Solutions

1

The first brother is 70 inches tall, the second 72, the third 74 and the fourth brother 80 inches tall.

2

Twenty-six minutes.

3

Since the boys have as many brothers as sisters, there must be 1 boy more than the number of girls. If we try 2 and 1, 3 and 2, and 4 and 3, we will find that 4 boys and 3 girls is the solution to fulfil the requirement that each girl has twice as many brothers as sisters.

4

Naturally, the train travelling against the spin of the earth. This train will wear out its wheels more quickly, because the centrifugal force is less on this train.

5

No, the answer is not $32^1/_2$ miles an hour, though this figure is the obvious answer! However, this represents the average of the 2 speeds and not the average speed for the whole trip.

If the time is equal to the distance divided by the average speed, then the time for the trip starting from San Francisco equals $^S/_{40}$ and the time for the return

trip is $^{S}/_{25}$ which gives us a total time of $^{S}/_{40} + {}^{S}/_{25}$, which equals $^{13S}/_{200}$.

Therefore, the average speed for the whole trip when the average speed equals the distance divided by the time is 2S divided by $^{13S}/_{200}$ which equals 2S times $^{200}/_{13S}$, which equals $^{400S}/_{13S}$ or $30\ ^{10}/_{13}$ miles an hour.

6

The lowest square number I can think of, containing all the nine digits once and only once, is 139854276, the square of 11826, and the highest square number under the same conditions is 923187456 the square of 30384.

7

One can think of different answers for this question, but yet the correct answer is very simple. All we have to consider is that the shop owner could not have possibly lost more than the tourist actually stole.

The tourist got away with the bicycle which cost the shop owner Rs. 300 and the Rs. 50 'change', and therefore, he made off with Rs. 350. And this is the exact amount of the shopkeeper's loss.

8

By experiment we find that the only numbers that can be turned upside down and still read as a number are 0, 1, 6, 8 and 9.

The numbers, 0, 1 and 8 remain 0, 1 and 8 when turned over, but 6 becomes 9 and 9 becomes 6. Therefore,the possible numbers on the bus were 9, 16, 81, 100, 169 or 196. However, the number 196 is the only number which becomes a perfect square when turned over because 961 is the perfect square of 31.

Therefore,196 is the correct answer.

9

Here is the formula that gives the minutes past twelve to which the hour hand points when the minute hand is exactly thirty minutes ahead.

Minutes past twelve $Y = \frac{30}{11}\ [(n-1)\ 2+1]$

where n is the next hour—

Let's take the case of at what time between 4 and 5 will the hands be opposite each other? (n=5).

$\therefore Y = \frac{30}{11} \times 9 = \frac{270}{11} + 24\frac{6}{11}$.

i.e. the hour hand will be $24\frac{6}{11}$ minutes past 4.

The formula may be derived from the following:

If X is distance moved by the minute hand

Y is the distance moved by hour hand

then $X-Y = 30$

First time the hands move round $X = 12\ Y$

Second time the hands move round $X = 12\ Y-5$

Third time the hands move round $X = 12\ Y-10$ etc.

10

The Police Officer took thirty steps. In the same time the thief took forty-eight, which added to his start of

twenty-seven, that means he took seventy-five steps. This distance would be exactly equal to thirty steps of the Police Officer.

11

While striking 7 the clock strikes its first gong at 7 o'clock and it strikes 6 more at regular intervals. These 6 intervals take 7 seconds so that the intervals between gongs is $^{7}/_{6}$ seconds. However,to strike 10 there are 9 intervals each taking $^{7}/_{6}$ seconds for a total of $10\frac{1}{2}$ seconds.

12

In order that the little girl should have disposed of the oranges she had remaining after her second sale, she must have had at least one whole orange remaining so that she could deduct from it 'half of her oranges plus half an orange', for the third and the final sale. Therefore, if 1 orange represents half of the remaining after the second sale, then she must have sold two oranges in her second sale, leaving the 3 oranges after the first sale.

Lastly,if three oranges only represent half the original number, plus half an orange , then she must have started with $[(3 \times 2) + 1]$ or 7 oranges.

13

All the transactions carried out through the counterfeit note are invalid, and, therefore, everybody stands in

relation to his debtor just where he was before I picked up the note.

14

A pound of cotton is heavier than a pound of gold because cotton is weighed by the avoirdupois pound, which consists of 16 ounces, whereas gold, being a precious metal is weighed by the troy pound which contains 12 ounces (5760 grams).

15

When Tinku takes 12, Rinku and Jojo will take 9 and 14, respectively—and then they would have taken altogether thirty-five nuts.

Thirty-five is contained in 770 twenty-two times which means all one has to do now is merely multiply 12, 9 and 14 by 22 to find that Tinku's share was 264, Rinku's 198 and Jojo's 308.

Now as the total of their ages is $17\frac{1}{2}$ years or half the sum of 12, 9 and 14, their respective ages must be 6, $4\frac{1}{2}$ and 7 years.

16

Jayant was 24 and Mohini 18.

17

The minimum number of weights required is five and these should weigh 1, 3, 9, 27 and 81 pounds.

18

Let's assume G is the number of glasses delivered intact. Then,

3G = the amount earned.

Let's assume B is the number of glasses broken. Then,

9B = the amount forfeited

$3G - 9B = 240$

$9B = -240$

$G + B = 100$

$3B = 300$

$128 = 60$

$\therefore$ B = 5 and G = 95

19

The number is 27, 2 + 7 = 9, $9 \times 3 = 27$

20

$81\frac{5643}{297}$ $81\frac{7524}{396}$ $82\frac{3546}{197}$

$91\frac{5742}{638}$ $91\frac{5823}{647}$ $91\frac{7524}{836}$

$94\frac{1578}{263}$ $96\frac{1428}{357}$ $96\frac{1752}{438}$

$96\frac{2148}{537}$ and $3\frac{69258}{714}$

21

I don't know about you, but I would have handed over 5 two paise stamps, 30 one paisa stamps and 7 five paise stamps.

22

There isn't really any mystery, because the explanation is simple. While the two ways of selling are only identical, when the number of marbles sold at three for a paisa and two for a paisa is in the proportion of three to two. Therefore,if the first woman had handed over 36 marbles and the second woman 24, they would have fetched 24 paise, immaterial of, whether sold separately or at five for 2 paise. But if they had the same number of marbles which led to loss of 1 paisa when sold together, in every 60 marbles.So, if they had 60 each, there would be a loss of 2 paise and if there were 90 each (180 altogether) they would lose 3 paise and so on.

In the case of 60, the missing 1 paisa arises from the fact that the 3 marbles per paisa woman gains 2 paise and the 2 marbles per paisa woman loses 3 paise.

The first woman receives $9^1/_2$ paise and the second woman $14^1/_2$,so that each loses $^1/_2$ paise in the transaction.

23

The couple arrived home 10 minutes earlier than usual. Therefore,the point at which they met must have been 5 minutes driving time from the station. Thus,the wife should have been at that point at five minutes to six. Since the man started to walk at five o'clock, he must have been walking for 55 minutes when he met his wife.

24

At each station passengers can get tickets for any of the other 24 stations and, therefore, the number of tickets required is $25 \times 24 = 600$.

25

My aunt's share was Rs. $49200\frac{10}{13}$

26

We can build concentric hexagons containing 1, 6, 12, 18, 24, 30, 36 and 42 circles. When R/r becomes sufficiently large there will be room for extra circles.

If there is an even number of circles per side in last hexagon, an outsider can be placed centrally, if

$$\frac{R}{r} \geqslant \frac{1 + \sqrt{\frac{3}{2}}}{1 - \sqrt{\frac{3}{2}}} \quad \text{i.e. if } \frac{R}{r} \geqslant 13.9.$$

Two more 'outsiders' can be put each side of this one, if

$$[(R + r)^2 \left(\sqrt{\frac{3}{2}} \right)^2 + (2r)^2 \ ] + r \leqslant R$$

$$\text{i.e. if } 0 \leqslant \frac{R^2}{r^2} - 14\frac{R}{r} - 15$$

i.e. if $0 \leq \left(\frac{R}{r} + 1\right)\left(\frac{R}{r} - 1\right)$

i.e. if $\frac{R}{r} \geq 15$.

Therefore,in the given example three outsiders can be accommodated.

And the number of saucers that can be placed on the table are:

$1 + 6 + 12 + 18 + 24 + 30 + 36 + 42 + (3 \times 6) = 187$

27

If I walk 26 steps I require 30 seconds.

If I walk 34 steps I require only 18 seconds.

Multiplying 30 by 34 and 26 by 18 we get 1020 and 468.

The difference between 1020 and 468 is 552. When we divide this number by the difference between 30 and 18, i.e. by 12 we get the answer 46—the number of steps in the stairway.

28

No It cannot be done.

Each rectangle covers one white square and one black square, because on a chess board the white and black squares are always adjacent.

The two squares which we remove from the chess board are of the same colour, and so the remaining board has two more boxes of one colour than the other. And after the rectangles have covered 60 boxes, there will be left two squares of the same colour.

Obviously the remaining rectangle cannot cover these two squares.

29

Just one look at the number 999919 and we know that it cannot be a prime number. And if the problem has to have only one answer, this number can have only two factors. The factors are 991 and 1009, both of which are primes.

We know that each cat killed more mice than there were cats, and,therefore,the correct answer, clearly, is that 991 cats killed 1009 mice.

30

The forewheel is 8 feet in circumference and the hind wheel 12 feet.

31

If X is the temperature $\frac{9X}{5}=X-32$

i.e. $\frac{4X}{5}=-32$

which gives $X=-40$

i.e. $-40°C=-40°F$.

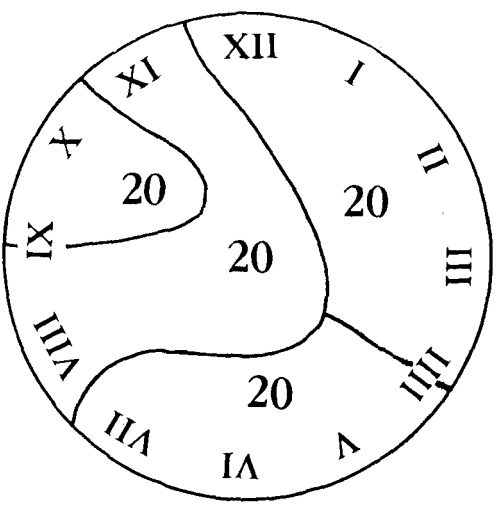
32

The entire mile was run in nine minutes. Though from the facts given we cannot determine the time taken over the first and second quarter-miles separately, we

know, however, that together they took four and a half minutes. And the last two quarters were run in two and a quarter minutes each.

33

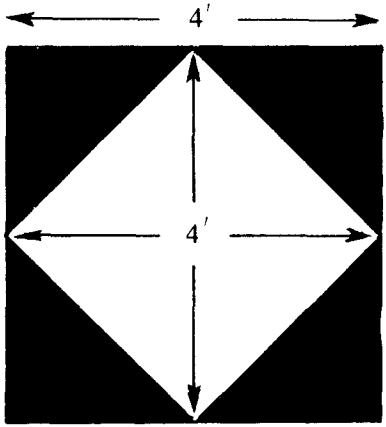
The clock broken in the manner shown in the illustration below:



The numerals on each of the four parts will sum to 20.

34

The painted area as shown in the illustration below:



Though it does not leave the clear area $4' \times 4'$, however, does measure $4'$ from top to bottom and from side to side.

35

We know that there were five droves with an equal number in each drove, and,therefore,the number must be divisible by 5. As every one of the eight dealers bought the same number of animals, the number must also be divisible by 8. This leads us to the conclusion that the number must be a multiple of 40.

Now the highest possible multiple of 40 that will work is 120, and this number could be made up in one of two ways—1 cow, 23 sheep and 96 pigs or 3 cows, 8 sheep and 109 pigs. But the first does not fit in because the animals consisted of 'Cows, Sheep and Pigs' and a single 'Cow' is not 'Cows'. Therefore, the second possibility is the correct answer.

36

$^{8}/_{7}$th of Rs. 35 equals Rs. 40, the regular selling price of the first frock and $^{7}/_{6}$th of Rs. 30 equals Rs. 35, the regular selling price of the second frock. Now, if the first frock usually sells for Rs. 40 and is sold for Rs. 35 on the reduced price, then I save Rs. 5. This gives me a gain on the cost the percentage of $^{5}/_{35}$ which equals $^{1}/_{7}$ and that is a little more than 14.28.

The second frock usually sells for Rs. 35, which on the reduced price costs me Rs. 30. Again I save Rs. 5 which equals $^{5}/_{30}$ or $^{1}/_{6}$ that amounts to, in percentage, a gain of little more than 16.66. The difference between the first frock and the second in terms of percentage gained is a little more than 2.38. Hence, the second frock is a better buy.

37

The key to the solution is that with a little bit of pencil work, it will be found, while I can walk 5 miles, my friend who started from Tumkur can walk 7 miles. Let's assume the distance between Bangalore and Tumkur is 24 miles, then the point of meeting would be 14

miles from Bangalore, and, therefore, I walked $3\frac{4}{5}$ miles per hour while my friend walked $4\frac{4}{5}$ miles per hour, and we both arrived exactly at 7 P.M

38

Let's assume that the man and the train normally meet at the crossing at 8 A.M., then the usual time of the cyclist at the bend is 8 A.M. and he is 6 miles behind at 7.30 A.M. But when the cyclist is late, he arrives at the bend at 8.25 A.M. and therefore he is six miles behind at 7.55 A.M. Since the train takes 5 minutes to travel the six mile run, the speed of the train is 72 m.p.h.

39

The woman made altogether Rs. 20. She made Rs. 10 when she sold the item for the first time and another Rs. 10 when she sold it for the second time.

40

The number is 84.

41

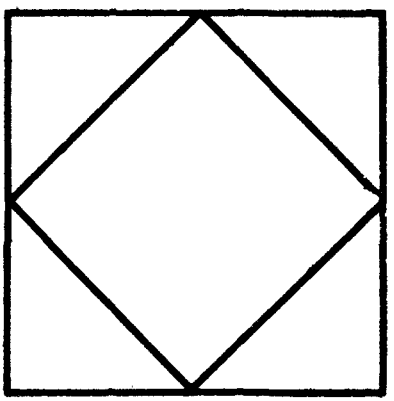
The manufacturer must take one flywheel made by each machine, find their total weight and compare this with the weight of the equivalent number of good flywheels to obtain the difference. Then, he must take 1 flywheel from machine number one, 2 flywheels

from machine number two and so forth, and weigh these against the correct weight for that number of parts.

42

While the first was the example given, the top row must be one of the four following numbers: 192, 219, 273 or 327.

43



44

The merchant must mix 70 Kilos of the Rs. 32 coffee with 30 Kilos of Rs. 40 coffee.

45

I must have had Rs. 42 in my purse when I started

46

4, 5 and 6.

47

If the sari cost Rs. 100 and the blouse Rs. 10 the difference would be Rs. 90, and therefore the sari must cost more and the blouse less. A little thought indicates the sari costs Rs. 105 and the blouse Rs. 5. So, the difference in cost is Rs. 100.

48

The date on which I met the boy was 1st January 1977, and the boy's birthday was on 31st December, 1965. The boy was 11 years old on the day I met him.

49

The whole block weighs 3 lbs.

50

They had Rs. 22781.25.

51

Let's assume that the age of the ship at present is X years and of the boiler Y years.

Then

The ship X is twice as old as its boiler (Y − X) was when the ship was (x − X) as old as the boiler is now.

$\therefore X = 2(Y - X)$ and $(x - X) = 2$.

Eliminating X gives $4Y = 3x$.

Also, $x + Y = 30$

$\therefore$ Y (the boiler) $= \frac{90}{7}$ years.

and X (the ship)

$= 12\frac{6}{7}$ years.

52

The following would be the procedure in chart form:

	19 Ounces	*13 Ounces*	*7 Ounces*
	0	13	7
Step 1	7	13	0
Step 2	19	1	0
Step 3	12	1	7
Step 4	12	8	0
Step 5	5	8	7
Step 6	5	13	2
Step 7	18	0	2
Step 8	18	2	0
Step 9	11	2	7
Step 10	11	9	0
Step 11	4	9	7
Step 12	4	13	3
Step 13	17	0	3

	19 Ounces	*13 Ounces*	*7 Ounces*
Step 14	17	3	0
Step 15	10	3	7

53

Just myself! Only I was going to the market and I met all the others coming from the opposite direction

54

The fraction is $\frac{7}{13}$

55

They will never step out with right foot together.

56

Mammu should take out 3 socks from the drawer because if she takes out only 2 then, both could be of different colours However the third selection would result in a pair of white or brown socks.

57

As Rekha's share falls in through her death, the farm has now to be divided only between Rashmi and Mala, in the proportion of one-third to one-fourth - that is in the proportion of four-twelfths to three Therefore, Rashmi gets four-sevenths of the hundred acres and Mala three-sevenths.

58

Ten applicants had neither mathematics nor literature training. So,we can now concentrate on the remaining 90 applicants. Of the 90, twenty had got no mathematics training and eight had got no literary training.

That leaves us with a remainder of 62 who have had training in both literature and mathematics.

59

The man must have lost. And the longer he went on the more he would lose—with simple calculations, we can draw this conclusion:

In two tosses he was left with three quarters of his money.

In six tosses with twenty-seven sixty-fourths of his money, and so on.

Immaterial of the order of the wins and losses, he loses money, so long as their number is in the end equal.

60

28 is the answer.

The method of working out this problem is to reverse the whole process—multiplying 2 by 10, deducting 8, squaring the result and so on.

61

$\sqrt{40^2 + 9^2}$ ft = $\sqrt{1600 + 81}$ ft = $\sqrt{1681}$ ft = 41 feet.

62

There were sixty eyes, so there must have been thirty animals. Now the question is what combination of four-legged pigs and two-legged ducks adding to thirty will give 86 feet. With some pencil work, we get the answer 13 pigs and 17 ducks.

63

If 65 minutes be counted on the face of the same watch then the problem would be impossible, because the hands must coincide every $65\frac{5}{11}$ minutes as shown by its face—and it hardly matters whether it runs fast or slow. However, if it is measured by actual time, it gains $\frac{5}{11}$ of a minute in 65 minutes or $\frac{60}{143}$ of a minute per hour.

64

The simplest way is to find those numbers between 50 and 100, which are multiples of 2 and 3 leaving no remainder. These numbers are 54, 60, 66, 72, 78, 84, 90 and 96. By scrutiny we find that if 78 is divided by 5 it will give 15 plus 3 left over. Therefore, 78 is the total number of eggs Rasool had in his basket, before the accident. And, therefore, he was paid Rs. 39 by the gentleman.

65

The value per sheep was Rs. 30.

66

The trains travel at 25 miles per hour. Therefore, they will meet after travelling for one hour and the falcon also must have been flying for one hour. Since it travels at 100 miles per hour, the bird must have flown 100 miles.

67

At a raise of Rs. 300 per year:
Ist year Rs. 1000 + Rs. 1000 = Rs. 2000
2nd year Rs. 1150 + Rs. 1150 = Rs. 2300
3rd year Rs. 1300 + Rs. 1300 = Rs. 2600
4th year Rs. 1450 + Rs. 1450 = Rs. 2900

At a raise of Rs. 100 each half year:
Ist year Rs. 1000 + Rs. 1100 = Rs. 2100
2nd year Rs. 1200 + Rs. 1300 = Rs. 2500
3rd year Rs. 1400 + Rs. 1500 = Rs. 2900
4th year Rs. 1600 + Rs. 1700 = Rs. 3300

Obviously the second proposition is much more lucrative.

68

Mammu had 5 marbles and Nawal 7

69

The ages must be as follows:

Mrs. Sareen	39
Sudha	21
Seema	18

Reema	18
Sonny	12
Kishu	9

It is obvious that Seema and Reema are twins.

70

Since 437 contains the percentage of all apartments including the number of 4's and total of these percentage is 244, the number of 4's must be represented by 100% as the base. In order to find the base of 100% representing the number of 4's, we have to divide 437 by 244%, which gives us 179.0984. Thus, we can work out a table showing the number of each type apartment, which should look as follows:

Type of Apartment	*Number of Apartments*	*Rounded out to the nearest figure*
2	8.9549	9
$2\frac{1}{2}$'s	12.5369	13
3's	26.8647	27
$3\frac{1}{2}$'s	35.8197	36
4's	179.0984	179
$4\frac{1}{2}$'s	87.7582	88
5's	59.1024	59
$5\frac{1}{2}$'s	21.4918	21
6's	5.3729	5
Total	436.9799	437

71

There are only 5 numbers that can be read upside down—0. 1. 6. 8 and 9. Now we only have to arrange these numbers so that when turned upside down the result will be larger by 78633. With some experiment we will find that the number is 10968 which is 89601. inverted.

72

He sold one for Rs. 600 losing 20% on the transaction. So,he must have paid Rs. 750 for that lathe and since he made 20% profit on the other machine he must have bought it for Rs. 500. Therefore,his total loss is of Rs. 50.

73

In the first three pickings you may get 1 of each colour, on the 4th pick there will be at least two of one colour.

Therefore,the answer is 4.

74

A brick weighed 3 lbs. Therefore, 16 bricks weighed 48 lbs and 11 bricks 33 lbs. Multiplying 48 by 33 and taking the square root we get 39.79. The girl's weight must have been about 39.79 lbs.

75

As the difference between twice the number and half

of it amounts to 45, or half of the number plus the whole of its represented by 1 adds up to 45.

$\frac{1}{2} + 1 = \frac{1}{2} + \frac{2}{2} = \frac{3}{2} = 45$

Now we have to find what number $\frac{3}{2}$ is equal of 45. To do this we invert $\frac{3}{2}$ to $\frac{2}{3}$ and multiply by 45. This gives us

$$\frac{2}{3} \times 45 = 30$$

Therefore.30 is the number.

76

Eleven minutes. The twelfth piece does not require sawing.

77

The train schedule must have been in the following manner:

Churchgate train into the station at	1.00 P.M.
And Bandra train at	1.01 P.M.
Churchgate train into the station at	1.10 P.M.
And Bandra train at	1.11 P.M.
Churchgate train into the station at	1.20 P.M.
And Bandra train at	1.21 P.M.

and so on and so forth.

This way each train would be arriving every ten minutes but his chances of getting the Churchgate train would be 9 times as great as of getting the Bandra train, because if he arrives in the station between 1.20 P.M. and 1.21 P.M. he goes on the Bandra train but if he arrives between 1.21 P.M. and 1.30 P.M. he goes to Churchgate.

78

14 and 20.

79

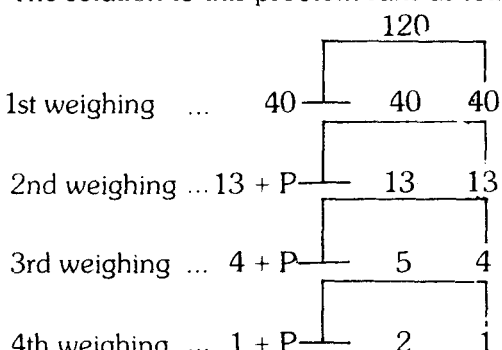
The writers spent Rs. 350, the doctors also spent Rs. 350, the dentists spent Rs. 420 and the bank employees spent Rs. 210. Thus,they spent altogether Rs. 1330. The five writers spent as much as four doctors, twelve doctors spent as much as nine dentists, and six dentists as much as eight bank employees.

80

I must have entered the store with Rs. 99.98 in my purse.

81

Let's assume P is a coin that's known to be imperfect. The solution to this problem runs as follows:



And in the fifth and the last weighing we determine the actual faulty coin.

82

The container would be half full on the 9th day. Since the number of bacteria doubles each day, the container should be half full on the day before it became full.

83

The number is 120.

84

A simple general solution to this problem would be as follows:

Let's assume there are n number of players. Then the amount held by every player at the end will be m (2^n), and the last winner must have held at the start m (n + 1), the next m (2n + 1), the next m (4n + 1) and so on to the first player, who must have held m $(2^{n-1}n + 1)$.

Therefore, in this case, n = 7

And the amount held by every player at the end was 2^7 quarter of a rupee pieces

Therefore,m = 1

Govind started with 8 quarter of a rupee pieces or Rs. 2.

Fakhruddin started with 15 quarter of a rupee pieces or Rs. 3.75.

Edward started with 29 quarter of a rupee pieces or Rs. 7.25.

Dev started with 57 quarter of a rupee pieces or Rs. 14.25.

Chunder started with 113 quarter of a rupee pieces or Rs. 28.25

Binoy started with 225 quarter of a rupee pieces or Rs. 56.25.
Arun started with 449 quarter of a rupee pieces or Rs. 112.25.

85

Ram Rakhan worked for $16^{2}/_{3}$ days and idled $13^{1}/_{3}$ days.

His salary at Rs. 240 per 30 day month works out to Rs. 8 a day. At Rs. 8 a day, working $16^{2}/_{3}$ days he earned Rs. 133.33 and idling $13^{1}/_{3}$ days he lost also Rs. 133.33. Therefore neither owed the other anything.

86

The person who moves when there are 5 matchsticks will lose the game, because if you remove one matchstick the other person will take the remaining 4, and if that person takes two then you will take the remaining 3, so on and so forth. Therefore, the person who moves when there are 10 or 15 matchsticks will lose.

The only correct way to make the first move is to take away 2 matchsticks and reduce the pile to 15, then no matter what your opponent does on his move, you reduce the pile to 10, then to 5 and lastly you take the remaining matchsticks.

87

First I was offered 16 guavas for Rs. 1.20. That would

have been at the rate of 90 paise a dozen. The two extra guavas gave me 18 for Rs. 1.20, which is at the rate of eighty paise a dozen, which amounts to ten paise a dozen less than the original price settled.

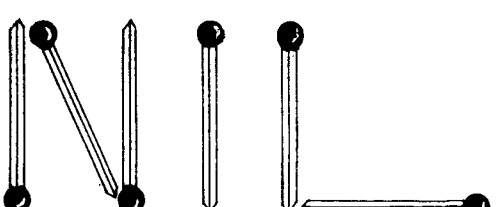
88

Shepherd Gopal had one sheep only.

89

The ratio of the father and son's age is now 4 to 1, and 30 years from now it will be 2 to 1. The period of thirty years equals the difference of the two ratios or 2 to 1. Therefore, $30 \times 2 = 60$, the father's age and $\frac{1}{2} \times 30 = 15$, the son's age.

90



91

I had one 50 paise coin, one 25 paise coin and four 10 paise coins.

92

Let's consider the year 1948. Fortyeight has the following factors:

24 and	2	i.e.	24th of February
4 and	12	i.e.	4th of December
12 and	4	i.e.	12th of April
16 and	3	i.e.	16th of March
6 and	8	i.e.	6th of August or
8 and	6	i.e.	8th of June

and giving six dates. The years 36, 48, 60 and 72 each give six dates whereas the maximum number of such dates is given by the year 24—seven occasions.

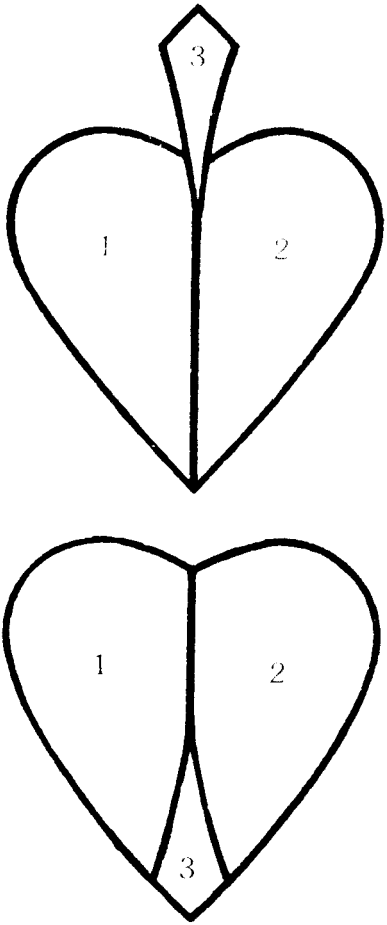
93

The bucket full of half sovereign gold pieces are worth more since the denominations of the gold pieces make no difference. What is most important here is the bucket containing half sovereign gold pieces is full of gold whereas the other one is only half full.

94

Double the product of the two distances from the wall and you get 144, which is the square of 12. The sum of the two distances is 17, and when we add these two numbers, 12 and 17 together and also subtract one from the other, we get two answers 29 and 5 as the radius, or half-diameter of the table. Naturally the diameter should be 58" or 10". However,a table of the latter dimensions cannot be a 'large circular table' and therefore,the table must be 58" in diameter.

95



96

Let's assume X is one of the numbers and Y the other. Then,

$X^2 - Y^2 = 51$ (i)

$X - Y = 3$ (ii)

Divide (i) & (ii)

$X + Y = 17$ (iii)

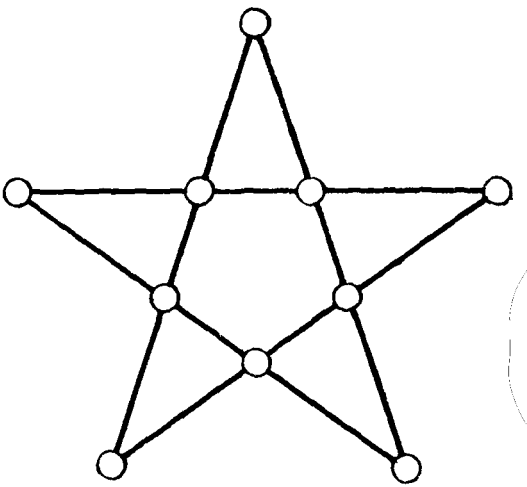
Add (ii) & (iii)

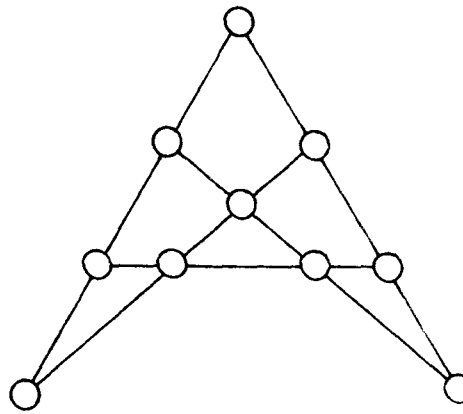
$2X = 20$

$X = 10$

$Y = 7$

97





98

Since the squirrel climbs 5 ft. in ascending 4 ft. of the pole, he travels 20 ft. in climbing 16 ft.

99

The man's rate of speed is 4 miles an hour to the woman's 3 miles and,therefore,their total rate is 7 miles an hour. Since they are 63 miles apart they can cover an average of 9 miles in one hour. Therefore, $9 \times 4 = 36$ miles travelled by the man and $9 \times 3 = 27$ miles the distance travelled by the woman

100

The three men shared the beer equally and so each drank the contents of $2^2/_3$ bottles. Therefore,the man

who had bought 5 bottles contributed $2\frac{1}{3}$ bottles and the man who had paid for 3 bottles contributed $\frac{1}{3}$ of the bottle, to make up the third man's share.

The first man's contribution is 7 times that of the second and,therefore,he gets Rs. 7 and the latter Re. 1.

101

The woman's age is 45 years and her husband's 54.

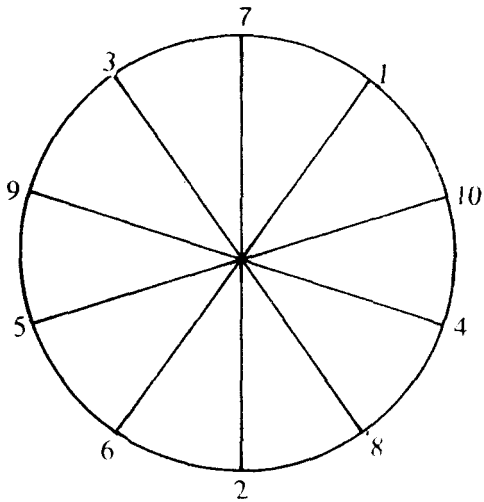
102

When the trains are moving in opposite directions, they are passing each other with the combined speeds of the two trains. Hence, when going in the same direction, the 'passing speed' is the speed of the passenger speed minus the speed of the goods train.

If the passenger train goes twice as fast as the goods train, then the passing speed when going in the opposite directions will be 2 plus 1 or 3 compared with 2 minus 1 or 1 when the trains are going in the same direction.

Therefore, the answer is twice as fast.

103



104

One of the answers is that there were 5 old persons, 25 young persons and 70 children.

105

$3^3 + 3 + {}^3/_3$.

106

There were 72 bees.

107

12 cows grazing once = 24 cows grazing twice
9 Mules = 13 1/2 cows
Divide 500 in ratio
24 : 13 1/2
First man paid Rs. 180 and second man Rs. 320.

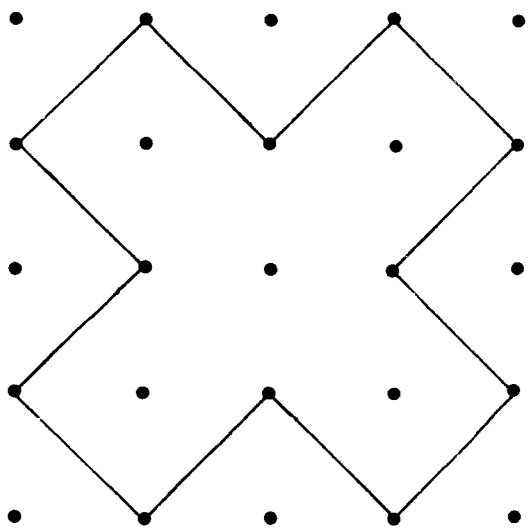
108

The candles must have burnt for three hours and three quarters as one candle had one-sixteenth of its total length left and the other four-sixteenths.

109

200 feet.

110



111

The crew can row $^1/_5$ of the distance per minute on still water and the stream does half that distance per minute.

The difference and sum of these two fractions are $^7/_{60}$ and $^{17}/_{60}$. Hence, rowing against the stream would take $^{60}/_{17}$ minutes and with the stream $^{60}/_{17}$ minutes.

The correct answer is $3^9/_{17}$ minutes.

112

The mixture of spirits of wine and water is in the proportion of 40 to 1, just as in the other bottle it was in the proportion of 1 to 40.

113

For the train to pass completely through the tunnel, it has to travel 2 miles. After 1 mile, the train would be completely in the tunnel, and after another mile it would be completely out, and since the train is travelling at 1 mile a minute, it will take 2 minutes to pass through the tunnel.

114

Since it takes the horse and the cow 40 days, in 1 day $^1/_{40}$ of the pasture would be eaten, since it takes the horse and the sheep 60 days, in 1 day $^1/_{60}$ would be grazed, since it takes the cow and the sheep 90 days, in 1 day $^1/_{90}$ of the pasture would be devoured.

$$\frac{1}{40} + \frac{1}{60} + \frac{1}{90} = \frac{19}{360}$$

$^{19}/_{360}$ equals what 2 horses, 2 cows and 2 sheep eat in a day and

$$\frac{19}{360} \div 2 = \frac{19}{720}$$

$^{19}/_{720}$ equals what 1 horse, 1 cow and 1 sheep eat in 1 day.

As it takes to eat $^1/_{720}$ of the contents of the pasture $^1/_{720}$ will require 19th part of 1 day or $^{720}/_{720}$ or the whole of the contents of the pasture will require 720 times as many days.

$$\text{or } 37 - \frac{17}{19}$$

$$\therefore 19 : 1 :: 720 : 37 - \frac{17}{19}$$

115

Their ages were respectively 58 and 28.

116

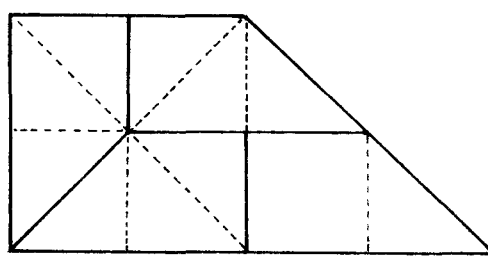
When the car travels one mile each of 4 tyres sustain one mile's use.

Therefore, when a car has travelled 20,000 miles, a total of 80,000 tire miles has been used.

Since this mileage has been gathered on 5 tires, each tire must have been used for 16,000 miles.

117

Divide the figure up into 12 equal triangles, as shown



in the sketch and follow the direction of the cuts as indicated by the heavy lines.

118

444 + 444 + 44 + 44 + 4 + 4 + 4 + 4 + 4 +4

119

$10^2 - 6^2 = 100 - 36 = 64 = 4^3$

$10^3 - 6^3 = 1000 - 216 = 784 = 28^2$

120

18 Paise.

121

Let's call the men A B C D and their wives E F G H. They must play in such a way that no person ever plays twice with or against another person.

	First Court	*Second Court*
1st day	ADagainst BF	CE against DF
2nd day	AH against CF	DE against BH
3rd day	AF against DG	BE against CH

In this way no man ever plays with or against his own|wife.

122

It is obvious that the seller of the typewriter follows the rule to reduce three-eighths of the price at every reduction, and,therefore,after the consistent reduction, the typewriter should be next offered for Rs. 156.25.

123

Pineapples cost Rs. 1.75 a piece and jackfruits Rs. 2.25.

124

There is only one cheapest method and that is to open the 4 links of one section and then use these links to join the other 4 sections together, which should cost altogether Rs. 8.

125

The sides of the three boards measure 31 inches, 41 inches and 49 inches.

126

Democharés must be sixty years of age.

127

The ratio of Reena's age to Seena's must be as 5 to 3.

Since the sum of their age is 44, Reena must be $27\frac{1}{2}$ and Seena $16\frac{1}{2}$.

128

Only the box in the very centre of the stack will not

suffer the strokes of the paint brush, whereas all the other 26 boxes will have at least one side painted.

129

No, 6 is not the answer! It is not correct, because after the 6 cigarettes have been smoked there will again be 6 butts which can be made into another cigarette. The answer is 7

130

The driver's number was 121.

131

Every time a match is held, one player is eliminated and to eliminate 29 of the 30 players, 29 matches are required.

132

The first and the second labourers should each take a crate with the former carrying his load one mile and turning it over to the third, who will carry it two miles. Then the second labourer should carry his crate two miles and turn it over to the first, who will then carry it one mile. Thus, each carries a crate 2 miles.

133

The number of bees was 15

134

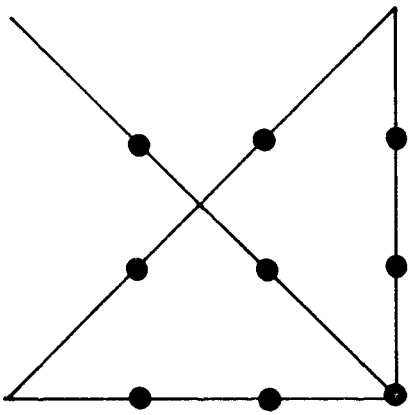
The following solution in eleven manipulations shows the contents of every vessel at the start and after every manipulation:

10 Quart	*10 Quart*	*5 Quart*	*5 Quart*
10	10	0	0
5	10	5	0
5	10	1	4
9	10	1	0
9	6	1	4
9	7	0	4
9	7	4	0
9	3	4	4
9	3	5	3
9	8	0	3
4	8	5	3
4	10	3	3

135

348 miles in 12 days.

136



137

20 triangles.

138

From the Jews abode the Christian and the Turk set out on a tour round the world, the Christian going due east and the Turk due west. This way the Christian gains a day and the Turk loses a day. So that when they meet again at thehouse of the Jew their reckoning will agree with his and all three may keep their Sabbath on the same day.

139

The canvas must be 10 inches in width and 20 inches

in height and the picture itself 6 inches wide and 12 inches high.

140

With some trial one will find 987652413 as the highest possible number containing 9 of the 10 digits that is divisible by 11, without a remainder

141

Half the sum of the side is 29 and from this we deduct the sides in turn, which gives us 9, 13, 17, 19, which when multiplied together make 37791. The square root of this number is 194.4.

194.4 square rods will be the answer

142

30 squares.

143

He bought at least 1 mule, 1 ox, 2 goats and 1 pig.

Other answers are possible.

144

The numbers of the houses on each side will add up alike if the number of the house be 1 and there are no other houses, and if the number be 6 with 8 houses in

all, if 35 with 49 houses, if 204 with 288 houses, if 1189 with 1681 houses and so on. But we know that there are more than 50 and less than 500 houses, and so we are limited to a single case.

The number of the house must be 204.

145

Assuming only 4 mangoes remained in the morning, this would mean that the third boy must have found 7 mangoes left when he woke up during night. But 7 is not $^2/_3$ of a whole number, so this is impossible.
The next possibility is 7 mangoes left in the morning, which is again impossible.

Now the next possibity is 10, which is $^2/_3$ of 15. This means that the third boy found 16 mangoes, took one and then took 5 more. The second boy then must have found 25 mangoes, taken one and then taken 8 more. But 25 is not $^2/_3$ of a whole number and,therefore,the assumption that 10 mangoes remained in the morning is absurd.

By similar reasoning the numbers 13, 16 and 19 can be eliminated, but 22 will be found to meet the required conditions.

The third boy found 34, took one and left $^2/_3$ of 33 or 22, the second boy found 52, took one and left $^2/_3$ of 51 or 34, the first boy found 79 took 1 and left $^2/_3$ of 78 or 52.

The answer is the boys stole altogether 79 mangoes.

146

25 paise + 50 paise + 100 paise = 175 paise and Rs. 700 = 70,000 paise

$$\frac{70,000}{175} = 400$$

400 is the number for each denomination.

147

It cannot be done in less than six cuts, because the cube which is formed in the middle of the original cube has no exposed surface.

Since a cube has 6 sides, the saw must create this cube by 6 passes of the saw, no matter how the slices are rearranged.

148

One train was running just twice as fast as the other.

149

Besides several other answers, the smallest numbers that satisfies the conditions are:

a = 10430, b = 3970, c = 2114, d = 386

a + b = 10430 + 3970 = 14400 = 120^2

a + c = 10430 + 2114 = 12544 = 112^2

a + d = 10430 + 386 = 10816 = 104^2

b + c = 3970 + 2114 = 6084 = 78^2

b + d = 3970 + 386 = 4356 = 66^2

c + d = 2114 + 386 = 2500 = 50^2

$$a + b + c + d = 10430 + 3970 + 2114 + 386$$
$$= 16900 = 130^2$$

150

45 years.