Q1 Deducting the remainders from numbers we get,

$398 - 7 = 391$
$436 - 11 = 425$
$542 - 15 = 527$

H.C.F of these new numbers is the largest possible number that divides 398, 436, 542 leaving respective remainders

$391 = 17 \times 23$
$425 = 17 \times 5^2$
$527 = 17 \times 31$

$\therefore$ Answer = H.C.F (391, 425, 527) = 17

Q2. $$\frac{\sqrt{1204.09} - \sqrt{125.44}}{\sqrt{1204.09} + \sqrt{125.44}}$$

$$= \frac{34.7 - 11.2}{34.7 + 11.2} = \frac{23.5}{45.9}$$

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23] adj sides of rectangle

$S_1 = -6p^3 + 7p^2q^2 + pq$

and $S_2 = 7pq - 5p^3 + 9p^2q^2$

c. Perimeter of rectangle $= 2(S_1 + S_2)$

$$\text{Perimeter} = 2\left[(-6p^3 + 7p^2q^2 + pq) + (7pq - 5p^3 + 9p^2q^2)\right]$$

$$= 2\left[-6p^3 + 7p^2q^2 + pq + 7pq - 5p^3 + 9p^2q^2\right]$$

$$= 2\left[16p^2q^2 + 8pq - 11p^3\right]$$

$$\text{Perimeter} = (32p^2q^2 + 16pq - 22p^3)$$

24] Show that $\dfrac{a^{-17} \times (a^4)^8 \times (8a^3)^{2/3}}{(16a^4)^{1/4} \times (a^2)^8} = 2$

Show that $\dfrac{a^{-17} \times (a^4)^8 \times (8a^3)^{2/3}}{(16a^4)^{1/4} \times (a^2)^8} = 2$

$$LHS = \frac{a^{-17} \times (a^4)^8 \times (8a^3)^{2/3}}{(16a^4)^{1/4} \times (a^2)^8}$$

$$= \frac{a^{-17} \times a^{32} \times 2^2 a^2}{2a \times a^{16}}$$

$$= a^{-17+32+2-1-16} \times \frac{4}{2}$$

$$= 2a^0$$

$$= 2$$

$RHS = 2$ $\therefore$ $LHS = RHS$

6. Let Price of sugar = x Rs/kg

After increasing 20%

Final price = $x + \frac{x}{100} \times 20$

$= \left(\frac{6x}{5}\right)$ Rs

Increament value = $\frac{6x - x}{5}$

$= \left(\frac{x}{5}\right)$ Rs

$\therefore$ In x Rs = 1 kg

1 Rs = $\left(\frac{1}{x}\right)$ kg/Rs

$\therefore$ In $\left(\frac{x}{5}\right)$ Rs = $\left(\frac{1}{x}\right) \times \frac{x}{5} = \left(\frac{1}{5}\right)$ kg

∴ % Reduce = $\frac{1/5}{1} \times 100 = 20\%$ Ans

(7) ∵ LCM = 9 HCF

Mean L = 9H

L + H = 500

9H + H = 500

10H = 500

H = 50 Ans

(8) $\left(\frac{x+1}{x+2}\right)^2 = \left(\frac{x+2}{x+4}\right)$

$(x+4)(x+1)^2 = (x+2)^2$

$(x+4)[x^2+1+2x] = x^2+4+4x$

$x^3+x+2x^2+4x^2+4+8x = x^2+4x+4$

$x^3+5x^2+5x = 0$

$x[x^2+5x+5] = 0$

$x = 0, \quad x^2+5x+5 = 0$

$x = \frac{-5 \pm \sqrt{25-20}}{2}$

$x = \frac{-5 \pm \sqrt{5}}{2}$

$x \neq 0$ Ans

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(9) Let at initial value having
men = x Rs

After dossing 20%, men have
money = $x - \frac{x}{100} \times 20$

$= x - \frac{x}{5} = \left(\frac{4x}{5}\right)$ Rs

Again-
After spending 25% of the
remainder
he has money = $\frac{4x}{5} - \frac{\frac{4x}{5} \times 25}{100}$

$= \frac{4x}{5}\left(1 - \frac{1}{4}\right)$

$= \frac{4x}{5}\left(\frac{3}{4}\right) = \frac{3x}{5}$ Rs

$\therefore \frac{3x}{5} = 480$

$x = 800$ Rs Ans

10 (a) $x^2 - y^2 - 9z^2 + 6yz$

$= x^2 - [y^2 + 9z^2 - 6yz]$

$= x^2 - [y - 3z]^2$

$= x^2 - (y - 3z)^2$ $\because a^2 - b^2 = (a+b)(a-b)$

$= (x - y + 3z)(x + y - 3z)$ Ans

10/b:- $3-12(a-b)^2$

$= 3[1-4(a-b)^2]$

$= 3[1-\{2(a-b)\}^2]$

$= 3[\{1-2(a-b)\}\{1+2(a-b)\}]$

$= 3[(1-2a+2b)(1+2a-2b)$

Ans

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Q.16] $x + \frac{1}{x} = 11$

a) $x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2 \cdot x \cdot \frac{1}{x}$

$= 11^2 - 2 = 119$

b) $x^4 + \frac{1}{x^4} = \left(x^2 + \frac{1}{x^2}\right)^2 - 2 \cdot x^2 \cdot \frac{1}{x^2}$

$= (119)^2 - 2$

$= 14159.$

Q.17] Let No of tickets of Rs 2.50 be x &
No of tickets of Rs 5 be y

∴ According to Condition

$x + y = 300$ — (i)

$(2.5)x + (5)y = 1250$ — (ii)

$2.5[x + 2y] = 1250$

$x + 2y = \frac{1250}{2.5} = 500$

∴ $x + 2y = 500$ — (iii)

Solving (i) & (iii) simultaneously

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$$x + 2y = 500$$
$$-x + y = 300$$
$$y = 200$$

$\therefore x + 2(200) = 500$

$x = 500 - 400$

$x = 100$

No of tickets of rs 2.5 are 100 & rs. 5.0 are 200.

18] a) Die is thrown once

Sample Space : $\{1, 2, 3, 4, 5, 6\}$

An even prime number is 2 only

$\therefore$ No of favourable outcome of $\rightarrow 1$

$\therefore$ P (Getting an even prime Number) $= \boxed{\frac{1}{6}}$

b) There are 2 non-prime number in Sample space $\{4, 6\}$

$\therefore$ P (Non-prime) $= \frac{2}{6} = \frac{1}{3}$

There are 3 non-composite number in sample space $\{2, 3, 5\}$

P (Non-composite) $= \frac{3}{6} = \frac{1}{2}$

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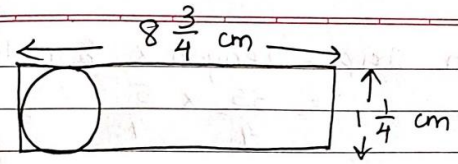
19]



Diameter of circle = Breadth = $1\frac{1}{4} = \frac{5}{4}$ cm

Length of aluminium strip = $8\frac{3}{4} = \frac{35}{4}$ cm

Number of full circles to be cut from aluminium strip $= \frac{\frac{35}{4}}{\frac{5}{4}}$

$= \frac{35}{4} \times \frac{4}{5} = 7$ circles

$\therefore$ 7 circles

Radius $= \frac{5}{4 \times 2} = \frac{5}{8}$

Area : $\pi r^2 = \frac{22}{7} \times \frac{25}{64}$

Now, Area of 7 circles : $7 \times \frac{22}{7} \times \frac{25}{64}$

$= \frac{22 \times 25}{64}$

$= \frac{550}{64}$ cm^2

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Area of aluminium strip = length × breadth

$$= \frac{35}{4} \times \frac{5}{4}$$

$$= \frac{175}{16} \text{ cm}^2$$

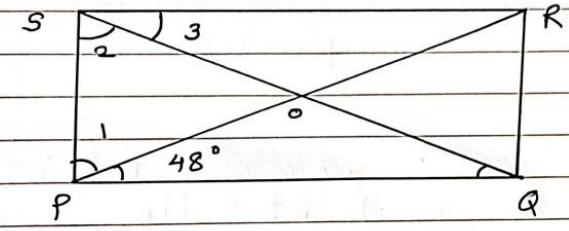
The Wastage of aluminium strip

Area of aluminium strip − Area of 7 circles

$$\left(\frac{175}{16} - \frac{550}{64}\right) = \frac{700 - 550}{64} = \frac{150}{64}$$

$$= \frac{75}{32} \text{ cm}^2$$

20]



To Find
$\angle RSQ = ?$

→ As diagonal of rectangle are equal & bisect each other

$\therefore OP = OQ$

$\therefore \angle OPQ = PQO = 48°$

$\angle SPO + \angle OPQ = 90°$ [Right angle of rectangle]

$\angle SPO + 48 = 90°$

$\angle SPO = 90 - 48$

$= 42°$

As $\angle SPO = \angle OSP = 42°$ [As OS = OP]

Now, $\angle RSQ + \angle QSP = 90°$ [— " —]

$\angle RSQ + 42 = 90°$

$\angle RSQ = 90 - 42$

$= 48°$.

$\therefore \angle RSQ = 48°$

Q21) Some toffees are bought at 9 for Rs 10 and an equal no. at 11 for Rs 10. If all toffees are sold at 10 for Rs 10, find the gain or loss percent.

→

Condition (I)

CP of 11 toffee = ₹10

∴ CP of 1 toffee = $₹\frac{10}{11}$

Condition (II)

CP of 9 toffee = ₹10

CP of 1 toffee = $₹\frac{10}{9}$

∴ CP of both toffees = $₹\frac{10}{11} + ₹\frac{10}{9}$

$= ₹\left(\frac{90+110}{99}\right)$

$= ₹\frac{200}{99}$

So, CP of 1 toffee = $\frac{200}{99} \div 2$

$= ₹\frac{100}{99}$

$\therefore$ SP of 1 toffee = ₹1 — (Given)

$\therefore$ Loss = CP − S.P

$= \frac{100}{99} - 1$

$= \frac{1}{99}$

$\therefore$ loss % $= \frac{\text{loss}}{CP} \times 100$

$= \frac{\frac{1}{99}}{\frac{100}{99}} \times 100$

$= \frac{1}{99} \times \frac{99}{100} \times 100$

$= \boxed{1}\ \%$

$\therefore$ 1% Loss.

Q22) The difference beth the compound intrest & simple intrest on a certain sum of money at 10% per annum for 2 years is 500. find the sum when the interest is compounded anually.

→

Formula:- $CI - SI = \frac{P \times R^2}{(100)^2}$

$500 = \frac{P \times (10)^2}{(100)^2}$

$P = \frac{(100)^2 \, 500}{(10)^2}$

$P = \frac{10000 \times 500}{100}$

$\therefore$ Principal $\boxed{P = 50000}$

Q27) 120 men had food provision for 200 days. After 5 days, 30 men died due to an enidmic. How long will the remaining food last?

→

No. of men	120	90
Days food will last	200	x

Here relation is inverse beth no. of people & day

∴ Total provision for 1 day = 120 × 200
= 24,000

After 5 day, provision reduced by
⇒ 120 × 5 = 600

so, left provision
⇒ 24000 - 600 = 23,400 men.

After 5 day, Men Left ⇒ 120-30
⇒ 90.

Food will last (days) for 90 men

⇒ $\frac{\text{Left Provision}}{\text{No. of men}} = \frac{23400}{90} = 260$ days.

∴ 260 days more remaining food last.

Q25 Find the value of 'p'

(a) $8p = (59)^2 - (51)^2$

→ We know that

$a^2 - b^2 = (a+b)(a-b)$

$59^2 - 51^2 = (59+51)(59+51)$

$= (110)(8)$

$8(p) = (8)(110)$

$\therefore \boxed{p = 110}$

(b) $abp = (3a+b)^2 - (3a-b)^2$

→ we know that

$a^2 - b^2 = (a+b)(a-b)$

$\therefore (3a+b)^2 - (3a-b)^2$

$= (3a+b+3a-b)(3a+b-3a+b)$

$= (6a) \times (2b)$

$= 12ab$

$abp = 12ab$

$\therefore \boxed{p = 12}$

(c) $143p = (76)^2 - (67)^2$

→ We know that

$a^2 - b^2 = (a+b)(a-b)$

$76^2 - 67^2 = (76+67)(76-67)$

$143p = (143)(9)$

$143p = 143 \times 9$

$\boxed{p = 9}$

(d) $441 - p^2 = (21)^2 - (17)^2$

→ we know that $(21)^2 = 441$

$(21)^2 - p^2 = (21)^2 - (17)^2$

Comparing both sides

$p^2 = 17^2$

$\boxed{p = 17}$

Q22) A lead pencil consist of a cylinder of wood with a solid cylinder of graphite is 1mm & length of pencil is 10cm. Calculate the weight of the whole pencil, if the specific gravity of the wood is 0.7 gm/cm³. & that of the graphite is 2.1 gm/cm³.

→

d_1 = 7mm (wood)

d_2 = 1mm (Graphite)

h = 10 cm = 100mm

Volume of Graphite = $\pi r_2^2 h$

$= \frac{22}{7} \times (0.5)^2 \times 100$

$= \frac{550}{7}$ mm³

$= \frac{0.55}{7}$ cm³

Volume of wood = $\pi r_1^2 h - \pi r_2^2 h$

$= \pi h (r_1^2 - r_2^2)$

$= \frac{22}{7} \times 100 (12.25 - 0.25)$

$= \frac{22}{7} \times 100 \times 12$

$= \frac{26400}{7}$ mm³

$= \frac{26.4}{7}$ cm³

∴ Mass = Density × volume

$M_1 = 0.7 \times \frac{26.4}{7} = 2.64$ g

$$M_2 = \frac{2.1 \times 0.55}{7} = 0.165\ g$$

Total volume $= M_1 + M_2$

$= 2.64 + 0.165$

$= \boxed{2.805\ g}$

Q.30 If two unbiased dice are thrown. What is the probability of getting a sum of five.

→

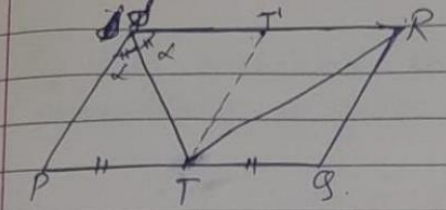
$$S = \begin{Bmatrix} (1,1) & (1,2) & (1,3) & (1,4) & (1,5) & (1,6) \\ (2,1) & (2,2) & (2,3) & (2,4) & (2,5) & (2,6) \\ (3,1) & (3,2) & (3,3) & (3,4) & (3,5) & (3,6) \\ (4,1) & (4,2) & (4,3) & (4,4) & (4,5) & (4,6) \\ (5,1) & (5,2) & (5,3) & (5,4) & (5,5) & (5,6) \\ (6,1) & (6,2) & (6,3) & (6,4) & (6,5) & (6,6) \end{Bmatrix}$$

Favourable outcome of $A = \{(1,4), (4,1), (3,2), (2,3)\}$.

∴ Probability to get sum of 5 $= \frac{n(A)}{n(S)} = \frac{4}{36} = \frac{1}{9}$

∴ $\boxed{\frac{1}{9}}$ Ans

Q28.



Q29 3 sets of English, Maths and Science books containing 336, 240 and 96 books, respectively have to be stacked in such a way that all the books are ~~stacked~~ subject wise and height of each stack is the same. How many ~~stacks~~ stack will be there?

No of English book = 336
No of Mathematics book = 240
No of Science book = 96

For no. of book in each stack are equal,
So, We take HCF of 336, 240, 96

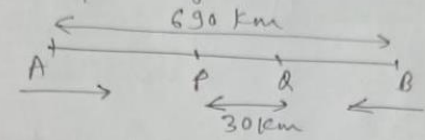
$336 = 2^4 \times 3 \times 7$
$240 = 2^4 \times 3 \times 5$
$96 = 2^5 \times 3$
$HCF = 2^4 \times 3^1 \times 7^0 \times 1^0$
$= 16 \times 3$
$HCF = 48$

~~No.~~
Total no. of stack =
$= \frac{336}{48} + \frac{240}{48} + \frac{96}{48}$
$= 7 + 5 + 2$
$= 14$ Ans

(11) Distance b/w two stations A and B is 690 km. Two cars start simultaneously from A and B towards each other, and the distance b/w them after 6 hours is 30 km. If the speed of one car is less than the other by 10 km/h find the speed of each car.

Let speed of faster car = x km/h

then speed of other car = $(x-10)$ km/h



$\because$ distance = speed × time

$\therefore AP = x \times 6 = 6x$

$BQ = (x-10)6 = 6x-60$

$\because AP + PQ + BQ = 690$

$6x + 30 + 6x - 60 = 690$

$12x = 720$

$\boxed{x = 60 \text{ km/h}}$

$\therefore$ speed of faster car = 60 km/h
speed of other car = 50 km/h

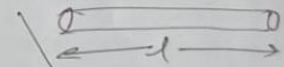
(12.) 2.2 cubic dm of brass is to be drawn into a cylindrical wire 0.50 cm in diameter. Find the length of the wire.

$\because$ volume of brass = $2.2\ dm^3$

$= 2.2 \times 10^3\ cm^3$

$= 2200\ cm^3$

$\because \boxed{1\ dm^3 = 10^3\ cm^3}$



diameter (d) = 0.50 cm

$r = \frac{d}{2} = 0.25 = \frac{1}{4}$ cm

let length of wire = l cm

A/q, volume of cyl. wire = volume of brass

$\pi r^2 l = 2200$

$\frac{22}{7} \times \frac{1}{4} \times \frac{1}{4} \times l = 2200$

$\boxed{l = 11200 \text{ cm}} \Rightarrow \boxed{l = 112 \text{ m}}$ Ans

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Q26 A bicycle dealer has 20,000 Rs to invest on a bicycle is available for Rs 800. If price of cycle increases by 25%. ~~after~~ find no. of cycles he purchased.

Sol Let Dealer have money to invest = 20,000 Rs.
Initially price of a bicycle = 800 Rs

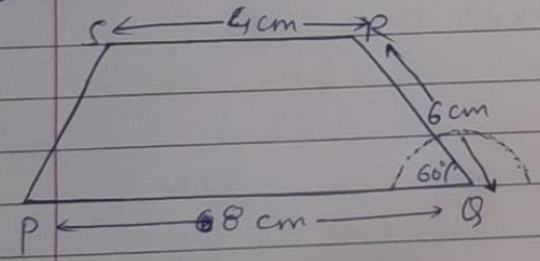
After increment 25% in price,
New price of a cycle = $800 + \frac{800}{100} \times 25$

$= 800 + 200$
$= 1000$ Rs.

No. of cycle that purchased by dealer = $\frac{20000}{1000}$

$= 20$ Ans

Q.27



(13.) The sum of three consecutive numbers is 156. Find the number which is a multiple of 13 out of these numbers.

Let 3 Consecutive numbers be x, $x+1$ and $x+2$.

A/q, $x + x+1 + x+2 = 156$

$3x = 153$

$\boxed{x = 51}$

$\therefore$ numbers be 51, $\boxed{52}$, 53

$\therefore$ Out of these numbers 52 is multiple of 13.

Ans:- $\boxed{52}$

(15.) If $\frac{3}{5}$ of a number exceeds its $\frac{2}{7}$ by 44. Find the number.

Let the number be 'x'

A/q, $\frac{3x}{5} = \frac{2}{7}x + 44$

$\frac{3x}{5} - \frac{2x}{7} = 44$

$\frac{21x - 10x}{35} = 44$

$\frac{11x}{35} = 44$

$x = \frac{44 \times 35}{11}$

$\boxed{x = 140}$ Ans

14) Evaluate

$\sqrt[3]{968} + \sqrt[3]{1375}$

2	968
2	484
2	242
11	121
	11

5	1375
5	275
5	55
	11

$\therefore \sqrt[3]{968} + \sqrt[3]{1375}$

$= \sqrt[3]{2^3 \times 11^2} + \sqrt[3]{5^3 \times 11}$

$= 2\sqrt[3]{121} + 5\sqrt[3]{11}$

If given Question are in multiplication then $\sqrt[3]{968} \times \sqrt[3]{1375}$

$= \sqrt[3]{968 \times 1375}$

$= \sqrt[3]{2^3 \times 11^2 \times 5^3 \times 11}$

$= \sqrt[3]{2^3 \times 5^3 \times 11^3}$

$= 2 \times 5 \times 11$

$= \boxed{110}$

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8 Prove that interior angle of a regular five sided polygon (Pentagon) is 3 times the exterior angle of Decone

∴ Interior angle of polygon $= \frac{180(n-2)}{n}$

∴ Interior angle of Pentagon $= \frac{180(5-2)}{5}$

$= 36 \times 3$

Interior angle of Pentagon $= 108°$ - (I)

Exterior angle of ~~Decone~~ Polygon $= \frac{360}{n}$

Exterior angle of Decone $= \frac{360}{10} = 36°$

∴ $3 \times$ Exterior angle of Decone $= 108°$ (II)

∴ from (I) and (II)

Interior angle of pentagon $= 3 \times$ Exterior angle of Decone