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Important Concept 1a 🚀

If a person completes a work in ‘n’ days

then work done in 1 day = $\frac{1}{n}$ part of the work.

Important Concept 1b 🚀

Unit of work.

Total work done by n person in m days = mn

5 person 10 days = 5 × 10

= 50

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Important Concept 2 🚀

Total work done is usually considered as ONE unit.

Important Concept 3 🚀

If M_1 persons can do W_1 work in D_1 days and M_2 persons can do W_2 work in D_2 days then,

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

Important Concept 4 🚀

If M_1 persons can do W_1 work in D_1 days working T_1 hours per day and M_2 persons can do W_2 work in D_2 days working T_2 hours per day then,

$$\frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$$

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Important Concept 5 🚀

If A can do a work in x days and B can do it work in y days the A and B working together can do same work in

$$\frac{xy}{x+y}\ days$$

Important Concept 6a 🚀

If A, B, C can do a piece of work in x, y and z days respectively, then all of them working together can do it in

$$\frac{xyz}{xy + yz + xz}\ days$$

Important Concept 6b 🚀

If A and B can do a work in x days, B and C can do it in y days and A and C can do it in z days, then all of them working together can do it in

$$\frac{2xyz}{xy + yz + xz}\ days$$

Important Concept 6c

$$\left[\frac{xyz}{xy+yz+xz}\right]$$ DAYS.

x y z

If A, B, C can do a piece of work in x, y and z days respectively, the contract of the work is for Rs. r then

$$Share\ of\ A = Rs.\frac{ryz}{xy+yz+xz}$$

$$Share\ of\ B = Rs.\frac{rxz}{xy+yz+xz}$$

$$Share\ of\ C = Rs.\frac{rxy}{xy+yz+xz}$$

Important Concept 6d 🚀

If A can do a work in x days. With help of B, A can do it in y days. If they get Rs.a for the work, then

$$Share\ of\ A = \frac{ay}{x}$$

$$Share\ of\ B = \frac{a(x-y)}{x}$$

Important Concept 7a 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

A and B working together can finish the work in

$$\frac{kn}{k^2 - 1} \; days$$

Important Concept 7b 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

A working alone can finish work in

$$\frac{n}{k-1}\ days$$

Important Concept 7c 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

B working alone can finish work in

$$\frac{kn}{k-1}\ days$$

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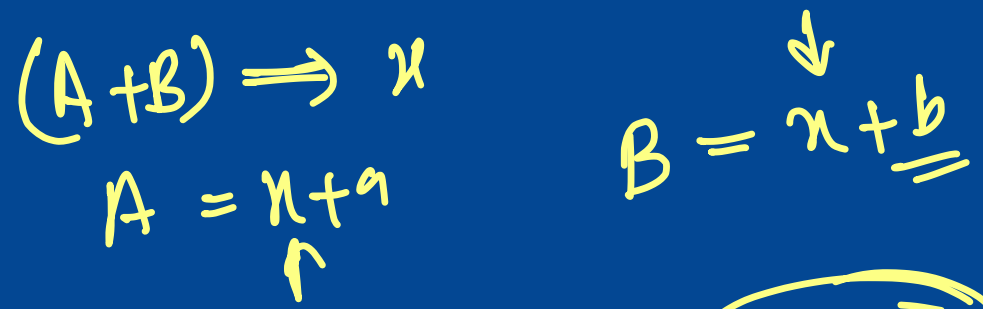
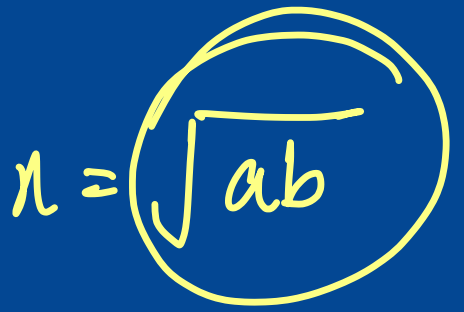
Important Concept 8 🚀





If A working alone takes 'a' days more than A and B working together. B alone takes 'b' days more than A and B working together. Then number of days taken by A and B working together to finish the job is $\sqrt{ab}$

Important Concept 9 🚀

If A and B can complete a work in x days and A alone can finish in y days, then number of days required by B to complete the work alone will be $\frac{xy}{y-x}$ days.

A — x
B - y
$A+B = \frac{xy}{x+y}$

Important Concept 10a 🚀

A can do a work in d_1 days and B can do same work in d_2 days, the the ratio of the wages of A and B are:

A's Share : B's Share = $\frac{1}{d_1} : \frac{1}{d_2} = d_2 : d_1$

Important Concept 10b

A can do a work in d_1 days and B can do same work in d_2 days and C can do it in d_3 days, the the ratio of the wages of A, B, and C are:

A's Share : B's Share: C's Share = $\frac{1}{d_1} : \frac{1}{d_2} : \frac{1}{d_3} = d_2d_3 : d_1d_3 : d_1d_2$

$d_2d_3 : d_1d_3 : d_1d_2$

20 30 60

1. A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

A. 12 days
B. 15 days
C. 16 days
D. 18 days

B

WD by A in 1 day $= \frac{1}{20}$

2 days $= 2 \times \frac{1}{20_{10}} = \boxed{\frac{1}{10}}$

WD by A, B, C in 1 day $= \frac{1}{20} + \frac{1}{30} + \frac{1}{60}$

$= \frac{3+2+1}{60} = \frac{6}{60}$

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

Total WD in 3 days $= \frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \boxed{\frac{1}{5}}$ 3 days.

Total work can be done in $3 \times 5 = 15$ days.

15 20

2. A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is :

A. 1/4
B. 1/10
C. 7/15
D. 8/15

D

WD by A & B in one day $= \frac{1}{15} + \frac{1}{20}$

$= \frac{20+15}{15 \times 20} = \frac{35}{300} = \frac{7}{60}$

Complete Work = 1 unit

(A+B) one day $= \boxed{\frac{7}{60}}$

Left out $= 1 - \frac{7}{15} = \frac{15-7}{15}$

$= \frac{8}{15}$

4 days $= \frac{7 \times 4}{60_{15}} = \boxed{\frac{7}{15}}$

6 days. 8 days

3. A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs. 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?

A. Rs. 375
B. Rs. 400
C. Rs. 600
D. Rs. 800

A - d_1
B - d_2
C - d_3

(A+B+C) = 3 days.

WD by (A+B+C) in one day = $\left(\frac{1}{3}\right)$

WD by A in one day = $\frac{1}{6}$

B in one day = $\frac{1}{8}$

C in one day = $\frac{1}{3} - \left(\frac{1}{6} + \frac{1}{8}\right) = \frac{1}{3} - \frac{14}{48}$

$= \frac{48 - 42}{3 \times 48} = \frac{6}{3 \times 48_{24}} = \frac{1}{24}$

Days req. by C = 24

$\frac{1}{d_1} : \frac{1}{d_2} : \frac{1}{d_3} = \frac{1}{6} : \frac{1}{8} : \frac{1}{24}$

$= 4 : 3 : 1$

$\frac{3200}{400} \times \frac{1}{8}$

$= 400$

Total Work = 14 × 18 = 252 units.

4. Fourteen persons can do a work in 18 days. After 5 days of work, 6 workers left the work, and joined back on the last day of the work. In how many days the work got completed?

A. 24
B. 12
C. 21
D. 27

D

WD by 14 people = 14 × (5+1) = 14 × 6
= 84 units.

Remaining work = 252 − 84 = 168 units

Remaining people = 8

More day req. = $\frac{168}{8}$ = 21 days

27 days

16 days.

$M_1D_1 = M_2D_2$

5. 4 men and 5 women can complete a work in 15 days, whereas 9 men and 6 women can do it in 10 days. To complete the same work in 7 days, how many women should assist 4 men?

A. 11
B. 14
C. 12
D. 13

$(4M + 5W) \times 15 = (9M + 6W) \times 10$

$60M + 75W = 90M + 60W$

$75W - 60W = 90M - 60M$

$15W = 30M$

$\frac{W}{M} = \frac{30}{15} = \frac{2}{1}$

$\boxed{\frac{W}{M} = \frac{2}{1}}$

Work unit

$= (4 \times 1 + 5 \times 2) \times 15$

$= (4 + 10) \times 15 = 14 \times 15 = 210$

$30 = 4 + x_2$

$26 = x_2$

$x = 26/2 = 13$

$210 = (4M + xW) \times 7 = (4 + x_2) \times 7$

x_1

$\frac{210}{7} = 4 + x_2$

6 12

5. A and B can separately do a work in 6 days and 12 days respectively. How long will it take for them to do it together?

A. 9 days
B. 18 days
C. 4 days
D. 6 days

$$\frac{xy}{x+y} = \frac{6 \times 12}{18} = 4$$

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14

6. A can do a piece of work in 14 days which B can do in 21 days. They begin together but 3 days before the completion of the work, A leaves off. The total number of days to complete the work is

A. $6\frac{3}{5}$

B. $8\frac{1}{2}$

C. $10\frac{1}{5}$

D. $13\frac{1}{2}$

WD by A in 1 day = $\frac{1}{14}$

WD by B in 1 day = $\frac{1}{21}$

WD by (A+B) in 1 day = $\frac{1}{14}+\frac{1}{21}$

$= \frac{21+14}{14\times21} = \frac{35}{294} = \frac{5}{42}$

WD by B in 3 day = $3\times\frac{1}{21} = \frac{1}{7}$

Remaining = $1-\frac{1}{7} = \frac{6}{7}$

$\frac{6}{7}\times\frac{42}{5} = \frac{36}{5} = 7\frac{1}{5}+3 = 10\frac{1}{5}$

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P T D

7. If 20 men working 7h a day can do apiece of work in 10 days, in how many days will 15 men working for 8h a day do the same piece of work?

A. $15\frac{5}{21}$ days

B. $11\frac{2}{3}$ days

C. $6\frac{9}{16}$ days

D. $4\frac{1}{5}$ days

B

$11\frac{2}{3}$

$\frac{35}{3}$

$\frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$

$20 \times 7 \times 10 = 15 \times 8 \times D_2$

$\frac{20 \times 7 \times 10^{5}}{3 \cancel{15} \times \cancel{8}_{4}} = D_2$

8. If A and B can complete a piece of work in 15 days and B alone in 20 days. In how many days can A alone complete the work?

A. 60
B. 45
C. 40
D. 5

A

$(A+B) = 15$ days x

$B = 20$ days y

$$\frac{xy}{y-x} = \frac{15 \times 20}{20-15} = \frac{15 \times 20}{5} = 60$$

$A = 25$ days - 1 $(A+B) = 15$ days. (x)

9. A does 80% of a work in 20 days. He then calls in B and they together finish the remaining work in 3 days. How long B alone would take to do the whole work?

A. 23 days
B. ~~37 days~~
C. 37 ½ days
D. 40 days

$B = ?$

$\frac{4}{5}$ [80% → 20 days
100% → 25 days.] (A)

(C)

(A+B)

[20% → 3 days.
100% → 3 × 5 = 15 days]

$$\frac{xy}{y-x} = \frac{15 \times 25}{10} = \frac{375}{10} = 37.5$$

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10. 5 men can prepare 10 toys in 6 days working 6 hours a day. Then in how many days can 12 men can prepare 16 toys working 8 hours daily?

A. ~~5 days~~
B. 3 days
C. 4 days
D. 6 days
E. None

B

W_1 W_2

$$\frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$$

$$\frac{5 \times 6 \times 6}{10 \times 6} = \frac{12 \times D_2 \times 8}{16 \times 6}$$

$$\frac{30}{10} = 3$$

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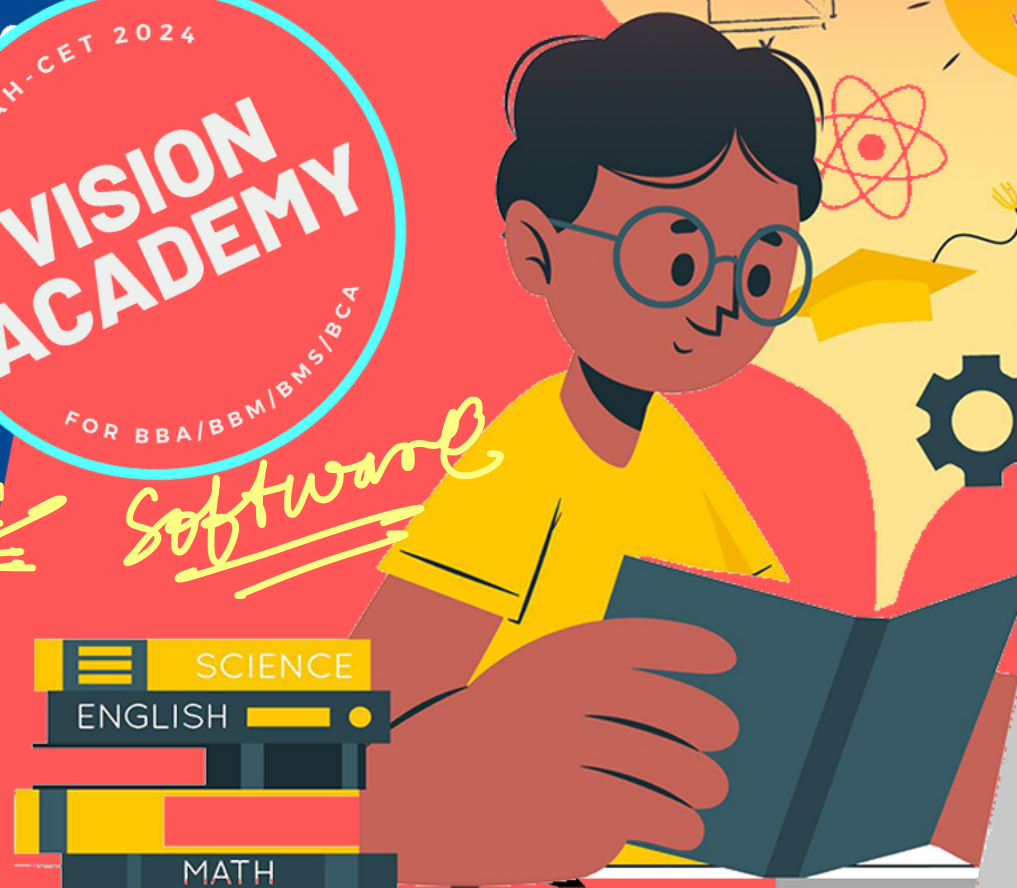

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