{t} = \frac{100}{800} \cdot \frac{120}{3} = 5\%$$

The new $r = 5\% + 3\% = 8\%$

$$A = p \left(1 + \frac{rt}{100} \right) = 800 \left(1 + \frac{8 \cdot 3}{100} \right) = 800 \cdot \frac{124}{100} = \text{Rs. } 992$$

$$16) \frac{prt}{100} = \frac{p(r-1)t}{100} = 24$$

$$\frac{pr-2}{100} = \frac{p(r-1)-2}{100} = 24$$

$$\frac{2pr}{100} = \frac{2pr-2p-2400}{100}$$

$$2pr = 2pr - 2p - 2400$$

$$2p = 2400$$

$$p = 1200$$

The sum is Rs. 1200.

$$17) A = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 20}{100} \right)$$

$$2p = p \frac{100 + r \cdot 20}{100}$$

$$200p = p(100 + 20r)$$

$$20r = 100 - 200$$

$$r = \frac{100}{20} = 5\%$$

The rate of interest is 5% per annum.

$$18) A = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 2.5}{100} \right)$$

$$1012 = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 2.5}{100} \right)$$

$$1012 = p \frac{100 + r \cdot 2.5}{100}$$

$$p = \frac{1012 \cdot 100}{100 + 2.5r}$$

Again

$$A = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 4}{100} \right)$$

$$1067.20 = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{r \cdot 4}{100} \right)$$

$$1067.20 = p \frac{100 + r \cdot 4}{100}$$

$$p = \frac{1067.20 \cdot 100}{100 + 4r}$$

$$\frac{1012 \cdot 100}{100 + 2.5r} = \frac{1067.20 \cdot 100}{100 + 4r}$$

$$1012(100 + 4r) = 1067.20(100 + 2.5r)$$

$$4048r + 2668r = 106720 - 101200$$

$$1380r = 5520$$

$$r = 4\%$$

$$19) A = p \left(1 + \frac{rt}{100} \right) = p \left(1 + \frac{12 \cdot t}{100} \right)$$

$$2p = p \left(1 + \frac{12 \cdot t}{100} \right)$$

$$2 = \frac{100 + 12t}{100}$$

$$100 + 12t = 200$$

$$t = \frac{100}{12} = 8\frac{1}{3} \text{ years}$$

The time period is 8 years 4 months

$$20) p = \frac{100 \cdot x}{x \cdot x} = Rs. \frac{100}{x}$$

II. Concept questions.

- 1) C. principal 2) A. $PRT/100$ 3) C.
4) A. $100 \times I/PR$ 5) B. interest = principal

Application Skill Achiever



I. Solve the following problems.

1) $\frac{1}{2}\% = 104$

$$100\% = 104 \times 2 \times 100 = \text{Rs. } 20800$$

His capital is Rs. 20800

2) the sum amounts to 2600 in 5 years and 2240 in 2 years

$$\text{Interest of 3 years} = 2600 - 2240 = 360$$

$$\text{Interest of 1 year} = 360/3 = 120$$

$$\text{Interest of 2 years} = 120 \times 2 = 240$$

$$\text{The sum is } 2240 - 240 = \text{Rs. } 2000$$

3) let the total capital of the man = x

$$\text{He invested for 7\% interest} = x/3$$

$$\text{He invested for 8\% interest} = x/4$$

$$\text{He invested for 10\% interest} = x - \frac{x}{3} - \frac{x}{4} = x \left(\frac{7}{12} - \frac{5}{12} \right)$$

$$\frac{x}{3} - \frac{7x}{100} - \frac{x}{4} + \frac{8x}{100} = \frac{5x}{12} - \frac{10x}{100} = 561$$

$$\frac{28x}{1200} - \frac{24x}{1200} + \frac{50x}{1200} = 561$$

$$x = 561 \times \frac{1200}{102} = \text{Rs. } 6600$$

The capital is Rs. 6600

4) $A = P \left(1 + \frac{rt}{100} \right)$ $P = \frac{A}{1 + \frac{rt}{100}}$

$$\frac{8p}{5} = P \left(1 + \frac{r \cdot 5}{100} \right)$$

$$\frac{8p}{5} = P \frac{100 + 5r}{100}$$

$$500 = 25r + 800$$

$$r = \frac{800 - 500}{25} = 12\%$$

The rate percent per annum is 12%

- 5) if the interest on Rs. 1200 be more than the interest on Rs. 1000 by Rs. 50 in 3 years,
Then the interest of Rs. 200 in 3 years is Rs. 50

$$r = \frac{100}{p} \cdot \frac{I}{t} = \frac{100}{200} \cdot \frac{50}{3} = 8\frac{1}{3}\%$$

Exercise - 7



I. Choose the correct answer.

- Ans: 1) (2mn) 2) $\frac{1}{3}n$ 3) (2n²) 4) (-6c)
- 5) $\frac{300}{300}x$ 6) (9p² - 4pq) 7) (a² + 2ab + b²) 8) (a² + 4ab + 4b²)
- 9) (a² - 4ac + c²) 10) (a - b)² 11) 45 12) 10004 + 400
- 13) 200 + 24 + 400 14) 3600 - 600 + 24 15) 6 16) 42
- 17) 12

II. Concept questions.

- 1) a² + 2.a.b + b²
- 2) a² - b²
- 3) LHS = RHS for all variables
- 4) Trinomial
- 5) a³ + 3a²b + 3ab² + b³

Application Skill Achiever



Application skill achiever.

- Ans: 1) 10r 2) $\frac{b^2}{10ac}$ 3) $\frac{3m}{2n}$
- 4) 7y + 8cm² 5) $\frac{a}{b} \cdot \frac{b}{a}^2 \cdot 2$ 6) a² $\frac{a}{3}$ 7) -ab - 2bc + 4ac

Exercise - 8



I. Solve the following equations.

1) $3x+5=5x+3$

$$3x-5x = 3-5$$

$$-2x = -2$$

$$x = 1$$

2) $\frac{x}{2} - 3 = \frac{x}{3} - 4$

$$\frac{x}{2} - \frac{x}{3} = -4 + 3$$

$$\frac{3x - 2x}{6} = -1$$

$$x = 6$$

3) $2.5x - 7 = 3x - 8$

$$2.5x - 3x = -8 + 7$$

$$-.5x = -1$$

$$x = 2$$

4) $6x - 1 = \frac{1}{3} - 5x$

$$6x - 5x = -1 + \frac{1}{3}$$

$$x = \frac{1}{3}$$

5) $5x - 3 = 4x - 2$

$$5x - 4x = -2 + 3$$

$$x = 1$$

6) $3x - 1 = 2x + 1$

$$3x - 2x = 1 + 1$$

$$x = 2$$

7) $\frac{x}{3} - 2 = 2x - 3$

$$\frac{x}{3} - 2x = -3 + 2$$

$$\frac{x - 6x}{3} = -1$$

$$5x = 15 \quad x = 3$$

$$8) \frac{1}{3}(2x - 1) - x = 1$$

$$2x - 1 - 3x = 3$$

$$2x - 3x = 3 + 1$$

$$x = 4$$

$$9) 8x - 2.5 = 5x - 1$$

$$8x - 5x = -1 + 2.5$$

$$3x = 1.5$$

$$x = 0.5$$

$$10) 6x - 5 = 3x - 3$$

$$6x - 3x = -3 + 5$$

$$3x = 2 \quad x = \frac{2}{3}$$

$$11) (x + 1)(x + 2) = (x + 2)(x - 3)$$

$$x^2 + 3x + 2 = x^2 - x - 6$$

$$3x + 2 = -x - 6$$

$$3x + x = -6 - 2$$

$$x = -2$$

$$12) (x + 1)(x + 2) = (x + 2)(x + 3)$$

$$x^2 + 3x + 2 = x^2 + 5x + 6$$

$$3x + 2 = 5x + 6$$

$$3x - 5x = 6 - 2$$

$$x = -2$$

$$13) (x + 1)(x + 4) = (x + 2)(x - 5)$$

$$x^2 + 5x + 4 = x^2 - 3x - 10$$

$$5x + 3x = -10 - 4$$

$$x = \frac{14}{8} = 1\frac{3}{4}$$

$$14) \frac{3x - 1}{3x - 2} = \frac{3}{4}$$

$$12x - 4 = 9x - 6$$

$$12x - 9x = -6 + 4$$

$$3x = -2 \quad x = -\frac{2}{3}$$

$$15) \frac{3x-5}{3x-5} = \frac{11}{5}$$

$$15x + 25 = 33x - 55$$

$$15x - 33x = -55 - 25$$

$$-18x = -80$$

$$x = \frac{80}{18} = 4\frac{4}{9}$$

$$16) \frac{\frac{1}{2}x-5}{\frac{5}{2}x-5} = \frac{1}{3}$$

$$3\left(\frac{1}{2}x - 5\right) = \frac{5}{2}x - 5$$

$$\frac{3}{2}x - 15 = \frac{5}{2}x - 5$$

$$x = 20$$

II. Concept questions.

1) Variable

2) both a and b

3) x

4) 3

5) None of these

Application Skill Achiever



I. Solve the following problems.

1) Let the even numbers are x and x + 2

$$\text{So } x + x + 2 = 198$$

$$2x + 2 = 198$$

$$2x = 198 - 2$$

$$x = 196 \div 2 = 98$$

So the numbers are 98 and 100.

2) Let the consecutive odd numbers are x - 2, x, x + 2

$$\text{The sum of the numbers are } x - 2 + x + x + 2 = 3x$$

$$3x = 81$$

$$x = 27$$

The numbers are 25, 27 and 29.

- 3) Let the consecutive even numbers are $x - 2, x, x + 2$

The sum of the numbers are $x - 2 + x + x + 2 = 3x$

$$3x = 42$$

$$x = 14$$

So the numbers are 12, 14 and 16.

- 4) Let the present age of Arjun is x

His age before 7 years = $x - 7$

$$\text{So } x + x - 7 = 31$$

$$2x - 7 = 31$$

$$2x = 31 + 7$$

$$x = 38 \div 2 = 19$$

The present age of Arjun is 19 years and after 7 years his age will be 26 years.

- 5) Let the age of Christopher = x

Age of George = $x + 8$

Age of Ford = $x - 2$

The sum of their age = $x + x + 8 + x - 2$

$$3x - 6 = 60$$

$$3x = 60 + 6 = 66$$

$$x = 66 \div 3 = 22$$

The age of Christopher = 22 years

Age of George = $x + 8 = 22 + 8 = 30$ years

Age of Ford = $x - 2 = 22 - 2 = 20$ years

- 6) Let the age of Nick is x

So the age of Kane = $x + 1$

$$x + x + 1 = 11$$

$$2x + 1 = 11$$

$$2x = 11 - 1 = 10$$

$$x = 5 \text{ years}$$

The age of Nick is 5 years and the age of Kane is 6 years.

7) Let the age of Ashley is $4x$

So the age of Mary = $7x$

$$4x + 7x = 22$$

$$11x = 22$$

$$x = 2$$

The age of Ashley = $4x = 4 \times 2 = 8$ years

The age of Mary = $7x = 7 \times 2 = 14$ years

8) Let the age of Tony = x

The age of Teddy = $x + 2$

$$x + x + 2 = 42/3$$

$$2x + 2 = 14$$

$$2x = 14 - 2 = 12$$

$$x = 6$$

The age of Tony = 6

The age of Teddy = 8

9) Let the present age of Allen = x

The present age of Scott = $x + 10$

$$x + 10 + 10 = 3x$$

$$x + 20 = 3x$$

$$x - 3x = -20$$

$$x = 10$$

The present age of Allen = $x = 10$ years

The present age of Scott = $x + 10 = 20$ years

10) $5x - 17 = 23$

$$5x = 23 + 17 = 40$$

$$x = 40 \div 5 = 8$$

The number is 8 and 5 times the number is 40.

11) $\frac{x}{3} \quad 7 \quad 8$

$$\frac{x + 21}{3} \quad 8$$

$$x + 21 = 24$$

$$x = 24 - 21 = 3$$

The number is 3

$$\begin{aligned}
 12) \quad & \frac{2x}{3} \quad 6 \quad 10 \\
 & \frac{2x \quad 18}{3} \quad 10 \\
 & 2x \quad 18 \quad 30 \\
 & 2x \quad 30 \quad 18 \\
 & x \quad 9
 \end{aligned}$$

The number is 9

13) The sum of the digits of a two digit number is 15

The tens place digit is 8

The units place digit = $15 - 8 = 7$

The two digit number = $10 \times 8 + 7 = 87$

$$14) \quad 97 - 2x = 79$$

$$-2x = 79 - 97$$

$$x = (-18)/(-2) = 9$$

The number is 9

15) The fraction is $\frac{3}{7}$

Exercise - 9



I. Factorize the following polynomials

- 1) $x^2y^2 + xyz + xy + z = xy(xy + z) + 1(xy + z) = (xy + z)(xy + 1)$
- 2) $2x^2 - 5x - 2xy + 5y = 2x^2 - 2xy - 5x + 5y = 2x(x - y) - 5(x - y) = (x - y)(2x - 5)$
- 3) $2mx - 2my - nx + ny = 2m(x - y) - n(x - y) = (x - y)(2m - n)$
- 4) $x^4 + x^3 + 5x + 5 = x^3(x + 1) + 5(x + 1) = (x + 1)(x^3 + 5)$
- 5) $ab(x^2 + 1) + x(a^2 + b^2)$
 $= abx^2 + ab + xa^2 + xb^2$
 $= abx^2 + xa^2 + xb^2 + ab$
 $= ax(bx + a) + b(bx + a)$
 $= (bx + a)(ax + b)$
- 6) $(2x + 3y)^2 - 16z^2 = (2x + 3y + 4z)(2x + 3y - 4z)$
- 7) $1 - 100x^2 = (1 + 10x)(1 - 10x)$
- 8) $(a - b)^2 - (x + y)^2 = (a - b + x + y)(a - b - x - y)$
- 9) $(a + b - c)^2 - (x - y + z)^2 = (a + b - c + x - y + z)(a + b - c - x + y - z)$
- 10) $16a^2 - (4a + 1)^2 = (4a + 4a + 1)(4a - 4a - 1) = -(8a + 1)$
- 11) $(a - b)^2 - (c - d)^2 = (a - b + c - d)(a - b - c + d)$
- 12) $(x + y - 9)^2 - (x - 9)^2 = (x + y - 9 + x - 9)(x + y - 9 - x + 9) = y(2x + y - 18)$
- 13) $x^2 - 26xy + 169 = (x - 13)(x - 13)$
- 14) $y^2 - 4y - 21 = (y - 7)(y + 3)$
- 15) $18x^2 + 18x - 20 = 2(9x^2 + 9x - 10) = 2(9x^2 + 15x - 6x - 10) = 2(3x + 5)(3x - 2)$
- 16) $12x^2 - 29xy + 14y^2 = 12x^2 - 21xy - 8xy + 14y^2 = (4x - 7y)(3x - 2y)$
- 17) $(a + b)^3 + 64(a - b)^3 = \{a + b + 4(a - b)\} \{(a + b)^2 - 4(a - b)(a + b) + (4a - 4b)^2\}$
 $= \{a + b + 4a - 4b\} \{a^2 + b^2 + 2ab - 4a^2 + 4b^2 + 16a^2 + 16b^2 - 32ab\}$
 $= (5a - 3b)(13a^2 - 30ab + 21b^2)$
- 18) $(2a + b)^3 - (3a + 6b)^3 = (2a + b - 3a - 6b) \{(2a + b)^2 + (2a + b)(3a + 6b) + (3a + 6b)^2\}$
 $= -(a + 5b) \{4a^2 + b^2 + 4ab + 6a^2 + 3ab + 12ab + 6b^2 + 9a^2 + 36b^2 + 36ab\}$
 $= -(a + 5b)(19a^2 + 43b^2 + 55ab)$
- 19) $9x^2 - (2y + 4x)^2 = (3x + 2y + 4x)(3x - 2y - 4x) = -(7x + 2y)(x + 2y)$
- 20) $x^3 - 3x^2 - x + 3 = (x - 3)(x^2 - 1) = (x - 3)(x + 1)(x - 1)$
- 21) $6 + x - 2x^2 = 6 + 4x - 3x - 2x^2 = (3 + 2x)(2 - x)$
- 22) $px^2 + pqx - 6x - 6q = (x + q)(px - 6)$

- 23) $ab - ac - b^2 + bc = (b - c)(a - b)$
- 24) $32 - 2(x - y)^2 = 2\{42 - (x - y)^2\} = 2(4 + x - y)(4 - x + y)$
- 25) $2x^3 + 5x^2y - 12xy^2 = 2x^3 + 8x^2y - 3x^2y - 12xy^2 = (x + 4y)(2x^2 - 3xy)$
- 26) $3x^3 - x^2 + x = x(3x^2 - x + 1)$
- 27) $2x^2y^3 - 6x^2y^2 + 2xy^3 = 2xy^2(xy - 3x + y)$
- 28) $mx - my - nx + ny = (x - y)(m - n)$
- 29) $mx - ma + nx - na = (x - a)(m + n)$
- 30) $axy + bcxy - az - bcz = xy(a + bc) - z(a + bc) = (a + bc)(xy - z)$
- 31) $ax - bx + by + cy - cx - ay$
 $= ax - bx - cx - ay + by + cy = x(a - b - c) - y((a - b - c)) = (a - b - c)(x - y)$
- 32) $f^2x^2 + g^2x^2 - ag^2 - af^2 = (f^2 + g^2)(x^2 - a)$
- 33) $a^2x + abx + ac + aby + b^2y + bc$
 $= ax(a + b) + by(a + b) + c(a + b)$
 $= (a + b)(ax + by + c)$
- 34) $12 - 7x + x^2 = (3 - x)(4 - x)$
- 35) $m^2 - 22mn + 105n^2 = (m - 15n)(m - 7n)$
- 36) $a^4b^4 + 37a^2b^2 + 300 = (a^2b^2 + 25)(a^2b^2 + 12)$
- 37) $20 + 9x + x^2 = (4 + x)(5 + x)$
- 38) $a^2 - 11a - 152 = (a - 19)(a + 8)$
- 39) $x^2y^2 - 5xy - 24 = (xy - 8)(xy + 3)$
- 40) $a^2 - 38a + 361 = (a - 19)(a - 19)$
- 41) $y^4 + 6x^2y^2 - 27x^4 = (y^2 + 9x^2)(y^2 - 3x^2)$
- 42) $x^4 + 13a^2x^2 - 300a^4 = (x^2 + 25a^2)(x^2 - 12a^2)$
- 43) $380 - x - x^2 = (19 - x)(20 + x)$
- 44) $120 - 7ax - a^2x^2 = (8 - ax)(15 + ax)$
- 45) $12x^2 - 23xy + 10y^2 = (4x - 5y)(3x - 2y)$
- 46) $15x^2 + 224x - 15 = (x + 15)(15x - 1)$
- 47) $72x^2 - 145x + 72 = (8x - 9)(9x - 8)$
- 48) $x^4 - 16b^2 = (x^2 + 4b)(x^2 - 4b)$

II. concept questions.

- 1) factor 2) binomial 3) $x^2 + 2xy + y^2$
- 4) $x - y$ 5) only one term

Application Skill Achiever



I. Solve the following problems.

$$1) \frac{15x^2 - 4x - 4}{5x - 2} - \frac{(3x - 2)(5x - 2)}{5x - 2} = 3x - 2$$

$$2) \frac{8x^2 - 6x - 1}{2x - 1} - \frac{(2x - 1)(4x - 1)}{2x - 1} = 4x - 1$$

$$3) \frac{72x^2 - 17x - 3}{8x - 1} - \frac{(8x - 1)(9x - 3)}{8x - 1} = 9x - 3$$

$$4) \frac{6x^2 - 5x - 1}{2x - 1} - \frac{(2x - 1)(3x - 1)}{2x - 1} = 3x - 1$$

$$5) \frac{12x^2 - 19x - 5}{4x - 5} - \frac{(4x - 5)(3x - 1)}{4x - 5} = 3x - 1$$

$$6) \frac{32x^2 - 28x - 15}{8x - 3} - \frac{(4x - 5)(8x - 3)}{8x - 3} = 4x - 5$$

$$7) \frac{24x^2 - 4x - 8}{2x - 1} - \frac{4(6x^2 - x - 1)}{2x - 1} - \frac{4(2x - 1)(3x - 2)}{2x - 1} = 12x - 8$$

Exercise - 10



I. Answer the following question.

1) 71.4 mm

2) 30.6cm.

3) D = 11m.

$$\text{Circumference of the circle} = \frac{22}{7} \times 11 = \frac{242}{7} = 34.6m$$

4) D=7.5M.

$$\text{Circumference of the circle} = \frac{22}{7} \times 7.5 = \frac{165}{7} = 23.6m$$

5) Circumference of the circle = 21.98m.

$$\text{diameter} = \frac{21.98}{\frac{22}{7}} = 21.98 \times \frac{7}{22} = 6.99m.$$

6) radius of a circle = 4m.

$$\text{Area of the circle} = \frac{22}{7} \times 4 \times 4 = 50.28m^2$$

7) radius of a circle = 3.5m.

$$\text{Area of the circle} = \frac{22}{7} \times 3.5 \times 3.5 = 38.5m^2$$

8) the area of the circle = 200.96 m²

$$\text{The radius of the circle} = \sqrt{\frac{\text{area}}{\frac{22}{7}}} = \sqrt{200.96 \times \frac{7}{22}} = \sqrt{63.94} = 7.99m$$

9) radius of a circle = 1.5m.

$$\text{Circumference of the circle} = 2 \times \frac{22}{7} \times 1.5 = 9.43m$$

10) diameter of a circle = 6 cm.

$$\text{The radius of the circle} = 6/2 = 3cm.$$

$$\text{Area of the circle} = \frac{22}{7} \times 3 \times 3 = 28.285cm^2$$

11) the radius of the plate = 6cm.

$$\text{Area of the plate} = \frac{22}{7} \times 6 \times 6 = 113.142cm^2$$

12) the distance around the wheel of a truck = 7.42 m.

$$\text{The diameter of the wheel} = \frac{7.42}{\frac{22}{7}} = 7.42 \times \frac{7}{22} = 2.361m.$$

13) a lawn sprinkler sprays water 5 feet in every direction.

$$\text{The area of the sprinkled area} = \frac{22}{7} \times 5 \times 5 = 78.57 \text{ feet}^2$$

14) The diameter of the pizza = 12inch

$$\text{The circumference of the pizza} = \frac{22}{7} \times 12 = 37.71inch$$

15) Radius of the circular area the dog can run = 3m.

$$\text{The area of the circular area} = \frac{22}{7} \times 3 \times 3 = 28.285m^2$$

16) Circumference of the circle = 21.98yard

$$\text{radius} = \frac{21.98}{2} = 21.98 \times \frac{7}{22} \times \frac{1}{2} = 3.5yard$$

17) The radius of the storm = 7miles

$$\text{The area of the storm affected area} = \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154sq.mile$$

18) The circumference of the crater = 78.5mile

$$\text{The diameter of the crater} = \frac{\text{circumference}}{\pi} = \frac{78.5}{\frac{7}{22}} = 24.98mile$$

19) The diameter of the semicircular rug = 2feet

$$\text{The area of the rug} = \frac{r^2}{2} = \frac{22}{7} \times \frac{2}{2} \times \frac{2}{2} \times \frac{1}{2} = 1.571sq.feet$$

20) The radius of the spinner = 3 inch.

$$\text{The area of the spinner} = \pi r^2 = \frac{22}{7} \times 3 \times 3 = 28.285sq.inch$$

$$\text{Area of red sectors} = \frac{28.28}{2} = 14.14sq.inch$$

II. Concept questions.

- 1) Radius 2) the diameter is twice the radius 3) $2r$
4) r^2 5) 3.141

Application Skill Achiever



III. Answer the following questions.

1) the big circle area = r^2

$$\text{The smallest circle area} = \frac{r}{4} \times \frac{r}{4}$$

$$\text{The ratio of their area} = \frac{r^2}{\frac{r^2}{16}} = 16:1$$

- 2) area of a small square = 4m^2

$$\text{Sides of the small square} = \sqrt{4\text{m}^2} = 2\text{m}.$$

$$\text{Area of a circle of radius 2 m.} = \pi r^2 = \frac{22}{7} \times 2 \times 2 = 12.57\text{m}^2$$

$$\text{Area of 4 small squares} = 4 \times 4 = 16\text{m}^2$$

$$\text{Area of the garden} = 16\text{m}^2 + 12.57\text{m}^2 = 28.57\text{m}^2$$

- 3) A lawn sprinkler sprays water 12 m. in every direction.

$$\text{The area of the sprinkled area} = \frac{22}{7} \times 12 \times 12 = 452.57\text{m}^2$$

- 4) The diameter of the circular garden = 10m.

$$\text{Radius of the circular garden} = 10/2 = 5\text{m}.$$

$$\text{Width of the walkway} = 1\text{m}.$$

$$\text{Radius of the big circle} = 10/2 + 1\text{m} = 5\text{m} + 1\text{m} = 6\text{m}.$$

$$\text{Area of the walk way} = \text{area of big circle} - \text{area of small circle}$$

$$R^2 - r^2 = \frac{22}{7} \times 6 \times 6 - \frac{22}{7} \times 5 \times 5 = \frac{22}{7} (36 - 25) = 34.57\text{m}^2$$

- 5) The diameter of the pizza = 36 cm

$$\text{Area of the pizza} = \frac{22}{7} \times \frac{36}{2} \times \frac{36}{2} = 1018.29\text{cm}^2$$

$$\text{Cost of the pizza} = \text{Rs. } 1999$$

$$\text{Cost of } 1\text{cm}^2 \text{ pizza} = \frac{199900}{1018.29} = \text{Rs. } 1.96$$

- 6) Area of the garden = 5m^2

$$\text{Radius of the garden} = \sqrt{\frac{\text{area}}{\pi}} = \sqrt{\frac{5}{\frac{22}{7}}} = \sqrt{1.59} = 1.26\text{m}$$

$$\text{Perimeter of the garden} = 2 \times \pi \times r = 2 \times \frac{22}{7} \times 1.26 = 8\text{m}$$

- 7) Let the radius of the circular disk = r

$$\text{Area} = \pi r^2$$

$$\text{After increasing 20\% the radius} = r + \frac{20r}{100} = \frac{5r}{5} + \frac{r}{5} = \frac{6r}{5}$$

$$\text{Area} = \frac{6r}{5} \times \frac{6r}{5} = \frac{36}{25} r^2$$

$$\text{Increase in area} = \frac{36}{25} r^2 - r^2 = \frac{11}{25} r^2$$

$$\text{The percentage increase in area} = \frac{\frac{11}{25} r^2}{r^2} \times 100 = 44\%$$

8) The diameter of the table = 100 inch

The radius of the table = $100 \div 2 = 50$ inch

The radius of the table cloth = $50 + 15 = 65$ inch

The area of the table cloth = $\frac{22}{7} \times 65 \times 65 = 13278.57 \text{ inch}^2$

9) Area of the circle = 100 cm^2

Radius of the circle = $\sqrt{\frac{\text{area}}{7}} = \sqrt{100 \times \frac{7}{22}} = \sqrt{\frac{700}{22}} \text{ cm}$

AC = $\sqrt{2r^2} = \sqrt{2 \times \left(\sqrt{\frac{700}{22}} \text{ cm}\right)^2} = \sqrt{2 \times \frac{700}{22}} = 7.97 \text{ cm}$

10) The ratio of their area = $(3:1)^2 = 9:1$