

PART-II : ELEMENTARY MATHEMATICS

- Q51. A man cycles at the rate of 15.6 km/h. How many metres does he cover in 2 minutes?
(a) 31.2 m. (b) 260 m. (c) 520 m. (d) 5200 m.
- Q52. Renu rides at the rate of 10 km/h but stops for 10 minutes to take rest at the end of every 15 km. How many hours will she take to cover 100 km?
(a) 10 (b) 11 (c) 12 (d) 17
- Q53. A number consists of two digits; whose sum is 10. If 18 is subtracted from the number, digits of the number are reversed, what is the product?
(a) 15 (b) 18 (c) 24 (d) 32
- Q54. The value of $x^2 - 4x + 11$ can never be less than?
(a) 7 (b) 8 (c) 11 (d) 22
- Q55. The difference of maximum values of the expressions $(6 + 5x - x^2)$ and $(y - 6 - y^2)$ for any real values of x and y is?
(a) 16 (b) 17 (c) 18 (d) 19
- Q56. The value of $(\sec^2 60^\circ - 1)$ is?
(a) 2 (b) 3 (c) 4 (d) 5
- Q57. If $\tan x = 3 \cot x$ then the value of x is?
(a) 45° (b) 30° (c) 60° (d) 15°
- Q58. The value of $(\sin 79^\circ \cos 11^\circ + \cos 79^\circ \sin 11^\circ)$?
(a) 1 (b) 0 (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{2}$
- Q59. The value of $\cos 20^\circ + \cos 60^\circ + \dots + \cos 160^\circ + \cos 180^\circ$?
(a) 0 (b) 1 (c) -1 (d) 2
- Q60. The value of $(\cos 70^\circ \cos 10^\circ + \sin 70^\circ \sin 10^\circ)$?
(a) $\frac{1}{2}$ (b) $\cos 80^\circ$ (c) $\sin 80^\circ$ (d) $\frac{\sqrt{3}}{2}$
- Q61. If $\sin x = \frac{1}{3}$ then the value of $\sin 3x$ is?
(a) $\frac{11}{23}$ (b) $\frac{13}{27}$ (c) $\frac{19}{27}$ (d) $\frac{23}{27}$
- Q62. A ladder 25 m long is leaning against a wall which is perpendicular to the level ground. The bottom of the ladder is 7 m from the base of the wall. If the top of the ladder slips down 4 m, how much will the bottom of the ladder slip?
(a) 7 m. (b) 8 m. (c) 10 m. (d) 15 m.
- Q63. Two poles of heights 6 m. and 11m. stand vertically upright on a plane ground. If the distance between their feet is 12 m. what is the distance between their tops?
(a) 13 m. (b) 11 m. (c) 12 m. (d) 14 m.
- Q64. The angles of elevation of the top of tower from two points situated at distance 36m. and 64m from its base and in the same straight line with it are complimentary. What is the height of the tower?
(a) 50 m. (b) 48 m. (c) 25 m. (d) 24 m.
- Q65. A chord AB of a circle of radius 20 cm. makes a right angle at the centre of the circle. What is the area of the minor segment in cm^2 ?
(a) 31.4 cm^2 (b) 57 cm^2 (c) 62.8 cm^2 (d) 114 cm^2
- Q66. If a wire of length 36 cm is bent in the form of a semi-circle, then what is the radius of the semi-circle?
(a) 9 cm (b) 8 cm (c) 7 cm (d) 6 cm
- Q67. If the outer and inner diameters of a stone parapet around a well are 112 cm and 70 cm. respectively, then what is the area of the parapet?
(a) 264 sq cm (b) 3003 sq cm (c) 6006 sq cm (d) 24024 sq cm
- Q68. If the area of a rectangle whose length is 5 units more than twice its width is 75 sq units, then what is the width?
(a) 3 units (b) 5 units (c) 7 units (d) 10 units

- Q69. Three cubes of metal whose edges are 6 cm, 8 cm and 10 cm respectively are melted and a single cube is formed. What is the length of the edge of the newly formed cube ?
 (a) 10 cm (b) 12 cm (c) 16 cm (d) 22 cm
- Q70. The ratio of the surface areas of two hemispheres is 4 : 1. What is the ratio of their volumes?
 (a) 8 : 1 (b) 4 : 1 (c) 3 : 1 (d) 2 : 1
- Q71. a, b, c are non-zero integers such that (ab) divides (cd). If a and c are co-prime, then which one of the following is correct?
 (a) a is a factor of c (b) a is a factor of b (c) a is a factor of d (d) d is a factor of a
- Q72. The arithmetic mean of a set of 10 numbers is 20. If each number is first multiplied by 2 and then increased by 5, then what is the means of new number?
 (a) 20 (b) 25 (c) 40 (d) 45
- Q73. In a divisible operation, the dividend is five times the quotient and twice the remainder. If the remainder is 15, then what is the dividend?
 (a) 175 (b) 185 (c) 195 (d) 250
- Q74. What is the total number of three digit numbers with the unit digit 7 and divisible by 11?
 (a) 6 (b) 7 (c) 8 (d) 9
- Q75. Which one of the following is a prime number?
 (a) 161 (b) 171 (c) 173 (d) 221
- Q76. Greatest number which can divide 1354, 1886 and 2762 leaving the same remainder 10 in each case is ?
 (a) 64 (b) 124 (c) 156 (d) 260
- Q77. The greatest number by which, if 1657 and 2037 are divided the remainders will be 6 and 5 respectively is?
 (a) 65 (b) 127 (c) 156 (d) 260
- Q78. LCM of two numbers is 14 times their HCF. The sum of the LCM and HCF is 600. If one of the numbers is 280, then the other is?
 (a) 40 (b) 60 (c) 80 (d) 100
- Q79. $16.7 + 12.38 - ? = 10.09$?
 (a) 16.98 (b) 17.89 (c) 18.99 (d) 20.09
- Q80. $.000033 + .11 = ?$
 (a) .003 (b) .03 (c) .0003 (d) .3
- Q81. $\sqrt{1.21} - \sqrt{.01} = ?$
 (a) .99 (b) 1 (c) $\sqrt{1.2}$ (d) .82
- Q82. If $\sqrt{3} = 1.732$, then the value of $\frac{1}{\sqrt{3}}$ is ?
 (a) 0.617 (b) 0.313 (c) 0.577 (d) 0.173
- Q83. A person sold an article for ₹ 3600 and got a profit of 20%. Had he sold the article for ₹ 3150, how much profit would he have got?
 (a) 4% (b) 5% (c) 6% (d) 10%
- Q84. A fruit seller has a certain number of mangoes of which 5% are rotten. He sells 75% of the remainder and is left with 95 mangoes. How many mangoes did he have originally?
 (a) 500 (b) 450 (c) 400 (d) 350
- Q85. 10 years ago Ram was 5 times as old as Shyam but 20 years later from now he will only be twice as old as Shyam. How many years old is Shyam?
 (a) 20 years (b) 30 years (c) 40 years (d) 50 years
- Q86. In a class, the number of boys is more than the number of girls by 12% of the total students. What is the ratio of the number of boys to that of the girls?
 (a) 11 : 14 (b) 14 : 11 (c) 28 : 25 (d) 25 : 28
- Q87. The ratio of the ages of A and B is 2 : 5 and the ratio of the ages of B and C is 3 : 4. What is the ratio of the ages of A, B and C ?
 (a) 6 : 15 : 20 (b) 8 : 5 : 3 (c) 6 : 5 : 4 (d) 2 : 15 : 14

- Q88. The population of a state increased from 100 million to 169 million in two decades. What is the average increase in population per decade?
 (a) 20% (b) 34.5% (c) 69% (d) 30%
- Q89. Nine numbers are written in ascending order. The middle number is the average of the nine numbers. The average of the five larger numbers is 68 and that of five smaller numbers is 44. What is the sum of all nine numbers?
 (a) 450 (b) 501 (c) 504 (d) 540
- Q90. If the mean age of combined group of boys and girls is 18 years and the mean age of boys is 20 and that of girls is 16, then what is the percentage of boys in the group?
 (a) 60 (b) 50 (c) 45 (d) 40
- Q91. Harish and Kewal start a business jointly. If Harish invests Rs 7000 for 9 months and Kewal invests Rs 12000 for 7 months, then out of a total profit of Rs 2730, Harish gets.
 (a) Rs 1170 (b) Rs 916 (c) Rs 1560 (d) Rs 2047.50
- Q92. A, B and C enter into a partnership with a capital in which A's contribution is Rs 10000. If out of a total profit of Rs 1000, A gets Rs 500 and B gets Rs 300, then C's capital is: ?
 (a) Rs 4000 (b) Rs 5000 (c) Rs 6000 (d) Rs 9000
- Q93. A bicycle is sold at a gain of 16%. If it had been sold for Rs 60 more, 20% would have been gained. The cost price of the bicycle is:
 (a) Rs 1050 (b) Rs 1200 (c) Rs 1500 (d) Rs 1800
- Q94. By selling 45 oranges for Rs 80, a man loses 20%. How many should he sell for Rs 48 so as to gain 20% in the transaction?
 (a) 25 (b) 18 (c) 15 (d) 20
- Q95. A train 280m long is moving at a speed of 60km/h. What is the time taken by the train to cross a platform 220m long?
 (a) 45 sec (b) 40 sec (c) 35 sec (d) 30 sec
- Q96. A wheel of radius 2.1m of a vehicle makes 75 revolutions in 1 min. What is the speed of the vehicle?
 (a) 78 km/h (b) 59.4 km/h (c) 37.4 km/h (d) 35.4 km/h
- Q97. Two trains are moving in the same direction at 1.5 km/minute and 60 km/hour respectively. A man in the faster train observes that it takes 27 seconds to cross the slower train. The length of the slower train is:
 (a) 225 m (b) 230 m (c) 240 m (d) 250 m
- Q98. If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same in 2 days, what is the time taken by 15 men and 20 boys in doing the same type of work?
 (a) 4 days (b) 5 days (c) 6 days (d) 7 days
- Q99. 45 people take 18 days to dig a pond. If the pond would have to be dug in 15 days, then the number of people to be employed will be?
 (a) 50 (b) 54 (c) 60 (d) 72
- Q100. A is twice as fast as B and B is thrice as fast as C. The journey covered by C in 42 minutes will be covered by A in?
 (a) 14 min (b) 7 min (c) 28 min (d) 54 min

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ANSWER PRACTICE TEST PAPER - 1

51. (c) 520 m.

Explanation:

$$\text{Speed} = 15.6 \text{ km} \times h$$

$$= 15.6 \times \frac{5}{3} = \frac{13}{3} \text{ m/s}$$

$$\text{time} = 2 \text{ min} = 2 \times 60 = 120 \text{ s}$$

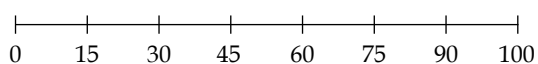
$$\text{distance} = \text{speed} \times \text{time}$$

$$= \frac{13}{3} \times 120 = 520 \text{ m.}$$

52. (b) 11 hours

Explanation:

$$\text{No. of hours she spend in riding only} = \frac{100}{10} = 10 \text{ hours}$$



$$\text{Time she spent in taking rest} = 6 \times 10 = 60 \text{ minutes} = 1 \text{ hour}$$

$$\text{Total time spent} = 10 + 1 = 11 \text{ hours}$$

53. (c) 24

Explanation:

$$\text{Let ones digit} = x$$

$$\text{ten digit} = 10 - x$$

$$\text{Two digit number} = 10(10 - x) + x$$

$$= 100 - 10x + x$$

$$= 100 - 9x$$

$$\text{Number obtained on reverring the digits} = 10x + 10 - x$$

$$= 9x + 10$$

According to condition

$$100 - 9x - 18 = 9x + 10$$

$$82 - 10 = 9x + 9x$$

$$72 = 18x$$

$$x = \frac{72}{18} = 4$$

$$\text{Ones digit} = x = 4$$

$$\text{Tens digit} = 10 - x = 10 - 4 = 6$$

$$\text{Product} = 4 \times 6 = 24$$

54. (a) 7

$$\text{Explanation: } x^2 - 4x + 11$$

$$a = 1, b = -4$$

The minimum value occurs

$$\text{at } -\frac{b}{2a} = \frac{-(-4)}{2 \times 1} = \frac{4}{2} = 2$$

Therefore, the expression

$$x^2 - 4x + 11 \text{ is minimum at } x=2$$

$$\text{So the minimum value is } (2^2 - 4 \times 2 + 11) = 11 - 4 = 7$$

55. (c) 18

Explanation:

$$6 + 5x - x^2 = (x^2 - 5x - 6)$$

$$= \left(x^2 - 5x + \frac{25}{4} - 6 - \frac{25}{4} \right)$$

$$= \frac{49}{4} - \left(x - \frac{5}{2} \right)^2$$

$$\text{Maximum value of expression } 6 + 5x - x^2 = \frac{49}{4}$$

$$y - 6 - y^2 = -(y^2 - y + 6) = -\left(y^2 - y + \frac{1}{4} + 6 - \frac{1}{4} \right)$$

$$= -\frac{23}{4} - \left(y - \frac{1}{2} \right)^2$$

$$\text{Maximum value of expression } y - 6 - y^2 = \frac{-23}{4}$$

Therefore the difference between the maximum values

$$\frac{49}{4} - \left(\frac{-23}{4} \right) = \frac{72}{4} = 18$$

56. (b) 3

Explanation:

$$\sec^2 60^\circ - 1$$

$$[\sec^2 \theta - \tan^2 \theta = 1]$$

$$= \tan^2 60^\circ$$

$$= \sqrt{3}^2$$

$$= 3$$

57. (c) 60°

Explanation:

$$\tan x = 3 \cot x$$

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

$$\tan^2 x = 3$$

$$\tan^2 x = \sqrt{3}^2$$

$$\tan x = \tan 60^\circ$$

$$x = 60^\circ$$

58. (a) 1

Explanation:

$$\sin 79^\circ \cos 11^\circ + \cos 79^\circ \sin 11^\circ$$

$$\sin 79^\circ \cos (90^\circ - 79^\circ) + \cos 79^\circ \sin (90^\circ - 79^\circ)$$

$$\sin 79^\circ \cdot \sin 79^\circ + \cos 79^\circ \cdot \cos 79^\circ$$

$$\sin^2 79^\circ + \cos^2 79^\circ = 1$$

59. (c) - 1

Explanation:

$$\cos 20^\circ + \cos 40^\circ + \cos 60^\circ + \dots + \cos 160^\circ + \cos 180^\circ$$

$$\cos 20^\circ + \cos 40^\circ + \cos 60^\circ + \cos 80^\circ + \cos 100^\circ + \cos 120^\circ + \cos 140^\circ + \cos 160^\circ + \cos 180^\circ$$

$$= \cos 20^\circ + \cos 40^\circ + \cos 60^\circ + \cos 80^\circ + \cos (180^\circ - 80^\circ) + \cos (180^\circ - 40^\circ) + \cos (180^\circ - 20^\circ) + \cos 180^\circ$$

$$= \cos 20^\circ + \cos 40^\circ + \cos 60^\circ + \cos 80^\circ$$

$$- \cos 80^\circ - \cos 60^\circ - \cos 40^\circ - \cos 20^\circ + \cos 180^\circ$$

$$= -1$$

60. (a) $\frac{1}{2}$

Explanation:

$$\cos 70^\circ \cos 10^\circ + \sin 70^\circ \sin 10^\circ$$

$$\cos (70^\circ - 10^\circ) \quad [\cos A \cos B + \sin A \sin B = \cos(A - B)]$$

$$= \cos 60^\circ = \frac{1}{2}$$

61. (d) $\frac{23}{27}$

Explanation:

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

$$\sin 3x = 3 \sin x - 4 \sin^3 x$$

$$3 \times \frac{1}{3} - 4 \left(\frac{1}{3}\right)^3$$

$$1 - \frac{4}{27}$$

$$\frac{27 - 4}{27} = \frac{23}{27}$$

62. (b) 8 m

Explanation:

Let height at which ladder is placed be h

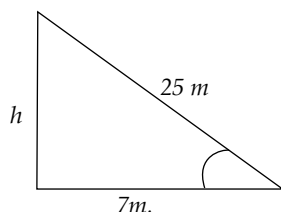
$$= h^2 = 25^2 - 7^2$$

$$= 625 - 49$$

$$= 576$$

$$h^2 = 24^2$$

$$h = 24$$



$$h_1 = 24 - 4 = 20$$

$$b_1^2 = 25^2 - 20^2$$

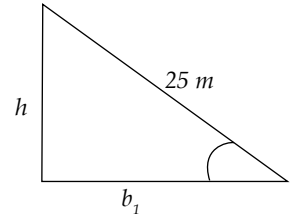
$$= 625 - 400$$

$$= 225$$

$$b_1^2 = 15^2$$

$$b_1 = 15$$

bottom of ladder is slipped by $= 15 - 7 = 8\text{m}$



63. (a) 13 m

Explanation:

Let AB and CD are two poles.

$$CE = 11 - 6 = 5\text{ m.}$$

$$BD = AE = 12\text{ m.}$$

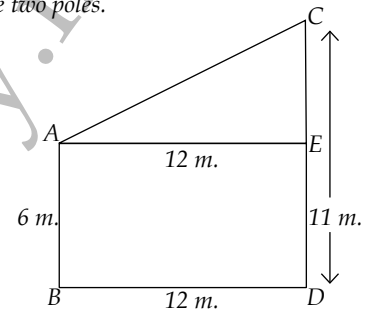
$$AC^2 = 12^2 + 5^2$$

$$= 144 + 25$$

$$= 169$$

$$AC = 13\text{ m}$$

Distance between their tops = 13m.



64. (b) 48 m.

Explanation:

Let angles of elevation at C and D be θ and $90^\circ - \theta$

In $\triangle ABC$

$$\tan \theta = \frac{h}{36}$$

In $\triangle ABD$

$$\frac{AB}{BD} = \tan (90^\circ - \theta)$$

$$\frac{h}{64} = \cot \theta$$

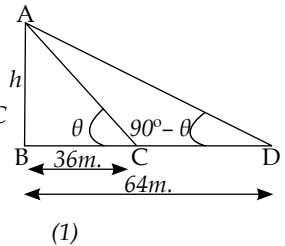
Multiply (1) and (2)

$$\frac{h}{36} \times \frac{h}{64} = \tan \theta \times \cot \theta$$

$$\frac{h^2}{6^2 \times 8^2} = \tan \theta \times \frac{1}{\tan \theta}$$

$$h^2 = 48^2$$

$$h = 48$$



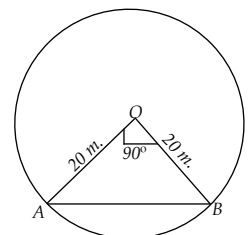
65. (d) 114 cm²

Explanation:

In $\triangle AOB$

$$\angle O = 90^\circ$$

$$OA = OB = 20\text{ m.}$$



In ΔOAB

$$AB^2 = OA^2 + OB^2$$

$$AB^2 = 20^2 + 20^2$$

$$AB^2 = 2 \times 20^2$$

$$AB^2 = (20\sqrt{2})^2$$

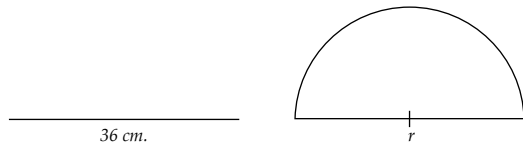
$$\text{Area of sector} = \frac{1}{4} \times \pi \times 20^2$$

$$\frac{1}{4} \times \frac{314}{100} \times 20 \times 20 = 314 \text{ cm}^2$$

$$\text{Area of } \Delta = \frac{1}{2} \times 20 \times 20 = 200 \text{ cm}^2$$

$$\begin{aligned} \text{Area of minor segment} &= 314 \text{ cm}^2 - 200 \text{ cm}^2 \\ &= 114 \text{ cm}^2 \end{aligned}$$

66. (c) 7 cm



Explanation:

$$\pi r + 2r = 36$$

$$r(\pi + 2) = 36$$

$$r \left(\frac{22}{7} + 2 \right) = 36$$

$$r \left(\frac{22+14}{7} \right) = 36$$

$$r \times \frac{36}{7} = 36$$

$$r = 36 \times \frac{7}{36} = 7$$

67. (c) 6006 cm²

Explanation:

$$r = \frac{70}{2} = 35$$

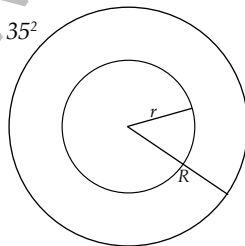
$$R = \frac{112}{2} = 56$$

$$\text{Area of parapet} = \pi \times 56^2 - \pi \times 35^2$$

$$\pi (56^2 - 35^2)$$

$$\frac{22}{7} \times (56 + 35)(56 - 35)$$

$$\frac{22}{7} \times 91 \times 21 = 6006 \text{ cm}^2$$



68. (b) 5

Explanation:

Let width = x

$$\text{length} = 2x + 5$$

$$\text{Area} = 75$$

$$(2x + 5) \times x = 75$$

$$2x^2 + 5x - 75 = 0$$

$$2x^2 + 15x - 10x - 75 = 0$$

$$x(2x + 15) - 5(2x + 15) = 0$$

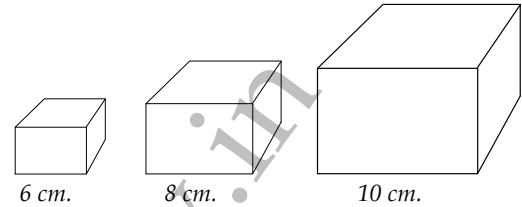
$$(x - 5)(2x + 15) = 0$$

$$x - 5 = 0$$

$$x = 5$$

69. (b) 12 m

Explanation:



Let side of new cube be x

$$x^3 = 6^3 + 8^3 + 10^3$$

$$x^3 = 216 + 512 + 1000$$

$$x^3 = 1728$$

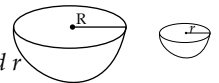
$$x^3 = 12^3$$

$$x = 12$$

70. (a) 8

Explanation:

Let radii of two hemisphere be R and r



$$\frac{4\pi R^2}{4\pi r^2} = \frac{4}{1}$$

$$\left(\frac{R}{r} \right)^2 = \left(\frac{2}{1} \right)^2$$

Volume will be $\frac{2}{3}\pi R^3$ and $\frac{2}{3}\pi r^3$

Ratio of Volumes

$$\frac{\frac{2}{3}\pi R^3}{\frac{2}{3}\pi r^3} = \left(\frac{R}{r} \right)^3 = \left(\frac{2}{1} \right)^3 = \frac{8}{1}$$

71. (c) $\frac{cd}{ab}$

Explanation:

HCF of a and c will be 1 as they're clearly a is factor of d

72. (d) 45

Explanation:

$$\text{Sum of 10 numbers} = 10 \times 20 = 200$$

When each number is multiplied by 2 and 5 is added to each then sum of numbers

$$= 400 + 5 \times 10$$

$$= 450$$

$$\text{Mean of new numbers} = \frac{450}{10} = 45$$

73. (c) 195

Explanation:

$$p = qd + r$$

$$r = 15$$

$$p = 2 \times 15 = 30p = 5q$$

$$30 = 5q$$

$$\frac{30}{5} = q$$

$$q = 6$$

$$p = qd + r$$

$$= 30 \times 6 + 15$$

$$= 180 + 15 = 195$$

$$\begin{array}{r} d \overline{) p} \\ \underline{r} \\ \end{array}$$

74. (c) 8

Explanation:

Three digit numbers with unit digit 7 and divisible by 11

$xy7 =$ Three digit numbers with unit digit 7

x, y are digits from 0 - 9 but $x \neq 0$ as $xy7$ is three digit number

$xy7$ is divisible by 11 So

$$x - y + 7 = 0$$

$$x - y + 7 = 0$$

$$x + 7 = y$$

$$x = 1 \text{ or } 2$$

$$x - 4 = y$$

$$x = 4, 5, 6, 7, 8, 9$$

$$x - y + 7 = 22$$

$$x - y = 15$$

Not possible as $x - y$ difference of digit

So possible numbers :

187, 247, 407, 517, 627, 737, 847, 957.

75. (c) 173

Explanation:

A. $161 > 13^2$. If 161 is a prime number then this is not divisible by any of the numbers 2, 3, 5, 7 and 11 but 161 is divisible by 7.

Hence 161 is not a prime number.

B. $171 < 14^2$. For prime number 171 is not divisible by any of the number 2, 3, 5, 7, 11, 13. But it is divisible by 3.

Hence 171 is not a prime number.

C. $173 < 14^2$. For prime number 173 is not divisible by any of the number 2, 3, 5, 7, 11 and 13.

Hence 173 is a prime number.

D. $221 < 15^2$. For prime number 221 is not divisible by any of the number 2, 3, 5, 7, 11 and 13. But it is divisible by 13.

Hence 221 is not a prime number.

76. (a) 64

Explanation:

$$1354 - 10 = 1344$$

$$1866 - 10 = 1856$$

$$2762 - 10 = 2752$$

Factors of

$$1344 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 7$$

$$1856 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 29$$

$$2752 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 43$$

$$HCF = 2^6 = 64$$

The number is 64 which divides 1354, 1866, 2762 leaving a remainder of 10 in each case

77. (b) 2032

Explanation:

$$1657 - 6 = 1651$$

$$2037 - 5 = 2032$$

$$\begin{array}{r} 1651 \overline{) 2032} (1 \\ \underline{1651} \\ 381 \end{array} \begin{array}{r} 1651 \overline{) 1651} (4 \\ \underline{1524} \\ 127 \end{array} \begin{array}{r} 381 \overline{) 381} (3 \\ \underline{381} \\ \end{array}$$

The greatest numbers by which 1657 and 2037 are divided the remainders will be 6 and 5 respectively is 127

78. (c) 80

Explanation:

Let HCF = x

$$LCM = 14x$$

$$14x + x = 600$$

$$15x = 600$$

$$x = \frac{600}{15} = 40$$

$$LCM = 14 \times 40 = 560$$

Product of two number = HCF \times LCM

$$250 \times y = 40 \times 560$$

$$y = \frac{40 \times 560}{250} = 80$$

79. (c) 18.99

Explanation:

Let the required number be x

$$16.7 + 12.38 - x = 10.09$$

$$16.7 + 12.38 - 10.09 = x$$

$$18.99$$

80. (c) 0.0003

Explanation:

$$0.000033 \div 0.11$$

$$\frac{0.000033}{0.11} \\ \frac{33^3}{1000000} \times \frac{100}{11} = 0.0003$$

81. (b) 1

Explanation:

$$\sqrt{1.21} - \sqrt{0.01}$$

$$= 1.1 - 0.1$$

$$= 1$$

82. (c) 0.577

Explanation:

$$\sqrt{3} = 1.732$$

$$\frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{1.732}{3}$$

$$0.577$$

83. (b) 5%

Explanation:

$$SP = ₹ 3600$$

$$\text{Profit \%} = ₹ 20\%$$

$$CP = \frac{300}{3600} \times \frac{100}{120} = ₹ 3000$$

$$\text{New SP} = ₹ 3150$$

$$\text{Profit} = ₹ 3150 - ₹ 3000$$

$$= ₹ 150$$

$$\text{Profit\%} = \frac{150}{3000} \times 100 = 5\%$$

84. (c) 400

Explanation:

Let no. of mangoes be x

$$\text{No. of rotten mangoes} = \frac{5}{100}x$$

$$\text{No. of rest mangoes} = \frac{95}{100}x$$

$$\text{No. of sold mangoes} = 75\% \text{ of } \frac{95}{100}x$$

$$\frac{75}{100} \times \frac{95}{100}x = \frac{7125}{10000}x$$

$$\frac{95}{100}x - \frac{7125}{10000}x = 95$$

$$\frac{95}{100}x \left(1 - \frac{75}{100}\right) = 95$$

$$\frac{95}{100}x \times \frac{25}{100} = 95$$

$$x = 95 \times \frac{100}{95} \times \frac{100}{25} = 400$$

85. (a) 20 years

Explanation:

Let the ages of Ram and Sham 10 yrs ago = $5x$ and x

Ages of Ram and Sham now = $5x + 10$, $x + 10$

Their ages 20 years later =

$$5x + 10 + 20, x + 10 + 20$$

$$5x + 30, x + 30$$

A.T.Q.

$$5x + 30 = 2(x + 30)$$

$$5x + 30 = 2x + 60$$

$$5x - 2x = 60 - 30$$

$$3x = 30$$

$$x = \frac{30}{3}$$

Present age of Sham = $x + 10$

$$10 + 10 = 20 \text{ years}$$

86. (c) $\frac{28}{25}$

Explanation:

Let no. of girls = x

$$\text{No. of boys} = \frac{112}{100}x \div x$$

$$\text{Ratio} = \frac{112}{100}x \times \frac{1}{x} = \frac{28}{25}$$

87. (a) 6 : 15 : 20

Explanation:

$$A : B = 2 : 5 = 6 : 15$$

$$B : C = 3 : 4 = 15 : 20$$

$$A : B : C = 6 : 15 : 20$$

88. (d) 30%

Explanation:

Earlier population = 100 million

Present population = 169 million

$$100 \left(1 + \frac{R}{100} \right)^2 = 169$$

$$\left(1 + \frac{R}{100} \right)^2 = \frac{169}{100}$$

$$\left(1 + \frac{R}{100} \right)^2 = \left(\frac{13}{10} \right)^2$$

$$\frac{R}{100} = \frac{3}{10}$$

$$R = \frac{3}{10} \times 100 = 30\%$$

89. (c) 504

Explanation:

Let nine number in ascending order are

$$x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9$$

$$\text{Sum of last 5 numbers } 5 \times 68 = 340 \quad (1)$$

$$\text{Sum of first 5 numbers} = 5 \times 44 = 220 \quad (2)$$

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 = 9x_5$$

Adding (1) and (2)

$$x_1 + x_2 + x_3 + x_4 + 2x_5 + x_6 + x_7 + x_8 + x_9 = 560$$

Subtract (3) and (4)

$$x_5 = 560 - 9x_5$$

$$10x_5 = 560$$

$$x_5 = \frac{560}{10} = 56$$

$$\text{Sum of 9 numbers} = 9x_5$$

$$9 \times 56 = 504$$

90. (b) 50%

Explanation:

Let number of boys be x and number of girls be y

$$\text{Sum of ages of boys} = 20x$$

$$\text{Sum of ages of girls} = 16y$$

$$\text{Sum of ages of boys and girls} = 18(x + y)$$

$$20x + 16y = 18(x + y)$$

$$20x + 16y = 18x + 18y$$

$$20x - 18x = 18y - 16y$$

$$2x = 2y$$

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

Percentage of boys = 50%

91. (a) 1170

Explanation:

Harish : Kewal

$$7000 \times 9 : 12000 \times 7$$

$$3 : 4$$

$$\text{Harish gets} = \frac{3}{3+4} \times 2730$$

$$\frac{3}{7} \times 2730 = 1170$$

92. (a) 4000

Explanation:

$$C's \text{ profit is} = 1000 - (500 + 300)$$

$$1000 - 800 = 200$$

$$A : B : C$$

$$500 : 300 : 200$$

$$\text{If value of 5} = 10000$$

$$\text{Then value of 1} = \frac{10000}{5}$$

$$\text{So value of 2} = 2000 \times 2 = 4000$$

$$C's \text{ capital is} = ₹4000$$

93. (c) 1500

Explanation:

$$\text{Let CP be} = ₹ 100$$

$$SP = 116$$

$$\text{New SP} = 120$$

$$\text{difference} = 120 - 116 = ₹ 4$$

$$\text{If difference is } ₹ 4 \text{ then CP} = ₹ 100$$

$$\text{Then difference } ₹ 60 = \frac{100 \times 60}{4}$$

$$= ₹1500$$

94. (b) 18

Explanation:

$$\text{CP of 45 oranges} = 80 \times \frac{100}{80} = 100$$

$$\text{CP of 1 oranges} = \frac{20}{45} = \frac{20}{9}$$

$$\text{gain \%} = 20\%$$

$$\text{SP of 1 orange} = \frac{20}{9} \times \frac{4}{100} = \frac{8}{3}$$

$$\text{No. of oranges he sells for } ₹48 = \frac{48}{8/3}$$

$$= 48 \times \frac{3}{8} = 18$$

95. (d) 30 sec

Explanation:

Speed = 60 km/h

$$= 60 \times \frac{5}{18} = \frac{50}{3} \text{ m/s}$$

$$\text{Time to cross a platform} = \frac{280 + 220}{50/3}$$

$$\frac{500}{50} \times \frac{3}{1} = 30 \text{ sec.}$$

96. (b) 59.4 km/h

Explanation:

Distance covered in 1 revolutions

$$2\pi r = 2 \times \frac{22}{7} \times 2.1$$

$$2 \times \frac{22}{7} \times \frac{21}{10} = 13.2 \text{ m}$$

Distance covered in 75 revolution

$$75 \times 13.2$$

$$\frac{75}{1000} \times \frac{13200}{100} = 990 \text{ m}$$

$$\frac{990}{1000} = 0.99 \text{ km}$$

$$\text{time} = 1 \text{ min} = \frac{1}{60} \text{ h}$$

$$\text{speed} = \frac{\text{Distance}}{\text{time}}$$

$$\frac{0.99}{1/60} = \frac{99}{100} \times 60 = 59.4 \text{ km/h}$$

97. (a) 225 m

Explanation:

$$\text{Distance covered in 60 sec} = 1.5 \text{ km} = 1500 \text{ m}$$

$$\text{distance covered in 1 sec} = \frac{1500}{60} = 25 \text{ m}$$

$$\text{speed} = 25 \text{ m/s}$$

$$\text{speed of second train} = 60 \text{ km/h} = 60 \times \frac{5}{18} = \frac{50}{3} \text{ m/s}$$

$$\text{Relative speed of train} = 25 - \frac{50}{3}$$

$$\frac{75 - 50}{3} = \frac{25}{3}$$

$$\text{length of slower train} = \frac{25}{3} \times 27 = 225 \text{ m}$$

98. (a) 4 days

Explanation:

Let 1 man's 1 day's work = x

and 1 boy's 1 day's work = y

$$6x + 8y = \frac{1}{10} \quad (1)$$

$$26x + 48y = \frac{1}{2} \quad (2)$$

Performing (1) \times 6 and subtract (2) we get

$$(36x + 48y) - (26x + 48y) = \frac{6}{10} - \frac{1}{2}$$

$$10x = \frac{1}{10}$$

$$x = \frac{1}{100}$$

Putting $x = \frac{1}{100}$ in (1)

$$\frac{6}{100} + 8y = \frac{1}{10}$$

$$8y = \frac{1}{10} - \frac{6}{100} = \frac{4}{100}$$

$$y = \frac{1}{200}$$

$$(15 \text{ men's} + 20 \text{ boys's}) \text{ is day's work} = \frac{15}{100} + \frac{20}{200} = \frac{1}{4}$$

So 15 men and 20 boys shall complete the work in 4 days

99. (b) 54

Explanation:

$$\text{Given } M_1 = 45$$

$$D_1 = 18$$

$$M_2 = ?$$

$$D_2 = 15$$

By using formula

$$M_1 D_1 = M_2 D_2$$

$$45 \times 18 = M_2 \times 15$$

$$\frac{45 \times 18}{15} = M_2$$

$$M_2 = 54$$

100. (b) 4 days

Explanation:

Let C's speed be x meters/min

Let time taken by A be y min.

Then B's speed = 3x meters/min

And A's speed = 6x meters/min

Ratio of A and C = Ratio of time taken by C and A

$$6x : x = 42 : y$$

$$\frac{6x}{x} = \frac{42}{y}$$

$$y = 7 \text{ min}$$