

NOTES

CLASS 7

MATHS

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COMPARING QUANTITIES

I. Concept and Result

(i) Ratio $\rightarrow$ Ratio compares two or more things of the same kind. Suppose when comparing of two quantities of the same kind like height of Raju is 120 cm and that of monu is 80 cm. If we want to compare it by division then

$$\frac{\text{Raju's height}}{\text{Monu's height}} = \frac{120\text{cm}}{80\text{cm}} = \frac{3}{2} = 3 : 2$$

$$\text{Raju's height} = \frac{3}{2} \times \text{Monu's height}$$

So ratio of two quantities of same kind and in the same measurement (units) is a fraction that shows how many times the one quantity of the others. It is denoted by (:))

e.g. Ratio of two quantities a and b is written as a : b. It has no unit.

Percentage $\rightarrow$ Percent as the name suggests the amount or part of anything out of 100 parts or per 100 or for every 100 and it is denoted by sign%. $5\% = \frac{5}{100} = \frac{1}{20}$

Profit or Loss $\rightarrow$ In daily life we come across situation where we either purchase or sell something .

Cost Price (CP) $\rightarrow$ Price at which object is bought or cost of shopkeeper in purchasing article including fair, repair, etc.

Selling Price (S.P.) $\rightarrow$ The price at which the article is sold to the customer.

Three conditions arises/during the selling/buying processes

(i) $SP > CP$ i.e. $S.P. - C.P. > \text{zero}$ i.e. profit

$$\text{Profit} = S.P. - C.P., \text{ profit \%} = \frac{\text{Profit}}{C.P.} \times 100$$

(ii) $C.P. > S.P.$ i.e. $C.P. - S.P. > 0$ i.e. loss

$$\text{Loss} = C.P. - S.P., \text{ Loss \%} = \frac{\text{Loss}}{C.P.} \times 100$$

(III) $S.P. = C.P.$ i.e. $S.P. - C.P. = 0$

No profit no loss.

MRP means maximum retail price or marked of the article.

$$S.P. = \left(\frac{100 + \text{profit}}{100} \right) \times C.P. \text{ Or } \left(\frac{100 - \text{loss}}{100} \right) \times C.P.$$

$$C.P. = \left(\frac{100}{100 + \text{profit}} \right) \times S.P. \text{ OR } \left(\frac{100}{100 - \text{loss}} \right) \times S.P.$$

Simple Interest $\rightarrow$ It is used in lending/ borrowing money from either money lender or any financial institution.

Three things are important

Principal $\rightarrow$ It is the amount lent/ borrowed by a lender/ or from borrower. It is denoted by P.

Time $\rightarrow$ The duration for which money lent/ borrowed. It is denoted by t.

Rate $\rightarrow$ Rate of interest on which money is lent / borrowed. it is denoted by r and in the form of percentage

$$\text{Simple Interest} = \frac{PRT}{100}, \text{ Amount (A)} = P + S.I.$$



(MCQs – 4 Questions)

Q1 Find the ratio of 9m to 27cm.

(a)100:3 (b) 3:1100 (c) 3:100 (d) 30:10

Q2 Convert the given fractional numbers to percent $\frac{1}{8}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 40% of it is 500 km.

(a)1200km (b) 1250km (c)1500km (d) 1000km

Q4 The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

(a)3% (b) 4% (c) 5%(d) 2%

(Case Based Question)

Read the paragraph carefully and answer the questions

For Diwali celebration Mayank needs to buy various kinds of sweets to gift his friends and relatives. The rate list is as follows

Kaju Burfi (**400 g**) - Rs 600

Milk Cake (**400 g**) - Rs 450

Gulab Jamun (1 kg) - Rs 250

Kaju Roll (**400 g**) - Rs 900 (Do any four)

Q1. Mayank's friend gifted him 1 kg milk cake ,if he want to gift him Kaju Burfi of equal price ,then approximately how much kg of Kaju Burfi he have to gift? what is the ratio of price of milk cake and Kaju Burfi?

A. 1kg, 450:700 B. 750 g,450:750 C. 850 g,450:850 D. 725 g,450:650

Q 2. Approximately how many kg of Gulab Jamun can be purchased in the price of 400 g Kaju Roll ?

A. 4 kg B. 3 kg C. 2 kg D. 5 kg

Q 3. If Mayank purchased 400 g Kaju Roll and 1.5 kg Gulab Jamun ? Howmuch money he has to pay to sweet seller ?

A. Rs 1225 B. Rs 1275 C. Rs 1245 D. Rs 1250

Q 4. Is the cost of 1 kg Gulab Jamun and 300g Kaju Roll together less than the cost of 250 g Kaju Burfi and 400g Milk Cake together? Write both the prices in the ratio?

A. NO, 925:825 B. Yes, 900:800 C. Both are equal, 905:805D. Can't say,950:850

Q 5. The ratio of cost of 1 kg milk cake to 1kg Kaju Barfi. *

A. 1100: 1000 B. 1025 : 1100 C. 1125 : 1500 D. 900 : 1100



(Short answer type question:3)

Q1 Convert the given decimal fractions to percents 0.65.

Q2 Find 75% of 1kg (gm)

Q3 25 ml is ----- per cent of 5 liters.

(Long answer type question:2)

Q1 If x and y shared Rs 1100 in the ratio 1:10 , how much did x get?

Q2 In what time will Rs 4000 give an interest of Rs500 at 5% p.a.?

(Questions for Practice)**(i) MCQs**

Q1 Convert the given decimal fractions to percents 0.02.

(a) 3% (b) 4% (c) 5% (d) 2%

Q2 Find 1% of 1hour (minutes)

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$ (c) $\frac{6}{5}$ (d) $\frac{7}{5}$

Q3 15kg is -----% of 50kg.

(a) 20% (b) 40% (c) 50% (d) 30%

Q4 The interest on Rs 30,000 for 3 years at the rate of 15% per annum is

(a) Rs 4,500 (b) Rs 9,000 (c) Rs 18,000 (d) Rs 13,500

Q5 The ratio 3:8 is equal to

(a) 3.75% (b) 37.5% (c) 0.375% (d) 0.0375%

Q6 225% is equal to

(a) 9:4 (b) 4:9 (c) 3:2 (d) 2:3

Q7 I bought a T.V. for Rs 10,000 and sold it at a profit of 20%. How much money did I get for it ?

(a) Rs 20,000 (b) Rs 11,000 (c) Rs 15,000 (d) Rs 12,000

Q8 What sum of money earned Rs 90 as simple interest in 4 years at the rate of 5% ?

(a) Rs 350 (b) Rs 450 (c) Rs 550 (d) Rs 650

Q9 Amina buys a book for Rs 275 and sells it at a loss of 15% . How much does she sell it for.

(a) Rs 233.25 (b) Rs 233.50 (c) Rs 233.75 (d) Rs 233.35

Q10 Express $33\frac{1}{3}\%$ as a ratio in the lowest form.

(a) 1:3 (b) 3:1 (c) 33:1 (d) 1:33

(ii) Short answer type questions

Q1 Find ratio of 30 days to 36 hours.

Q2 Convert the given fractional numbers to percent 2.1.

Q3 Find the whole quantity if 70% of it is 14 minutes.

Q4 Meeta saves Rs 400 from her salary. If this is 10% of her salary. What is her salary?

Q5 A skirt bought for Rs 250 and sold at Rs 150 Find profit or loss percent.

Q6 At what rate will Rs 840 yield an interest of Rs 210 in 3 years?



Q7 90% of x is 315 km, the value of x is

Q8 Savitri obtained 440marks out of 500 in an examination . She secured -----% marks in the examination.

Q9 0.018 is equivalent to

Q10 $\frac{4}{5}$ when expressed as a percent is

Long answer type questions

Q1 In how many years a sum of money will become 4 times at 6% simple interest per annum.

Q2 Convert each part of the ratio to percentage

2:3:5

Q3 A dealer buys a wrist watch for Rs225 and spends Rs15 on its repairs. If he sells the same for Rs 300, find his profit percent.

Q4 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

Q5 Solve $\frac{25\% \text{ of } 50\% \text{ of } 100\%}{25 \times 50}$

Q6 800kg of mortar consist of 55% sand, 33% cement and rest lime. What is the mass of lime in mortar?

Case Based Questions

Q1 In a quarterly examination ,a student secured 30% marks and failed by 12 marks .In the same examination another student secured 40% marks and got 28 more bare minimum marks to pass. Find

(i) the maximum marks (ii) the pass percentage

Q2 Chalk contains calcium, carbon and oxygen in the ratio 10:3:12 .

(i) Find the percentage of carbon in chalk.

(ii)) Find the percentage of calcium in chalk.

(iii)) Find the percentage of oxygen in chalk.

(iv) If in a stick of chalk , carbon is 3gm, what is the weight of the chalk stick?

CHAPTER TEST 1 (20 Marks)

Section A (4 MCQs,1mark each)

Q1 Find the ratio of 9m to 27cm.

(a)100:3 (b) 3:1100 (c) 3:100 (d) 30:10

Q2 Convert the given fractional numbers to percent $\frac{1}{8}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 40% of it is 500 km.

(a)1200km (b) 1250km (c)1500km (d) 1000km

Q4 The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

(a)3% (b) 4% (c) 5%(d) 2%

Section B (5 Questios 2Marks each)

Q1 Convert the given decimal fractions to percents 0.65.

Q2 Find 75% of1kg (gm)



Q3 25 ml is ----- per cent of 5 liters.

Q4 In a city 30% are females ,40% are males and remaining are children . What percent are children.

Q5 If $x\%$ of $\frac{25}{2}$ is 150, find the value of x .

Section C (2 Questions 3 Marks each)

Q1 If 20% of x is same as 30% of y , what percentage of x is y ?

Q2 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

Test 2 (30 Marks)

Section A (6 MCQ,s , 1 Mark each)

Q1 Find ratio of 30 days to 36 hours

(a) 20:1 (b) 200:1 (c) 200:10 (d) 200:100

Q2 Convert the given fractional numbers to percent $\frac{5}{4}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 70% of it is 14 minutes.

(a)23 minutes (b) 20 minutes (c)25 minutes (d) 26 minutes

Q4 Meeta saves Rs 400 from her salary. If this is 10% of her salary. What is her salary?

a)Rs 400 (b) Rs 40 (c)Rs40,000 (d) Rs 4,000

Q5 A skirt bought for Rs250 and sold at Rs150 Find profit or loss percent.

(a)25% (b) 40%(c) 45%(d) 12%

Q6 At what rate will Rs840 yield an interest of Rs210 in 3 years?

(a)5.33% (b) 1.33%(c) 8.33%(d) 12.33%

Section B (6 Questions 2Marks each)

Q1 Find the whole quantity if 8% of it is 40 liters.

Q2 Out of 15,000 voters , 60% voted. Find the percentage of voters who did not vote.How many actually did not vote?

Q3 In what time will Rs 4000 give an interestof Rs500 at 5% p.a.?

Q4 : What rate gives Rs 280 as interest on a sum of Rs 56000 in 2 Years.

Q5 A bicycle is purchased for Rs 1800 and is sold at a profit of 12%. Its selling price is?

Q6 Convert 0.07 in percent?

Section C (4 Questions 3 Marks each)

Q1 In a quarterly examination ,a student secured 30% marks and failed by 12 marks .In the same examination another student secured 40% marks and got 28 more bare minimum marks to pass.Find

(i) the maximum marks (ii) the pass percentage

Q2 Convert each part of the ratio to percentage

2:3:5

Q3 A dealer buys a wrist watch for Rs225 and spends Rs15 on its repairs. If he sells the same for Rs 300, find his profit percent.



Q4 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

ANSWERS

MCQs Q1(a), Q2(c), Q3(b) Q4(d)

Case based questions Q1(B) , Q2(A) , Q3(B), Q4(A)

Short answer questions

(Q1) $0.65 \times 100\% = 65\%$, (Q2) $\frac{75}{100} \times 1000 \text{ g} = 750 \text{ gram}$, (Q3) $\frac{x}{100} \times 5000 \text{ ml} = 25 \text{ ml}$, $x = 0.5\%$

Long answer questions

(Q1) Let share of x is Rs a , share of y = rupees (1100 - a) , a: (1100 - a) = 1:10 (given) , a = 100 , share of x is equal to rupees 100 , (Q2) $T = \frac{100 \times S.I}{P \times R} = \frac{100 \times 500}{4000 \times 5} = 2\frac{1}{2} \text{ years}$

MCQs

Q1(d), Q2(a) , Q3(d), Q4(d) , Q5(b), Q6(a), Q7(d), Q8(b), Q9(c), Q10(a)

Short answer type questions

(Q1) $\frac{30 \times 24}{36} = 20:1$, (Q2) $2.1 \times 100\% = 210\%$, (Q3) $\frac{70 \times x}{100} = 14 \text{ minutes}$, $x = 20 \text{ minutes}$, (Q4)

Let Meeta's salary = Rs x $\frac{10 \times x}{100} = 400$, $x = \text{Rs } 4000$, (Q5) C.P. = Rs 250 , S.P. = Rs 15 , Loss = Rs 100 , $L\% = \frac{\text{loss}}{\text{C.P.}} \times 100\% = 40\%$

(Q6) P = Rs 840 , S.I. = Rs 210 , T = 3 years $R = \frac{S.I \times 100}{P \times T} = \frac{210 \times 100}{840 \times 3} = 8\frac{1}{3}\%$, (Q7) $\frac{90 \times x}{100} = 315$, $x = 350$

(Q8) $\frac{440 \times 100\%}{500} = 88\%$, (Q9) $0.018 \times 100\% = 1.8\%$, (Q10) $\frac{4 \times 100\%}{5} = 80\%$

Long answer type questions

(Q1) Let P = Rs P , A = Rs 4P , S.I = Rs 3P , S.I. $\frac{P \times R \times T}{100}$, $3P = \frac{P \times 6 \times T}{100} = 50 \text{ Years}$

(Q2) $2+3+5 = 10$, $\frac{2 \times 100\%}{10} = 20\%$, $\frac{3 \times 100\%}{10} = 30\%$, $\frac{5 \times 100\%}{10} = 50\%$

(Q3) C.P. = Rs 225 , overhead expenses = Rs 15 , Total C.P. = Rs 240 , S.P. = Rs 300 , Profit = Rs 60

$P\% = \frac{60 \times 100\%}{240} = 25\%$, (Q4) Let P = Rs x , A = Rs 2x , S.I. = $2x - x = \text{Rs } x$, T = 25 years , R =

$\frac{S.I \times 100}{P \times T} = 4\%$

(Q5) $\frac{25 \times 50 \times 100 \times 1}{100 \times 100 \times 100 \times 25 \times 50} = \frac{1}{10000} = 0.0001$

(Q6) Percentage of sand = 55% , Percentage of cement = 33% , Percentage of lime = $100 - 88 = 12\%$



$$\text{Mass of lime in 800kg} = \frac{12 \times 800}{100} = 96\text{kg}$$

Case based questions

(Q1) Let the maximum marks be X. First student secured 30% of $X = \frac{3X}{10}$ marks, he fails by 12 marks, so pass marks $= \frac{3X}{10} + 12$, Second student secured 40% of $X = \frac{2X}{5}$ marks. Since he gets 28 marks more than pass marks, pass marks $= \frac{2X}{5} - 28$ marks, $\frac{3X}{10} + 12 = \frac{2X}{5} - 28$, Maximum marks = 400, Pass marks = 132, pass percentage $= \frac{132 \times 100}{400} = 33\%$

(Q2) Chalk contains calcium, carbon, oxygen in the ratio 10 : 3 : 12, now $10 + 3 + 12 = 25$ percentage of carbon $= \frac{3 \times 100}{25} = 12\%$ similarly percentage of calcium and oxygen 40% and 48%. Let the weight of chalk stick = X gram, 12% of X = 3, X = 25 gram

Test 1

Section A

Q1(a), Q2(c), Q3(b), Q4(d)

Section B

(Q1) $0.65 \times 100 = 65\%$, (Q2) $\frac{75}{100} \times 1000\text{g} = 750\text{g}$, (Q3) Let 25ml be x% of 5liters, $25 = \frac{X}{100} \times 5000$, X = 0.5%

(Q4) Percentage of children = $[100 - (30 + 40)] = 30\%$, (Q5) $\frac{x \times 25}{100 \times 2} = 150$, X = 1200

Section

(Q1) $\frac{20 \times x}{100} = \frac{30 \times y}{100}$, $\frac{2x}{3} = y$, Let x = 100%, $Y = \frac{200}{3}$, (Q2) Done

TEST 2 Section A

MCQs Q1 (a), Q2 (b), Q3 (b), Q4 (d), Q5 (b), Q6 (c)

Section B

Q1 $\frac{8 \times x}{100} = 40$ liters, Q2 No. of voters who did not vote = 40% of 15000 = 6000,

Q3 P = Rs 4000, S.I. = Rs 500, R = 5%, $T = \frac{S.I. \times 100}{P \times R} = \frac{500 \times 100}{4000 \times 5} = 2\frac{1}{2}$ Years

Q4 S.I. = $\frac{P \times R \times T}{100}$, $280 = \frac{56000 \times R \times 2}{100} = 0.25\%$, Q5 Profit% = $\frac{P}{C.P.} \times 100\%$, $12 = \frac{P}{1800} \times 100$,

P = Rs 216, S.P. = Rs 1800 + Rs 216 = Rs 2016, Q6 $0.07 \times 100\% = 7\%$

Section D Done earlier.



RATIONAL NUMBERS

Important Facts and Concepts:

A number that can be expressed in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$, is **called a rational number**.

All integers and fractions are **rational numbers**.

If the numerator and denominator of a rational number are multiplied or divided by a non-zero integer, we get a rational number which is said to be **equivalent to the given rational number**.

Rational numbers are classified as positive, zero or negative rational numbers. When the numerator and denominator both are positive integers or both are negative integers, it is a positive rational number. When either the numerator or the denominator is a negative integer, it is a negative rational number.

The number **0** is **neither a positive nor a negative** rational number.

There are **unlimited number of rational numbers** between two rational numbers.

A rational number is said to be in the standard form, if its denominator is a positive integer and the numerator and denominator have no common factor other than 1.

Two rational numbers with the same denominator can be added by adding their numerators, keeping with the same denominator.

Two rational numbers with different denominators are added by first taking the LCM of the two denominators and then converting both the rational numbers to their equivalent forms having the LCM as the denominator and adding them as above.

While subtracting two rational numbers, we add the additive inverse of the rational number to be subtracted to the other rational number.

• **Product of rational numbers** $= \frac{\text{Product of numerators}}{\text{Product of denominators}}$

• The **reciprocal of a non-zero rational number** $\frac{p}{q}$ **is** $\frac{q}{p}$.

• To divide one rational number by the other non-zero rational number, we multiply the first rational number by the reciprocal of the other.

EXAMPLE 1 Reduce $\frac{-45}{30}$ to the standard form.

Solution: $\frac{-45}{30} = -\frac{3 \times 3 \times 5}{2 \times 3 \times 3} = -\frac{5}{2}$

EXAMPLE 3: Do $\frac{4}{-9}$ and $-\frac{16}{36}$ represent the same rational number?

Solution: Yes, because $\frac{4}{-9} \times \frac{4}{4} = \frac{-16}{36}$, $\frac{-16}{36} \div \frac{4}{4} = -\frac{4}{9}$

EXAMPLE 3 List three rational numbers between -2 and -1 .

Solution: $-2 \times \frac{10}{10} = -\frac{20}{10}$, $-1 \times \frac{10}{10} = -\frac{10}{10}$, Any three numbers are, $-\frac{19}{10}, -\frac{18}{10}, -\frac{17}{10}$

SHORT ANSWER QUESTIONS:

Q1. Reduce $\frac{55}{66}$ into the standard form.

Solution: $\frac{55}{66} \div \frac{11}{11} = \frac{5}{6}$

Q2. Express $\frac{3}{4}$ as a rational number with denominator as -80

Solution: $-80 \div 4 = -20$



$$\text{So, } \frac{3}{4} \times \frac{-20}{-20} = \frac{-60}{-80}$$

Q3. Find the product of $\frac{15}{22} \times \frac{11}{5}$

$$\text{Solution: } \frac{15}{22} \times \frac{11}{5} = \frac{3 \times 5}{2 \times 11} \times \frac{11}{5} = \frac{3}{2}$$

Q4. Simplify: $\frac{2}{5} - \frac{1}{2}$

Solution: LCM of 2 and 5 is 10

$$\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$$

$$\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$$

$$\text{So, } \frac{4}{10} - \frac{5}{10} = \frac{4-5}{10} = -\frac{1}{10}$$

LONG ANSWER QUESTIONS:

Q1. List five rational numbers between -4 and -3 .

$$\text{Solution: } -4 \times \frac{6}{6} = -\frac{24}{6}$$

$$-3 \times \frac{6}{6} = -\frac{18}{6}$$

five rational numbers between -4 and -3 are,

$$-\frac{19}{6}, -\frac{20}{6}, -\frac{21}{6}, -\frac{22}{6}, -\frac{23}{6}$$

Q2. Solve: $\frac{29}{4} - \frac{30}{7}$

Solution: LCM of 4 and 7 is 28.

$$\frac{29}{4} \times \frac{7}{7} = \frac{203}{28}$$

$$\frac{30}{7} \times \frac{4}{4} = \frac{120}{28}$$

So,

$$\frac{203}{28} - \frac{120}{28} = \frac{203 - 120}{28} = \frac{83}{28} = \frac{2 \times 3 \times 7}{2 \times 2 \times 7} = \frac{3}{2}$$

PRACTICE QUESTIONS:

MCQ:

Q1. In the standard form of a rational number, the common factor of numerator and denominator is always:

- (a) 0 (b) 1 (c) -2 (d) 2

Q2: Which of the following rational numbers is equal to its reciprocal?

- (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 0

Q3. How many rational numbers are there between two rational numbers?

- (a) 1 (b) 0 (c) unlimited (d) 100

Q4. In the standard form of a rational number, the denominator is always a

- (a) 0 (b) negative integer (c) positive integer (d) 1





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