Problems on Ages

INTRODUCTION

Problems based on ages are generally asked in most of the competitive examinations. To solve these problems, the knowledge of linear equations is essential. In such problems, there may be three situations:

(i) Age some years ago

(ii) Present age

(iii) Age some years hence

Two of these situations are given and it is required to find the third. The relation between the age of two persons may also be given. Simple linear equations are framed and their solutions are obtained. Sometimes, short-cut methods given below are also helpful in solving such problems.

SOME USEFUL SHORT-CUT METHODS

1. If the age of A, t years ago, was n times the age of B and at present A's age is n_2 times that of B, then

$$A\text{'s present age} = \left(\frac{n_1 - 1}{n_1 - n_2}\right) n_2\, t \text{ years}$$

and $$B\text{'s present age} = \left(\frac{n_1 - 1}{n_1 - n_2}\right) t \text{ years}$$

Explanation

Let the present age of B be x years.

Then, the present age of $A = n_2\, x$ years

Given, t years ago,

$$n_1 (x - t) = n_2 x - t \quad \text{or,} \quad (n_1 - n_2)\, x = (n_1 - 1)t$$

or, $$x = \left(\frac{n_1 - 1}{n_1 - n_2}\right) t.$$

Therefore, $$B\text{'s present age} = \left(\frac{n_1 - 1}{n_1 - n_2}\right) t \text{ years}$$

and $$A\text{'s present age} = \left(\frac{n_1 - 1}{n_1 - n_2}\right) n_2\, t \text{ years.}$$

Illustration 1 The age of father is 4 times the age of his son. If 5 years ago father's age was 7 times the age of his son at that time, what is father's present age?

Solution: The father's present age

$$= \left(\frac{n_1 - 1}{n_1 - n_2}\right) n_2 t \qquad \text{(Here } n_1 = 7,\ n_2 = 4 \text{ and } t = 5\text{)}$$

$$= \left(\frac{7 - 1}{7 - 4}\right) 4 \times 5 = \frac{6 \times 4 \times 5}{3} = 40 \text{ years}$$

2. The present age of A is n_1 times the present age of B. If t years hence, the age of A would be n_2 times that of B, then

$$A\text{'s present age} = \left(\frac{n_2 - 1}{n_1 - n_2}\right) n_2\, t \text{ years}$$

and $$B\text{'s present age} = \left(\frac{n_2 - 1}{n_1 - n_2}\right) t \text{ years}$$

Explanation

Let the present age of B be x years.

Then, the present age of $A = n_1 x$

Given, t years hence,

$$(n_1 x + t) = n_2 (x + t)$$

or, $(n_1 - n_2)x = (n_2 - 1)t$

or, $x = \left(\frac{n_2 - 1}{n_1 - n_2}\right)t$

Therefore, B's present age $= \left(\frac{n_2 - 1}{n_1 - n_2}\right)n_1 t$ years

and A's present age $= \left(\frac{n_2 - 1}{n_1 - n_2}\right)n_1 t$ years.

Illustration 2 The age of Mr Gupta is four times the age of his son. After 10 years, the age of Mr Gupta will be only twice the age of his son. Find the present age of Mr Gupta's son

Solution: The present age of Mr Gupta's son

$$= \left(\frac{n_2 - 1}{n_1 - n_2}\right)t$$

$$= \left(\frac{2-1}{4-2}\right)10$$

(Here $n_1 = 4$, $n_2 = 2$ and $t = 10$)

$= 5$ years

3. The age of A, t_1 years ago, was n_1 times the age of B. If t_2 years hence A's age would be n_2 times that of B, then,

A's present age $= \frac{n_1(t_1 + t_2)(n_2 - 1)}{n_1 - n_2} + t_1$ years

and B's present age $= \frac{t_2(n_2 - 1) + t_1(n_1 - 1)}{n_1 - n_2}$ years.

Explanation

Let A's present age $= x$ years and B's present age $= y$ years.

Given $x - t_1 = n_1 (y - t_1)$ and $x + t_2 = n_2 (y + t_2)$

i.e., $x - n_1 y = (1 - n_1) t_1$ (1)

and $x - n_2 y = (-1 + n_2) t_2$ (2)

Solving Eqs. (1) and (2), we get

$$x = \frac{n_1(t_1 + t_2)(n_2 - 1)}{n_1 - n_2} + t_1$$

and, $$y = \frac{t_2(n_2 - 1) + t_1(n_1 - 1)}{n_1 - n_2}$$

Illustration 3 10 years ago Anu's mother was 4 times older than her daughter. After 10 years, the mother will be twice older than the daughter. Find the present age of Anu

Solution: Present age of Anu

$$= \frac{t_2(n_2 - 1) + t_1(n_1 - 1)}{n_1 - n_2}$$

(Here $n_1 = 4$, $n_2 = 2$, $t_1 = 10$ and $t_2 = 10$)

$$= \frac{10(2-1) + 10(4-1)}{4-2} = \frac{10 + 30}{2} = 20 \text{ years}$$

4. The sum of present ages of A and B is S years. If, t years ago, the age of A was n times the age of B, then

Present age of $A = \frac{Sn - t(n-1)}{n+1}$ years

and Present age of $B = \frac{S + t(n-1)}{n+1}$ years.

Explanation

Let the present ages of A and B be x and y years, respectively.

Given $x + y = S$ (1)

and, $x - t = n(y - t)$

or, $x - ny = (1 - n)t$ (2)

Solving Eqs. (1) and (2), we get

$$x = \frac{Sn - t(n-1)}{n+1}$$

and, $$y = \frac{S + t(n-1)}{n+1}$$

Illustration 4 The sum of the ages of A and B is 42 years. 3 years back, the age of A was 5 times the age of B. Find the difference between the present ages of A and B

Solution: Here $S = 42$, $n = 5$ and $t = 3$

$\therefore$ Present age of A

$$= \frac{Sn - t(n-1)}{n+1} = \frac{42 \times 5 - 3(5-1)}{5+1}$$

$$= \frac{198}{6} = 33 \text{ years}$$

and present age of B

$$= \frac{5 + t(n+1)}{n+1} = \frac{42 + 3(5-1)}{5+1}$$

$$= \frac{54}{6} = 9 \text{ years}$$

$\therefore$ Difference between the present ages of A and B = 33 – 9 = 24 years.

Note:

If, instead of sum (S), difference (D) of their ages is given, replace S by D and in the denominator $(n + 1)$ by $(n - 1)$ in the above formula.

5. The sum of present ages of A and B is S years. If, t years hence, the age of A would be n times the age of B, then

$$\text{present age of } A = \frac{Sn + t(n-1)}{n+1} \text{ years}$$

$$\text{and present age of } B = \frac{S - t(n-1)}{n+1} \text{ years.}$$

Explanation

Let the present ages of A and B be x and y years, respectively

Given $\quad x + y = S \quad (1)$

and, $\quad x + t = n(y + t)$

or, $\quad x - ny = t(n-1) \quad (2)$

Solving Eqs. (1) and (2), we get

$$x = \frac{Sn + t(n-1)}{n+1}$$

and, $$y = \frac{S - t(n-1)}{n+1}$$

Illustration 5 The sum of the ages of a son and father is 56 years. After four years, the age of the father will be three times that of the son. Find their respective ages

Solution: The age of father

$$= \frac{Sn + t(n-1)}{n+1} = \frac{56 \times 3 + 4(3-1)}{3+1}$$

(Here $S = 56$, $t = 4$ and $n = 3$)

$$= \frac{176}{4} = 44 \text{ years}$$

$$\text{The age of son} = \frac{S - t(n-1)}{n+1}$$

$$= \frac{56 - 4(3-1)}{3+1}$$

$$= \frac{48}{4} = 12 \text{ years}$$

6. If the ratio of the present ages of A and B is $a:b$ and t years hence, it will be $c:d$, then

$$A\text{'s present age} = \frac{at(c-d)}{ad - bc}$$

$$\text{and, } B\text{'s present age} = \frac{bt(c-d)}{ad - bc}.$$

Illustration 6 The ratio of the age of father and son at present is 6:1. After 5 years, the ratio will become 7:2. Find the present age of the son

Solution: The present age of the son $= \frac{bt(c-d)}{ad - bc}$

(Here $a = 6$, $b = 1$, $c = 7$, $d = 2$ and $t = 5$)

$$= \frac{1 \times 5(7-2)}{6 \times 2 - 1 \times 7} = 5 \text{ years}$$

Note:

If, with the ratio of present ages, the ratio of ages t years ago is given, then replace t by $(-t)$ in the above formula.

Illustration 7 Six years ago Mahesh was twice as old as Suresh. If the ratio of their present ages is 9:5 respectively, what is the difference between their present ages?

Solution: Present age of Mahesh

$$= \frac{-at(c-d)}{ad - bc}$$

$$= \frac{-9 \times 6(2-1)}{1 \times 9 - 5 \times 2}$$

(Here $a = 9$, $b = 5$, $c = 2$, $d = 1$ and $t = 6$)

$= 54$ years

Present age of Suresh

$$= \frac{-bt(c-d)}{ad - bc}$$

$$= \frac{-5 \times 6(2-1)}{1 \times 9 - 5 \times 2} = 30 \text{ years.}$$

$\therefore$ Difference of their ages $= 54 - 30 = 24$ years.

Practice Exercises

Difficulty Level-1 (Based on Memory)

1. A's age is one-sixths of B's age. B's age will be twice of C's age after 10 years. If C's eighth birthday was celebrated two years ago, then the present age of A must be:

(a) 5 years (b) 10 years

(c) 15 years (d) 20 years

[Based on MAT, 2002]

2. Sachin was twice as old as Ajay 10 years back. How old is Ajay today if Sachin will be 40 years old 10 years hence?

(a) 20 years (b) 10 years

(c) 30 years (d) None of these

[Based on MAT, 2005]

3. A demographic survey of 100 families in which two parents were present revealed that the average age A, of the oldest child, is 20 years less than half the sum of the ages of the two parents. If F represents the age of one parent and M, the age of the other parent, then which of the following equivalent to A?

(a) $\frac{F+M-20}{2}$ (b) $\frac{F+M}{2}+20$

(c) $\frac{F+M}{2}-20$ (d) $F+M-10$

[Based on MAT, 2001]

4. Rohan is two years younger than Mohan who is three years younger than Sohan who is four years older than Rohit who is two years older than Mohit who is three years younger than Sohit. Thus:

(a) Sohan is 7 years older than Mohit

(b) Rohit is 2 years younger than Sohit

(c) Mohan is 3 years older than Mohit

(d) Rohit is 2 years older than Sohit

5. Two groups of student, whose average ages are 20 years and 30 years, combine to form a third group whose average age is 23 years. What is the ratio of the number of students in the first group to the number of students in the second group?

(a) 5:2 (b) 2:5

(c) 7:3 (d) None of these

[Based on IIT Joint Man. Ent. Test, 2004]

6. A years ago, a father was four times his son's age. In six years, his age will be 9 more than twice his son's age. What is the present age of the son?

(a) 10 years (b) 9 years

(c) 20 years (d) None of these

[Based on IIT Joint Man. Ent. Test, 2004]

7. 5 years ago his mother's age was thrice that of Amit. Amit's present age is 20. What will be the ratio of their ages 10 years from now?

(a) 30:70 (b) 1:3

(c) 5:2 (d) 1:2

8. Sister's age is 3 times that of her brother's. After 5 years the sister shall be twice as old as her brother. How many years before, the sister's age was 6 times of her brother's age?

(a) 1 year (b) 3 years

(c) 5 years (d) 10 years

9. The average age of a class is 15.8 years. The average age of the boys in the class is 16.4 years and that of the girls is 15.4 years. What is the ratio of boys to girls in the class?

(a) 1:2 (b) 3:4

(c) 2:3 (d) None of these

10. A's age is thrice that of B's and four times that of C's. Find $A:B:C$.

(a) 1:3:4 (b) 3:4:12

(c) 2:3:8 (d) None of these

11. Namrata's father is now four times her age. In five years, he will be three times her age. In how many years, will he be twice her age?

(a) 5 (b) 20

(c) 25 (d) 15

[Based on SCMHRD Ent. Exam., 2003]

12. A father is twice as old as his son. 20 years back, he was twelve times as old as the son. What are their present ages?

(a) 24, 12 (b) 44, 22

(c) 48, 24 (d) None of these

[Based on IMT Ghaziabad, 2002]

13. The ratio of ages of Rahul and Deepesh is 3:5. 10 years later this ratio becomes 5:7. What is the present age of Deepesh?

(a) 20 years (b) 50 years

(c) 25 years (d) 40 years

14. The ratio of ages of A and B is 8:9 and the age of B is two-thirds of C's age and age of C is nine-thirteenths times the age of D. If the age of B is 18 years, then the age of C is:

(a) 36 years (b) 39 years

(c) 27 years (d) 54 years

15. If Dennis is one-third the age of his father Keith now, and was one-fourth the age of his father 5 years ago, then how old will his father Keith be 5 years from now?

(a) 20 years (b) 45 years

(c) 40 years (d) 50 years

16. Fifteen years hence, a man will be four times as old as he was fifteen years ago. His present age is:

(a) 25 years (b) 20 years

(c) 30 years (d) 45 years

17. The ages of A, B and C together total 185 years. B is twice as old as A and C is 17 years older than A. Then, the respective ages of A, B and C are:

(a) 40, 86 and 59 years (b) 42, 84 and 59 years

(c) 40, 80 and 65 years (d) None of these

18. One years ago a father was four times as old as his son. In 6 years time his age exceeds twice his son's age by 9 years. Ratio of their ages is:

(a) 13:4 (b) 12:5

(c) 11:3 (d) 9:2

19. The sum of ages of a father and son is 45 years. Five years ago, the product of their ages was four times the father's age at that time. The present age of the father is:

(*a*) 39 years (*b*) 36 years

(*c*) 25 years (*d*) None of these

20. Jayesh is as much younger to Anil as he is older to Prashant. If the sum of the ages of Anil and Prashant is 48 years, what is the age of Jayesh?

(*a*) 20 years (*b*) 24 years

(*c*) 30 years (*d*) Cannot be determined

21. The ratio of the ages of the father and the son at present is 7:1. After 4 years, the ratio will become 4:1. What is the sum of the present ages of the father and the son?

(*a*) 29 years (*b*) 35 years

(*c*) 32 years (*d*) None of these

[Based on MAT (Sept), 2008]

22. The product of the present ages of Sarita and Gauri is 320. Eight years from now, Sarita's age will be three times the age of Gauri. What was the age of Sarita when Gauri was born?

(*a*) 40 years (*b*) 32 years

(*c*) 48 years (*d*) 36 years

[Based on MAT (Feb), 2011]

23. Anil is at present one-fourth the age of his father. After 16 years, he will be one-half age of his father. Find the present age of Anil's father.

(*a*) 40 years (*b*) 36 years

(*c*) 32 years (*d*) 28 years

[Based on MAT (Sept), 2009]

24. Honey was twice as old as Vani 10 years ago. How old is Vani today, if Honey will be 40 years old 10 years hence?

(*a*) 25 years (*b*) 20 years

(*c*) 15 years (*d*) 35 years

[Based on MAT (Feb), 2009]

25. The age of the father 5 years ago was 5 times the age of his son. At present the father's age is 3 times that of his son. What is the present age of the father?

(*a*) 33 years (*b*) 30 years

(*c*) 45 years (*d*) None of these

[Based on MAT (Feb), 2009]

26. Sonu is 4 years younger than Manu while dolly is 4 years younger than Sumit but one-fifth times as old as Sonu. If Sumit is eight years old, how many times as old is Manu as Dolly?

(*a*) 6 (*b*) 1/2

(*c*) 3 (*d*) None of these

[Based on MAT (Sept), 2008]

27. If the ages of P and R are added to twice the age of Q, the total becomes 59. If the ages of Q and R are added to thrice the age of P, the total becomes 68 and if the age of P is added to thrice the age of Q and thrice the age of R, the total becomes 108. What is the age of P?

(*a*) 17 years (*b*) 19 years

(*c*) 15 years (*d*) 12 years

[Based on MAT (Sept), 2008]

28. A father's age is three times the sum of the ages of his two children, but 20 years hence his age will be equal to the sum of their ages. Then, the father's age is:

(*a*) 30 years (b) 40 years

(c) 35 years (*d*) 45 years

[Based on MAT (May), 2008 (Sept), 2007]

29. If 6 years are subtracted from the present age of Randheer and the remainder is divided by 18, then the present age of his grandson Anup is obtained. If Anup is 2 years younger to Mahesh, whose age is 5 years, then what is the age of Randheer?

(*a*) 84 years (*b*) 96 years

(*c*) 48 years (*d*) 60 years

[Based on MAT (Feb), 2008]

30. 1 year ago, a mother was 4 times older to her son. After 6 years, her age becomes more than double her son's age by 5 years. The present ratio of their age will be:

(*a*) 13:12 (*b*) 3:1

(*c*) 11:3 (*d*) 25:7

[Based on MAT (Dec), 2007]

31. The average age of a husband, his wife and son 3 years ago was 27 years and that of his wife and son 5 years ago was 20 years. What is the husband's present age?

(*a*) 35 years (*b*) 32 years

(*c*) 37 years (*d*) 40 years

[Based on MAT (Feb), 2008]

32. In a class, there are 20 boys whose average age is decreased by 2 months, when one boy age 18 years is replaced by a new boy. The age of the new boy is:

(*a*) 14 years 8 months (*b*) 16 years 4 months

(*c*) 15 years (*d*) 17 years 10 months

[Based on MAT (Dec), 2007]

33. The age of the father of two children is twice that of the elder one added to four times that of the younger one. If the geometric mean of the ages of the two children is $4\sqrt{3}$ and their harmonic mean is 6, then what is the father's age?

(*a*) 48 years (*b*) 32 years

(*c*) 40 years (*d*) 56 years

[Based on MAT (Sept), 2008]

34. The age of a man is 3 times that of his son. 15 years ago, the man was 9 times as old as his son. What will be the age of the man after 15 years?

(*a*) 45 years (*b*) 60 years

(*c*) 75 years (*d*) 65 years

[Based on MAT, 1999]

35. Ashu's mother was three times as old as Ashu 5 years ago. After 5 years, she will be twice as old as Ashu. How old is Ashu today?

(*a*) 35 years (*b*) 10 years

(*b*) 20 years (*d*) 15 years

[Based on MAT, 1999]

36. Father is 5 years older than the mother and the mother's age now is thrice the age of the daughter. The daughter is now 10 years old. What was the father's age when the daughter was born?

(*a*) 20 years (*b*) 15 years

(*c*) 25 years (*d*) 30 years

[Based on MAT, 1999]

37. A father told his son, 'I was as old as you are at present at the time of your birth'. If the father is 38 years old now, then what was the son's age five years back?

(*a*) 14 years (*b*) 19 years

(*c*) 38 years (*d*) 33 years

[Based on MAT, 1999]

38. Fifteen years hence, a man will be four times as old as he was fifteen years ago. His present age is:

(*a*) 25 years (*b*) 20 years

(*c*) 30 years (*d*) 45 years

[Based on MAT, 1999]

39. The average age of an adult class is 40 years. 12 new students with an average age of 32 years join the class, thereby decreasing the average by 4 years. The original strength of the class was:

(*a*) 10 (*b*) 11

(*c*) 12 (*d*) 15

[Based on MAT, 2000]

40. The father is five times older than his son. After 4 years, the sum of their ages would be 44 years. Then the son's age at present is:

(*a*) 5 years (*b*) 6 years

(*c*) 7 years (*d*) 8 years

[Based on MAT, 2000]

41. Father's age is 4 times that of his son. 5 years back, it was 7 times. His age now is:

(*a*) 30 (*b*) 35

(*c*) 40 (*d*) 45

[Based on MAT, 2000]

42. Sushil was thrice as old as Snehal 6 years back. Sushil will be five-thirds times as old as Snehal 6 years hence. How old is Snehal today?

(*a*) 18 years (*b*) 24 years

(*c*) 12 years (*d*) 15 years

[Based on FMS (MS), 2006]

43. Ratio of Ashok's age to Pradeep's age is 4:3. Ashok will be 26 years old after 6 years. How old is Pradeep now?

(*a*) 18 years (*b*) 21 years

(*c*) 15 years (*d*) 24 years

44. The ratio of Laxmi's age to the age of her mother is 3:11. The difference of their ages is 24 years. The ratio of their ages after 3 years will be:

(*a*) 1:3 (*b*) 2:3

(*c*) 3:5 (*d*) 2:5

[Based on FMS, 2006]

45. The ratio of *A*'*s* and *B*'*s* ages is 4:5. If the difference between the present age of *A* and the age of *B* 5 years hence is 3 years, then what is the total of present ages of *A* and *B*?

(*a*) 68 years (*b*) 72 years

(*c*) 76 years (*d*) 64 years

46. If twice the son's age in years be added to the father's age, the sum is 70 and if twice the father's age is added to the son's age, the sum is 95. Father's age is:

(*a*) 40 years (*b*) 35 years

(*c*) 42 years (*d*) 45 years

47. Sneh's age is one-sixth of her father's age. Sneh's father's age will be twice of Vimal's age after 10 years. If Vimal's eighth birthday was celebrated 2 years before, then what is Sneh's present age?

(*a*) 30 years (*b*) 24 years

(*c*) 6 years (*d*) None of these

[Based on NMAT, 2005]

48. A man's age is 125% of what it was 10 years ago, but $83\frac{1}{3}\%$ of what it will be after ten 10 years. What is his present age?

(*a*) 45 years (*b*) 50 years

(*c*) 55 years (*d*) 60 years

49. The age of a person is equal to 4 times the sum of the ages of her three daughters. 8 years hence her age will be double the sum of their ages. What is her age now?

(*a*) 20 years (*b*) 40 years

(*c*) 60 years (*d*) 80 years

[Based on ATMA, 2005]

50. The age of Mr. Chetan in 2002 was $\frac{1}{90}$ of his birth year. What is his age in 2006?

(*a*) 30 (*b*) 28

(*c*) 26 (*d*) 22

[Based on JMET, 2006]

51. 15 years hence, Rohit will be just four times as old as he was 15 years ago. How old is Rohit at present?

(*a*) 20 (*b*) 25

(*c*) 30 (*d*) 35

52. Ten years ago, Mohan was thrice as old as Ram was but 10 years hence, he will be only twice as old. Find Mohan's present age.

(*a*) 60 years (*b*) 80 years

(*c*) 70 years (*d*) 76 years

53. If the ages of P and R are added to twice the age of Q, the total becomes 59. If the ages of Q and R are added to thrice the age of P, the total becomes 68 and if the age of P is added to thrice the age of Q and thrice the age of R, the total becomes 108. What is the age of P?

(*a*) 19 years (*b*) 15 years

(*c*) 17 years (*d*) 12 years

[Based on MAT, 2013]

54. If 6 years are subtracted from the present age of Shyam and the remainder is divided by 18, then the present age of his grandson Anup is obtained. If Anup is 2 years younger to Mahesh whose age is 5 years, then what is the age of Shyam?

(*a*) 48 years (*b*) 60 years

(*c*) 84 years (*d*) 96 years

[Based on MAT, 2013]

55. The respective ratio between the present age of Manisha and Deepali is 5:X. Manisha is one year younger than Parineeta. Parineetas age after 9 years will be 33 years. The difference between Deepali's and Manisha's age is same as the present age of Parineeta. What will come in place of X?

(*a*) 23 (*b*) 39

(*c*) 15 (*d*) None of these

[Based on SNAP, 2013]

56. The age of the father 5 years ago was 5 times the age of his son. At present the father's age is 3 times that of his son. What is the present age of the father?

(*a*) 33 years (*b*) 30 years

(*c*) 45 years (*d*) none of these

[Based on SNAP, 2012]

Difficulty Level-2 (Based on Memory)

1. There were 15 students in a class. When the ages of a teacher and a new boy are added, the average age of the class increases by 10 per cent while it remains the same when only the age of a boy is added. If the teacher's age is eight more than twice the age of the new boy, then find the initial average age of the class.

(*a*) 15.4 years (*b*) 16.5 years

(*c*) 11.4 years (*d*) None of these

2. The age of a person k years ago was half of what his age would be k years from now. The age of the same person p years from now would be thrice of what his age was p years ago. What is the value of the ratio k:p?

(*a*) 3:2 (*b*) 2:3

(*c*) 1:4 (*d*) 4:1

3. Ten years ago, the ages of the members of a joint family of eight people added up to 231 years. Three years later, one member died at the age of 60 years and a child was born during the same years. After another three years, one more member died, again at 60, and a child was born during the same years. The current average age of this eight-member joint family is nearest to:

(*a*) 21 years (*b*) 25 years

(*c*) 24 years (*d*) 23 years

[Based on CAT, 2007]

4. 10 years ago the age of Karisma was two-thirds of the age of Babita. 14 years hence the ratio of ages of Karishma and Babita will be 5:9. Find the ratio of their present ages.

(*a*) 13:29 (*b*) 11:27

(*c*) 29:17 (*d*) 13:25

5. Father is 5 years older than mother and mother's age now is thrice the age of the daughter. The daughter is now 10 years old. What was father's age when the daughter was born?

(*a*) 20 years (*b*) 15 years

(*c*) 25 years (*d*) 30 years

6. The average age of the mother and her 6 children is 12 years which is reduced by 5 years if the age of the mother is excluded. How old is the mother?

(*a*) 42 years (*b*) 40 years

(*c*) 48 years (*d*) 50 years

7. A father's age is three times the sum of the ages of his two children, but 20 years hence his age will be equal to the sum of their ages. Then the father's age is:

(*a*) 30 years (*b*) 40 years

(*c*) 35 years (*d*) 45 years

8. Three times the present age of a father is equal to eight times the present age of his son. Eight years hence the father will be twice as old as his son at that time. What are their present ages?

(*a*) 35, 15 (*b*) 32, 12

(*c*) 40, 15 (*d*) 27, 8

9. Five years ago Mr Sohanlal was thrice as old as his son and ten years hence he will be twice as old as his son. Mr Sohanlal's present age (in years) is:

(*a*) 35 (*b*) 45
(*c*) 50 (*d*) 55

10. If 6 years are subtracted from the present age of Randheer and the remainder is divided by 18, then the present age of his grandson Anup is obtained. If Anup is 2 years younger to Mahesh whose age is 5 years, what is the age of Randheer?
(*a*) 84 years (*b*) 48 years
(*c*) 60 years (*d*) 96 years
[Based on MAT (Sept), 2008]

11. If 1 is added to the age of the elder sister, then the ratio of the ages of two sisters becomes 0.5:1, but if 2 is subtracted from the age of the younger one, the ratio becomes 1:3. Find the age of the two sisters.
(*a*) 8 and 5 years (*b*) 11 and 6 years
(*c*) 9 and 5 years (*d*) 8 and 6 years
[Based on MAT (Dec), 2010]

12. A boy was asked of his age by his friend. The boy said, 'The number you get when you subtract 25 times my age from twice the square of my age will be thrice your age.' If the friend's age is 14, then the age of the boy is:
(*a*) 28 years (*b*) 21 years
(*c*) 14 years (*d*) 25 years
[Based on MAT (Feb), 2011]

13. In a cricket 11, the average age of 11 players is 28 years. Out of these, the average ages of three groups of three players each are 25 years, 28 years and 30 years, respectively. If in these groups, the captain and the youngest player are not included and the captain is eleven years older than the youngest player, what is the age of the captain?
(*a*) 33 years (*b*) 34 years
(*c*) 35 years (*d*) 36 years
[Based on FMS (MS), 2006]

14. The average age of an adult class is 40 years. Twelve new students with an average age of 32 years join the class, thereby decreasing the average age of the class by 4 years. The original strength of the class was:
(*a*) 10 (*b*) 11
(*c*) 12 (*d*) 15
[Based on FMS (MS), 2006]

15. A man born in the first half of the nineteenth century was x years old in the years x^2. He was born in:
(*a*) 1806 (*b*) 1836
(*c*) 1812 (*d*) 1825
[Based on FMS, 2011]

16. Five years ago, Bina's age was three times that of Arti. Ten years ago, Bina's age was half that of Chitra. If c represents Chitra's current age, which of the following represents Arti's current age?
(*a*) $(c - 10)/3$ (*b*) $c/6 + 5$
(*c*) $3c - 5$ (*d*) $5c/3 - 10$
[Based on MHT-CET MBA, 2010]

17. If 1 is added to the age of the elder sister, then the ratio of the ages of two sisters become 0.5:1, but if 2 is subtracted from the age of the younger one, the ratio becomes 1:3, the age of the younger sister will be?
(*a*) 9 years (*b*) 5 years
(*c*) 18 years (*d*) 15 years
[Based on ATMA, 2008]

18. The sum of the reciprocals of the ages of two colleagues is five times the difference of the reciprocals of their ages. If the ratio of the product of their ages to the sum of their ages is 14.4:1, the age (in years) of one of the colleagues must be between (both inclusive):
(*a*) 20 and 23 (*b*) 23 and 26
(*c*) 26 and 30 (*d*) 30 and 35
[Based on ATMA, 2008]

19. The ages of Ram and Shyam differ by 16 years. Six years ago, Mohan's age was thrice as that of Ram's, find their present ages.
(*a*) 14 years, 30 years
(*b*) 12 years, 28 years
(*c*) 16 years, 34 years
(*d*) 18 years, 38 years

20. Ten years ago, the ages of the members of a joint family of eight people added up to 231 years. Three years later, one member died at the age of 60 years and a child was born during the same year. After another three years, one more member died, again at 60 a child was born during the same year. The current average age of this eight-member joint family is nearest to:
(*a*) 22 years (*b*) 21 years
(*c*) 45 years (*d*) 24 years
(*e*) 23 years
[Based on CAT, 2007]

Answer Keys

Difficulty Level-1

1. (*a*)	**2.** (*a*)	**3.** (*c*)	**4.** (*c*)	**5.** (*c*)	**6.** (*b*)	**7.** (*d*)	**8.** (*b*)	**9.** (*c*)	**10.** (*d*)	**11.** (*b*)	**12.** (*b*)	**13.** (*c*)
14. (*c*)	**15.** (*d*)	**16.** (*a*)	**17.** (*b*)	**18.** (*c*)	**19.** (*b*)	**20.** (*b*)	**21.** (*c*)	**22.** (*b*)	**23.** (*c*)	**24.** (*b*)	**25.** (*b*)	**26.** (*a*)
27. (*d*)	**28.** (*a*)	**29.** (*d*)	**30.** (*d*)	**31.** (*d*)	**32.** (*a*)	**33.** (*c*)	**34.** (*c*)	**35.** (*d*)	**36.** (*c*)	**37.** (*a*)	**38.** (*a*)	**39.** (*c*)
40. (*b*)	**41.** (*c*)	**42.** (*c*)	**43.** (*c*)	**44.** (*a*)	**45.** (*b*)	**46.** (*a*)	**47.** (*d*)	**48.** (*b*)	**49.** (*d*)	**50.** (*c*)	**51.** (*b*)	**52.** (*c*)
53. (*d*)	**54.** (*b*)	**55.** (*d*)	**56.** (*b*)									

Difficulty Level-2

1. (*c*)	**2.** (*b*)	**3.** (*c*)	**4.** (*a*)	**5.** (*c*)	**6.** (*a*)	**7.** (*a*)	**8.** (*b*)	**9.** (*c*)	**10.** (*c*)	**11.** (*c*)	**12.** (*c*)	**13.** (*c*)
14. (*c*)	**15.** (*a*)	**16.** (*b*)	**17.** (*b*)	**18.** (*b*)	**19.** (*a*)	**20.** (*d*)						

Explanatory Answers

Difficulty Level-1

1. (*a*) $A = \frac{1}{6}B, B + 10 = 2(C + 10), C = 10$

$\therefore \quad B = 30, A = 5$ years.

2. (*a*) Sachin's age today = 30 years

Sachin's age 10 years back = 20 years

Ajay's age 10 years back = 10 years

Ajay's age today = 20 years.

3. (*c*) $A = \frac{F + M}{2} - 20.$

4. (*c*) Rohan = Mohan – 2 = (Sohan – 3) – 2 = (Rohit + 4) – 3 – 2 = (Mohit + 2) + 4 – 3 – 2 = (Sohit – 3) + 2 + 4 – 3 – 2 = (Sohit – 2).

5. (*c*) Let the number of students in the two groups be x and y respectively.

$\therefore \quad 20x + 30y = 23(x + y) \Rightarrow 3x = 7y \Rightarrow \frac{x}{y} = \frac{7}{3}.$

6. (*b*) $(F - 1) = 4(S - 1)$ (1)

where F and S are the Father's and the Son's ages respectively at present.

$\therefore \quad (F + 6) = 2(S + 6) + 9$ (2)

From Eqs. (1) and (2), $S = 9$.

7. (*d*) Amit's present age is 20. 5 years ago he was 15; therefore his mother was 45. 10 years from now his mother will be 60; Amit will be 30. Hence the ratio of Amit's age to mother's is 1:2.

8. (*b*) Let the age of the sister = x years. So, the age of the brother = $\frac{x}{3}$

By the condition given in the problem,

$$x + 5 = 2\left(\frac{x}{3} + 5\right) \Rightarrow x = 15 \text{ years}$$

Again, let before t years sister's age was 6 times that of her brother's.

$\therefore \quad 15 - t = 6(5 - t) \Rightarrow t = 3.$

9. (*c*) Let number of boys = x

Let number of girls = y

$\therefore$ Total number of students = $x + y$

$\Rightarrow \quad (x + y) \times 15.8 = 16.4x + 15.4y \Rightarrow 0.6x = 0.4y$

$\Rightarrow \quad \frac{x}{y} = \frac{0.4}{0.6} = \frac{2}{3}.$

10. (*d*) Ratio of ages of A and B = 3:1

Ratio of ages of A and C = 4:1

A	B	C
3	1	
4		1
12	4	3

11. (*b*) Let Namrata's age = x years

Let Namrata's father's age = y years

$\therefore \quad y = 4x$ and $y + 5 = 3(x + 5)$

$\therefore \quad x = 10, y = 10$

Let, $y + K = 2(x + K)$

(i.e., After K years, the father will be double of her age)

$\Rightarrow \quad 40 + K = 2(10 + K) \Rightarrow K = 20$

$\therefore$ After 20 years, Namrata's father will be double of her age.

12. (*b*) $F = 2S, F - 20 = 12(S - 20)$

$\Rightarrow \quad 2S - 20 = 12S - 240 \Rightarrow S = 22$

$\therefore \quad F = 44.$

13. (*c*) $\frac{R}{D} = \frac{3x}{5x}$

$\frac{R}{D} \Rightarrow \frac{3x+10}{5x+10} = \frac{5}{7}$

$\Rightarrow \quad x = 5$

Hence, $\frac{R}{D} = \frac{15}{25}$

14. (*c*) $A:B = 8:9$

$B:C = 2:3$

$C:D = 9:13$

$A:B:C:D = 144x:162x:243x:351x$

But we need not solve this, since we already know that $B:C = 2x:3x$

$\therefore \quad 2x:3x :: 18:K \Rightarrow K = 27$ years

$\frac{y}{p} \times \frac{k}{y} = \frac{2}{3} \Rightarrow k:p = 2:3$

15. (*d*) Let the present age of Dennis and his father be x and y respectively. Then

$$x = \frac{1}{3}y \qquad (1)$$

and $\quad (x - 5) = \frac{1}{4}(y - 5) \qquad (2)$

From Eqs. (1) and (2), $y = 45$ years

Hence, required age $= (x + 5) = 50$ years

16. (*a*) Let the present age of the man $= x$ years

$\therefore \quad (x + 15) = 4(x - 15)$

$\Rightarrow \quad 3x = 75 \Rightarrow x = 25$

17. (*b*) Let A's age be x years

B's age be $2x$ years

C's age $= (x + 17)$ years

According to the question,

$x + 2x + (x + 17) = 185$

$\therefore \quad 4x = 185 - 17 = 168 \quad \therefore \quad x = 42$

$\therefore \quad A$'s age $= 42$ years

B's age $= 84$ years

C's age $= 42 + 17 = 59$ years

18. (*c*) Let the present ages of father and son be x and y years, respectively

Then, $\quad (x - 1) = 4(y - 1)$

or $\quad 4y - x = 3 \qquad (1)$

and $\quad (x + 6) - 2(y + 6) = 9$

or $\quad -2y + x = 15 \qquad (2)$

Solving Eqs. (1) and (2), we get, $x = 33, y = 9$

$\therefore$ Ratio of their ages $= 33:9 = 11:3$

19. (*b*) Let father's present age $= x$ years

Then, son's present age $= (45 - x)$ years

Given: $(x - 5)(45 - x - 5) = 4(x - 5)$

or, $\quad x^2 - 41x + 180 = 0$ or, $(x - 36)(x - 5) = 0$

$\therefore \quad x = 36$ years.

20. (*b*)

21. (*c*) Let the present age of father and son be $7x$ and x years, respectively.

After 4 years,

age of father $= (7x + 4)$ years

age of son $= (x + 4)$ years

Given, $\frac{7x+4}{x+4} = \frac{4}{1}$

$\Rightarrow \quad 7x + 4 = 4x + 16$

$\Rightarrow \quad 3x = 12$

$\therefore \quad x = 4$

$\therefore \quad 7x + x = 28 + 4 = 32$ years.

22. (*b*) Let the present ages of Sarita and Gauri are x and y.

Then, $\quad xy = 320$

and $\quad (x + 8) = 3(y + 8)$

$\Rightarrow \quad x - 3y = 16$

$\Rightarrow \quad x - 3\left(\frac{320}{x}\right) = 16$

$\Rightarrow \quad x^2 - 16x - 960 = 0$

$\Rightarrow \quad (x - 40)(x + 24) = 0$

$\Rightarrow \quad x = 40$ and $y = 8$

At the time of Gauri born, the age of Sarita is 32 years.

23. (*c*) Let the present age of Anil's father be x years.

Then, Anil's present age $= \frac{x}{4}$ years

$\therefore \quad \frac{x}{4} + 16 = \frac{1}{2}(x + 16)$

$\Rightarrow \quad \frac{x}{4} + 16 = \frac{x}{2} + 8$

$\Rightarrow \quad \frac{x}{4} = 8$

$\Rightarrow \quad x = 32$ years.

24. (*b*) Present age of Honey = 30 years

Honey's age 10 years ago = 20 years

$\therefore$ Vani's age 10 years ago = 10 years

$\therefore$ Present age of Vani = 20 years.

25. (*b*) Let the present age of father be x years.

$\therefore$ Present age of son = $\frac{x}{3}$ years

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

$\Rightarrow \quad x - 5 = \frac{5x}{3} - 25$

$\Rightarrow \quad \frac{2x}{3} = 20$

$\Rightarrow \quad x = 30$ years.

26. (*a*) Sonu = Manu – 4

Dolly = Sumit – 4

Dolly = $\frac{1}{5}$ Sonu

Sumit = 8 years, Dolly = 4 years, Sonu = 20 years and Manu = 24 years

Manu = 6 × Dolly.

27. (*d*) $2Q + P + R = 59$ (1)

$Q + R + 3P = 68$ (2)

$P + 3Q + 3R = 108$ (3)

From Eqs. (2) and (3),

$3Q + 3R + 9P = 204$

$P + 3Q + 3R = 108$

$\Rightarrow \quad 8P = 96$

$\therefore \quad P = 12$ years.

28. (*a*) Let the father's age be x years and age of his children be a and b years.

$\therefore \quad (a + b) = \frac{x}{3}$

and $\quad (a + b) + 20 + 20 = x + 20$

$\Rightarrow \quad \frac{x}{3} + 20 = x$

$\Rightarrow \quad x = 30$ years.

29. (*d*) Present age of Mahesh = 5 years

Present age of Anup = 3 years

Present age of Randheer = 3 × 18 + 6 = 60 years.

30. (*d*) Let present age of mother and son be x and y years respectively.

Then, $\quad x - 1 = 4(y - 1)$

$\Rightarrow \quad x = 4y - 3$ (1)

and, $\quad x + 6 = 2(y + 6) + 5$

$\Rightarrow \quad x = 2y + 11$ (2)

From Eqs. (1) and (2),

$4y - 3 = 2y + 11$

$\Rightarrow \quad y = \frac{14}{2} = 7$ years

and, $\quad x = 25$ years

$\therefore$ Required ratio = 25:7.

31. (*d*) Let present age of husband, his wife and son be x, y and z respectively.

According to the given condition,

$$\frac{(x-3) + (y-3) + (z-3)}{3} = 27$$

$\Rightarrow \quad x + y + z = 90$ (1)

and, $\quad \frac{(y-5) + (z-5)}{} = 20$

$\Rightarrow \quad y + z = 50$ (2)

From Eqs. (1) and (2), we get

$x = 90 - 50 = 40$ years.

32. (*a*) Total age decreases = 20 × 2 = 40 months

= 3 years 4 months

$\therefore$ The age of new boy = 18 years – 3 years 4 months

= 14 years 8 months.

33. (*c*) $F = 2E + 4Y$ (1)

and, $\quad \sqrt{EY} = 4\sqrt{3}$

$\Rightarrow \quad EY = 48$ (2)

And, $\quad \frac{2EY}{E+Y} = 6 \Rightarrow E + Y = 16$ (3)

Now, $(E - Y)^2 = (E + Y)^2 - 4EY$

$= (16)^2 - 4 \times 48$

$= 256 - 192 = 64$

$\Rightarrow \quad E - Y = 8$ (4)

From Eqs. (3) and (4), $E = 12$

and, $Y = 4$

From Eq. (1),

$$F = 2 \times 12 + 4 \times 4 = 40 \text{ years.}$$

34. (*c*) Let the age of man's son be x years.

$\therefore$ age of the man = $3x$ years.

15 years ago, age of the son = $x - 15$ years and age of the man = $(3x - 15)$ years

Now, according to the question,

$$\frac{3x-15}{x-15} = 9$$

or, $3x - 15 = 9x - 135$

or, $6x = 120$

$\therefore$ $x = 20$ years

$\therefore$ age of the man is; $20 \times 3 = 60$ years

$\therefore$ age of the man after 15 years

$= 60 + 15 = 75$ years.

35. (*d*) Let the age of Ashu at present be x years and her mother be y years.

Now, according to the question,

$$3(x - 5) = (y - 5)$$

or, $3x - 15 = y - 5$

or, $3x - y = 10$ (1)

Again, according to the question,

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

or, $2x + 10 = y + 5$

or, $2x - y = -5$ (2)

Subtracting Eq. (2) from (1), we get

$x = 15$

Hence, Ashu's today's age is 15 years.

36. (*c*) Age of mother = $3 \times 10 = 30$ years

Age of father = $30 + 5 = 35$ years

Age of father when the daughter was born

$= 35 - 10 = 25$ years.

37. (*a*) Let the present age of the son = x years

Now, according to the question,

$x = 38 - x$ or, $x = 19$ years

Five years back son's age = $19 - 5 = 14$ years.

38. (*a*) Let age of the man = x years

$\therefore$ $x + 15 = 4(x - 15)$

$\Rightarrow$ $x = 25$.

39. (*c*) Suppose original strength = x

$\therefore$ Total age of adult class = $40x$ years

Average age of 12 new students = 32 years

$\therefore$ Total age of 12 new students = 32×12

$= 384$ years

According to the question,

$$\frac{40x + 384}{x + 12} = 40 - 4 = 36$$

or $40x + 384 = 36x + 432$

or $4x = 48$ or $x = 12$.

40. (*b*) Suppose the present ages of father and son are $5x$, x years respectively.

According to the question,

$$(5x + 4) + (x + 4) = 44$$

or, $6x + 8 = 44$ or $6x = 36$

$\therefore$ $x = 6$

Hence, present age of son = $x = 6$ years.

41. (*c*) Let the age of son be x years

$\therefore$ Father's age = $4x$ years

5 years back age of son = $x - 5$ and age of father = $4x - 5$

Now, according to the question,

$$\frac{4x-5}{x-5} = 7$$

$\Rightarrow$ $x = 10$ years

$\therefore$ Father's age now is $10 \times 4 = 40$ years.

42. (*c*)

Sushil		Snehal
$3x$		x
$(3x + 12)$	$=$	$\frac{5}{3}(x + 12)$

$$4x = 24 \Rightarrow x = 6$$

Present age = $6 + 6 = 12$ years.

43. (*c*) Let the present ages of Ashok and Pradeep be $4x$ and $3x$

So that $4x + 6 = 26 \Rightarrow x = 5$

$\therefore$ Present age of Pradeep is $3x = 3 \times 5$, i.e., 15 years.

44. (*a*) $11x - 3x = 24$

$\Rightarrow$ $8x = 24$

$\Rightarrow$ $x = 3$

Present age = 9, 33

After 3 years = 12, 36

$\therefore$ Ratio = 1:3.

45. (*b*) Given $\frac{A}{B} = \frac{4}{5}$ or, $B = \frac{5}{4}A$

and, $B - (A + 5) = 3$ or, $B = A + 8$

$\therefore \quad \frac{5}{4}A = A + 8$

or, $A\left(\frac{5}{4} - 1\right) = 8$

$\therefore \quad A = 32$ years

and, $B = \frac{5}{4} \times 32 = 40$ years

$\therefore \quad A + B = 40 + 32 = 72$ years.

46. (*a*) Let son's age (in years) = x and father's age (in years) = y

Given: $2x + y = 70$ and, $x + 2y = 95$

Solving for y, we get $y = 40$.

47. (*d*) Vimal's present age = 8 + 2 = 10

Father's age after 10 years = (10 + 10) × 2 = 40 years

Father's present age = 40 – 10 = 30 years

$\therefore$ Sneh's present age = $-\times 30$ = 5 years.

48. (*b*) Let the present age be x years.

Then, 125% of $(x - 10) = x$

and, $83\frac{1}{3}\%$ of $(x + 10) = x$

$\therefore \quad 125\%$ of $(x - 10) = 83\frac{1}{3}\%$ of $(x + 10)$

or, $\frac{5}{4}(x - 10) = \frac{5}{6}(x + 10)$

or, $\frac{5}{4}x - \frac{5}{6}x = \frac{50}{6} + \frac{50}{4}$

or, $\frac{5x}{12} = \frac{250}{12}$

or, $x = 50$ years.

49. (*d*) Let age of 3 girls = x

$\therefore$ Age of person = $4x + 8$

Also $2(x + 24) = 4x + 8$

$\therefore \quad x = 20$

$\therefore$ Age of person = $4x = 4 \times 20 = 80$ years.

50. (*c*) Let age of Mr. Chetan in 2002 be x.

Then, his birth years = $2002 - x$

According to question, $x = \frac{2002 - x}{90} \Rightarrow x = 22$

So, his age in 2006 = 22 + 4 = 26.

51. (*b*) Let the present age of Rohit be x years

Then, given: $x + 15 = 4(x - 15) \Rightarrow x = 25$.

52. (*c*) Let Mohan's present age be x years and Ram's present age be y years.

Then, according to the first condition,

$x - 10 = 3(y - 10)$

or, $x - 3y = -20$ (1)

Now, Mohan's age after 10 years

$= (x + 10)$ years

Ram's age after 10 years = $(y + 10)$

$\therefore \quad (x + 10) = 2(y + 10)$

or, $x - 2y = 10$ (2)

Solving Eqs. (1) and (2), we get

$x = 70$ and $y = 30$

$\therefore$ Mohan's age = 70 years and Ram's age = 30 years.

53. (*d*) Let the ages of *P*, *Q* and R be x, y and z years, respectively.

According to the question,

$x + 2y + z = 59$ (1)

$3x + y + 3z = 68$ (2)

$x + 3y + 3z = 108$ (3)

On multiplying Eq. (2) by 3 and subtracting from Eq. (3) we get

$8x = 96 \quad \Rightarrow \quad x = 12$ years

$\therefore$ Age of P = 12 years.

54. (*b*) Let the present age of Shyam be x years.

$\therefore$ Age of Shyam's grandson Anup $= \frac{x - 6}{18}$ years

According to the question,

Age of Anup = Age of Mahesh –2 years = 5 – 2 = 3 years

$\Rightarrow \quad \frac{x - 6}{18} = 3$

$\therefore x = 60$ years

55. (*d*) According to the question,

Present age of Parineeta = 33 – 9 = 24 years

Present age of Manisha = 24 – 9 = 15 years

Present age of Deepali = 24 + 15 = 39 years

$\because \quad 5:X = 15:39$

$\therefore \quad X = \dfrac{5 \times 39}{15} = 13$

56. (*b*) Let the present age of father = x year and Son's present age = y years.

5 year ago, father's age = $x - 5$ and

Son's age = $y - 5$

According to the question,

$x - 5 = 5(y - 5)$ (1)

and $x = 3y$ (2)

$\therefore$ From Eqn (1) and (2), we have

$y = 10$ and $x = 30$ year.

Hence, father's present age = 30 years.

DIFFICULTY LEVEL-2

1. (*c*) Let the initial average age of the class be x years. Then, from the conditions given, the age of the new boy and the teacher is x and $8 + 2x$ years respectively.

$\therefore \quad \dfrac{15x + 8 + 3x}{17} = 1.1x \Rightarrow x = 11.4$ years.

2. (*b*) Let the present age of the persons be y years. The given data can be written as:

$(y + k) = \dfrac{1}{2}(y + k)$ and (1)

$(y + p) = 3(y - p)$ (2)

From Eq. (1), $\dfrac{y + k}{y - k} = \dfrac{2}{1}$

$\Rightarrow \quad \dfrac{y}{k} = \dfrac{3}{1}$ (3)

(by componendo and dividendo)

From Eq. (2), $\dfrac{y + p}{y - k} = \dfrac{3}{1}$;

$\Rightarrow \quad \dfrac{y}{p} = \dfrac{4}{2} = 2$ (4)

Dividing Eq. (4) by Eq. (3), x

3. (*c*) 10 years age, total age of 8 members = 231. After there years, sum of the ages = $231 + 8 \times 3 - 60 = 195$

There more years later sum of ages

$= 198 + 8 \times 3 - 60 = 169$

Current average age = $\dfrac{191}{8} \approx 24$ years.

4. (*a*)

5. (*c*) Given $F = M + 5, M = 3D, D = 10.$

$\therefore \quad M = 3 \times 10 = 30$ and $F = 30 + 5 = 35.$

$\therefore$ The father's age when daughter was born = 35 – 10 = 25 years.

6. (*a*) Total age of the mother and six children = $12 \times 7 = 84$ years.

Total age of six children = $7 \times 6 = 42$ years.

$\therefore$ Mother is 42 years old.

7. (*a*) Let the present age of father be x years and the present age of son be y years.

$\therefore \quad x = 3y$ (1)

Also, $(x + 20) = (y + 20 + 20)$ (2)

Solving Eqs. (1) and (2), we get

$x = 30$ years.

8. (*b*)

9. (*c*) Let Mr Sohanlal's age (in years) = x

and his son's age = y

Then, $x - 5 = 3(y - 5)$

i.e., $x - 3y + 10 = 0$

and, $x + 10 = 2(y + 10)$

i.e., $x - 2y - 10 = 0$

Solving the two equations, we get

$x = 50, y = 20$

10. (*c*) $\dfrac{R - 6}{18} = A$

Given Mahesh = 5 years

$\therefore \quad$ Anup = 3 years

$\therefore \quad R = 18 \times 3 + 6 = 60$ years.

11. (*c*) Let the ages of two sisters be x and y.

$\dfrac{x}{y + 1} = \dfrac{0.5}{1}$

$\Rightarrow \quad 2x = y + 1$ (1)

and, $\dfrac{x - 2}{y} = \dfrac{1}{3}$

$\Rightarrow \quad 3x - 6 = y$ (2)

From Eqs. (1) and (2),

$x = 5$ and $y = 9$

So, their ages are 9 years and 5 years.

12. (*c*) Let the age of boy be x years.

$\therefore \quad 2x^2 - 25x = 3 \times 14$

$\Rightarrow 2x^2 - 25x - 42 = 0$

$$\therefore \qquad x = \frac{25 \pm \sqrt{625 + 336}}{2 \times 2}$$

$$= \frac{25 \pm \sqrt{961}}{4} = \frac{25 \pm 31}{4}$$

$$x = \frac{25 + 31}{4} = \frac{56}{4} = 14 \text{years}.$$

13. (*c*) Total age, $28 \times 11 = 308$

$3 \times 25 = 75$

$3 \times 28 = 84$

$3 \times 30 = 90$

$\overline{249}$

Total age of a group = 75 + 84 + 90 = 249

Difference of captain and youngest players = 308 – 249 = 59

$x - y = 11$

$x + y = 59$

$\overline{2x = 70}$

$x = 35$

$\therefore$ Captain age = 35 Years.

14. (*c*) According to question

$$\frac{x \times 40 + 12 \times 32}{x + 12} = 36$$

$$\Rightarrow \qquad x = 12.$$

15. (*a*) The man was born between 1800 and 1850 and he was x years old in the years x^2.

Now, we can conclude that the years, when he was x years old must be a perfect square. Now, the only perfect square in between 1800 and 1900 is 1849, i.e., 43^2. So, he was 43 years old in the years 1849, which means he was born in (1849 – 43) = 1806.

16. (*b*) Let the Bina's present age = x and Arti's present age = y

Then $(x - 5) = 3(y - 5)$

$$x - 5 = 3y - 15 \qquad (1)$$

Again, $x - 10 = \frac{1}{2}(c - 10)$

$$x = \frac{1}{2}(c - 10) + 10 \qquad (2)$$

On putting value of x in Eq. (1)

$$\frac{1}{2}(c - 10) + 10 - 5 = 3y - 15$$

$$\Rightarrow \qquad \frac{c - 10 + 10}{2} + 15 = 3y$$

$$\Rightarrow \qquad \frac{c}{2} + 15 = 3y$$

$$\Rightarrow \qquad y = \frac{c}{6} + 5.$$

17. (*b*) Suppose that age of age of elder sister be x years and younger sister be y years. Then,

$$\frac{y}{x+1} = \frac{0.5}{1} = \frac{1}{2}$$

$$\Rightarrow \qquad 2y = x + 1$$

$$\Rightarrow \qquad x - 2y = -1 \qquad (1)$$

Again given, $\frac{y-2}{x} = \frac{1}{3}$

$$\Rightarrow \qquad 3y - 6 = x$$

$$\Rightarrow \qquad x - 3y = -6 \qquad (2)$$

After subtracting Eq. (2) from Eq. (1), we get

$$y = 5$$

Put this value in Eq. (1), we have

$$x - 10 = -1 \Rightarrow x = 10 - 1$$

$$x = 9$$

So, the age of younger sister is 5 years.

18. (*b*) Suppose that age of two colleagues be x years and y years.

By question,

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

$$\Rightarrow \qquad \frac{y + x}{xy} = 5\left(\frac{y - x}{xy}\right)$$

$$\Rightarrow \qquad y + x = 5y - 5x$$

$$\Rightarrow \qquad 6x - 4y = 0$$

$$\Rightarrow \qquad 3x - 2y = 0$$

$$\therefore \qquad y = \frac{3}{2}x \qquad (1)$$

Again by question

$$\frac{xy}{x+y} = \frac{14.4}{1}$$

$$= \frac{144}{10}$$

$$\Rightarrow \qquad \frac{xy}{x+y} = \frac{72}{5}$$

$$\Rightarrow \qquad 5xy = 72\,(x + y) \qquad (1)$$

By Eq. (1), put $y = \frac{3}{2}x$, we have

$$5x \cdot \frac{3}{2}x = 72\left(x + \frac{3}{2}x\right)$$

$$\Rightarrow \quad \frac{15}{2}x^2 = 72 \times \frac{5}{2}x$$

$$\Rightarrow \quad x = \frac{72 \times 5}{15} = 24 \text{ years}$$

i.e., age of one of colleagues lies between 23 and 26 years.

19. (*a*) Let Ram's age = x years

So, Mohan's age = $(x + 16)$ years

Also, $3(x - 6) = x + 16 - 6$ or, $x = 14$

$\therefore$ Ram's age = 14 years

and, Mohan's age = 14 + 16 = 30 years.

20. (d) Total age of eight people 10 years ago = 231 years

Total age of eight people 7 yr ago = $231 + 8 \times 3 - 60 + 0 = 195$.

Total age of eight people 4 yr ago = $195 + 3 \times 8 - 60 + 0 = 159$.

Current total age of eight people = $159 + 4 \times 8 = 191$ years

$\therefore$ Average age = $\frac{191}{8} = 24$ years (approximately).