Directions (1-2): Study the following graph carefully and answer the given questions.

The graph shows the percentage of literate population of three different villages in three different years.

1) In village B, total population in the year 2003, 2008 and 2013 ratio is 2: 3: 5 and the average population of total literates in 2003, 2008 and 2013 is 1700. Find the population of B in the year 2008?
   a) 4500
   b) 5000
   c) 3000
   d) 1500
   e) 3600

2) In village C, number of literates in the year 2003 is 600 less than 2008 and the number of literates in the year 2012 is 200 more than 2003. Find the total population of C in the year 2008 if the total literate in the year 2003, 2008 and 2013 in village C is 9800?
   a) 8000
   b) 6000
   c) 5000
   d) 9000
   e) 6400
Directions (3-5): Study the following graph carefully and answer the given questions.
The line graph shows the percentage of expenditure of five different persons in two different months.

Monthly income = Monthly Expenditure + Monthly savings

3) What is the monthly income of A in the month of November?
   Statement I: The difference between monthly savings of A in November and April is 20% of A’s monthly income in April
   Statement II: Monthly savings of B in November is 40% of monthly savings of A in April
   a) Statement I is sufficient to answer the question.
   b) Statement II is sufficient to answer the question.
   c) Either Statement I or statement II is sufficient to answer the question.
   d) Neither Statement I nor statement II is sufficient to answer the question.
   e) Both Statements I and II are necessary to answer the question.

4) Find the difference between the monthly income of C in April and November
   Statement I: The difference between the monthly savings of C in April and November is 12000.
   Statement II: The difference between the monthly expenditure of C in April and November is 10000.
   a) Statement I is sufficient to answer the question.
   b) Statement II is sufficient to answer the question.
   c) Either Statement I or statement II is sufficient to answer the question.
   d) Neither Statement I nor statement II is sufficient to answer the question.
   e) Both Statements I and II are necessary to answer the question.

5) If D spends 30% of monthly income in November in mutual funds, then find the amount spent by D in November in mutual funds
   Statement I: D’s income in November is 30% more than the C’s income in April.
   Statement II: C’s monthly savings in April is Rs.4800 which is 40% of his monthly income.
   a) Statement I is sufficient to answer the question.
b) Statement II is sufficient to answer the question.
c) Either Statement I or statement II is sufficient to answer the question.
d) Neither Statement I nor statement II is sufficient to answer the question.
e) Both Statements I and II are necessary to answer the question.

Directions (6-8): Read the following passage carefully and answer the given questions
There is an apartment with 40 flats, the water supply (24 hours) to the apartment is provided from the nearby reservoir which has a capacity of 60000 litres. The reservoir gets only filled when it becomes fully empty.
In November: 50% of flats were occupied and each flat uses 25 litres/hr. If the tank was empty at the starting of the month, then the reservoir should be filled (A) times in the end of November.
In December: 75% of the flats were occupied and 100 hrs taken to fill the tank for the entire month. The rate of tank filled per hour in November is (B) percentage more than the rate of tank filled per hour in December.
In January: Each flat consumed same amount of litres per hour in December and takes 125 hrs totally. In January, (C) flats were occupied.
Note: The vacant flats never use any quantity of water.

6) Find the in the place of (A)
a) 4  b) 5  c) 6  d) 3  e) 8

7) Find the in the place of (B)
a) 20%  b) 24%  c) 30%  d) 25%  e) 28%

8) Find the in the place of (C)
a) 20  b) 16  c) 24  d) 30  e) 28

Directions (9-10): Each question contains a statement followed by Quantity I, II and III. Read the information clearly and answer your questions accordingly. The options represent the relations between these three quantities
A) >
B) <
C) =
D) ≤
E) ≥
For example:
Quantity I = 200
Quantity II = 300
Quantity III = 100
Hence, Quantity I < Quantity II > Quantity III
a) A, B
b) B, C
c) B, A
d) E, B
e) B, D
9) **Quantity I**: Value of P, If the interest received by Ram invested Rs. P in simple interest for 2 years at the rate of R% per annum is 20 less than the interest received by him the same sum invested him in simple interest for 2 years at the rate of (R+5)% per annum.

**Quantity II**: Value of Q, If Shyam invested Rs. Q in compound interest for two years at the rate of 10% per annum is 68 less than the compound interest received by him invested the sum of Rs.250 for 2 years at the rate of 20% per annum compounded annually.

**Quantity III**: Value of R, If Ram invested Rs. R in simple interest for 2 years at the rate of 10% per annum and gets Rs.2.5 less interest than the interest received in the same sum invested in compound interest for same period at the same rate of interest

a) A), C)  
b) C), B)  
c) C), D)  
d) D), E)  
e) None of these

10) A and C together can do a piece of work in 24 days. B and C together can do the same work in 20 days. C can complete the same work in 60 days. After A has worked for 10 days, and then B for 10 days, time taken by C to complete the remaining job is x days.

**Quantity I**: Kalai alone can do the same of work in x days and Manoj can do the same work in (x-5) days. Find the number of days taken by Kalai and Manoj together complete the whole work

**Quantity II**: Pavi can do the same work in 30 days and Ravi can do the same work in (x+5) days. Find the number of days taken by Pavi and Ravi together complete the whole work

**Quantity III**: Value of x

a) B), C)  
b) C), D)  
c) A), B)  
d) B), B)  
e) E), A)

11) In a mixture 200 litres of milk and 40 litres of water. _____ litres of mixture is drawn and _____ litres of pure water is added, the milk in the mixture is 124 litres more than the water.

Which of the following options satisfies the two blanks in the question?

A) 36, 12  
B) 24, 8  
C) 18, 20  
D) 12, 6

a) Only B)  
b) Only C)  
c) Only A)  
d) Only D)  
e) Only B) and C)
12) Marked price of an article is 60% more than the cost price. A shopkeeper allows X% discount and earns ___% profit, if a shopkeeper allows 2X% discount and earns ___% profit.
Which of the following options satisfies the two blanks in the question?
A) 44, 28
B) 36, 12
C) 30, 16
D) 20, 12
a) Only B)
b) Only A), B)
c) Only C)
d) Only D)
e) Only A)

13) Viraj travels at (S+10) km/hr and takes (T-1) hrs to cover D km. If he travels (S-20) km/hr and takes (T+5) hrs to cover D km and also he travels (S-15) km/hr and takes (T+3) hrs to cover D km.
From the statement given in the above question which of the following can be determined.
A) Value of T
B) Value of S
C) Find the distance covered by a man if he travels at (S+10) km/hr and takes (T+2) hrs
D) Value of D
a) Only A) and B)
b) Only C) and D)
c) All A), B), C) and D)
d) Only A) and D)
e) None

14) Two trains, Train A and Train B crosses each other completely in 18 sec while travelling in opposite directions, speed of train A is 72 km/hr and speed of train B is 54 km/hr. Length of train A is 170 m less than the train B.
From the statement given in the above question which of the following can be determined.
A) Length of train A
B) Length of train B
C) Time taken by train B to cross a 130 m length of bridge
D) Time taken by train A to cross a 70 m pole
a) All A), B), C) and D)
b) Only B) and C)
c) Only D) and B)
d) Only A
 e) Only C

15) A’s investment is half of B’s investment. After 4 months B left and C joins with X amount in the business (not the same month). If profit of A and C is same
B’s initial investment is Rs.2400 which of the following will be value of x?

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Solutions:

1) Answer: C
Total population of village B in the year 2003, 2008 and 2013 is 2x, 3x and 5x.
According to the question,
\[ \frac{2x \times 50/100 + 3x \times 70/100 + 5x \times 40/100}{3} = 1700 \]
\[ x + 21x/10 + 2x = 5100 \]
\[ 10x + 21x + 20x = 51000 \]
\[ 51x = 51000 \]
\[ x=1000 \]
Total population in village B in the year 2008 = 3*1000 = 3000

2) Answer: D
Let us take total literate population in the year 2003 be x
According to the question,
\[ (x+x+600+x+200) = 9800 \]
\[ 3x + 800 = 9800 \]
\[ 3x = 9000 \]
\[ x=3000 \]
Total literate population of village C in the year 2008 = x+600
= 3000 + 600 = 3600
Total population in village C in the year 2008 = 3600/40 * 100 = 9000

3) Answer: D
Statement I:
The difference between monthly savings of A in November and April is 20% of A’s monthly income in April
Monthly income of A in April be Rs. a
Monthly income of A in November be Rs. b
Monthly savings of A in April = a*70/100 = 7a/10
Monthly savings of A in November = b*40/100 = 4b/10
\[ (7a/10 – 4b/10) = 20/100 * a \]
Statement II:
Monthly savings of B in November is 40% of monthly savings of A in April  
Monthly income of A in April be Rs. a  
Monthly income of B in November be Rs. c  
Monthly savings of A in April = a*70/100 = 7a/10  
Monthly savings of B in November = 40/100 * 7a/100  
From the statement I and II, we cannot find the answer of the given question.

4) Answer: E  
Monthly income of C in April be Rs. x  
Monthly income of C in November be Rs. y  
Monthly expenditure of C in April = x*60/100  
Monthly savings of C in April = x*40/100  
Monthly expenditure of C in November = y*75/100  
Monthly expenditure of C in November = y*25/100  
**Statement I:** The difference between the monthly savings of C in April and November is 12000.  
X*40/100 – y*25/100 = 12000  
40x – 25y = 1200000 --- (1)  
**Statement II:** The difference between the monthly expenditure of C in April and November is 10000.  
X*60/100 – y * 75/100 = 10000  
60x – 75y = 1000000 ---- (2)  
From the statement I and II, we can find the monthly income of C in April and November.

5) Answer: E  
**Statement I:** D’s income in November is 30% more than the C’s income in April.  
D’s income in November = 130/100 * C’s income in April  
**Statement II:** C’s monthly savings in April is Rs.4800 which is 40% of his monthly income.  
C’s monthly savings in April = 4800  
C’s monthly income in April = 4800/40 * 100 = 12000  
From Statement I and II, we can find the savings of D in November

**Directions (6-8):**

**November:**
Number of flats occupied = 50/100 * 40 = 20 flats
Total litres filled the reservoir per day in each flat = 25 * 24 = 600
Total litres filled the reservoir per day in 20 flats = 600 * 20 = 12000
Total litres filled the reservoir in one month in 20 flats = 12000 * 30 = 360000
Number of times the reservoir filled at the end of one month = 360000/60000 = 6 times

**December:**
Number of flats occupied = 75/100 * 40 = 30 flats
Total litres filled the reservoir per hour in 30 flats = 60000/100 = 600 litres
Rate of the litres filled per hour in each flat = 600/30 = 20 litres/hr
Required percentage = \((25-20)/20 \times 100\)  
= \(5/20 \times 100 = 25\%\)

January:
Rate of the litres filled per hour in each flat = 20 litres/hr  
Total litres filled the reservoir per hour in x flats = \(60000/125 = 480\) litres/hr  
Number of flats occupied in January = \(480/20 = 24\) flats  

6) Answer: C  
Number of times the reservoir filled at the end of one month = **6 times**

7) Answer: D  
Required percentage = **25\%**

8) Answer: C  
Number of flats occupied in January = 24 flats

9) Answer: B  
**Quantity I:** Value of P, If the interest received by Ram invested Rs.P in simple interest for 2 years at the rate of R\% per annum is 20 less than the interest received by him the same sum invested him in simple interest for 2 years at the rate of (R+5)\% per annum.

According to the question,
\[(P*(R+5)*2/100) - (P*2*R/100) = 20\]
\[2PR + 10P – 2PR = 2000\]
\[10P = 2000\]
\[P = 200\]

**Quantity II:** Value of Q, If Shyam invested Rs. Q in compound interest for two years at the rate of 10\% per annum is 68 less than the compound interest received by him invested the sum of Rs.250 for 2 years at the rate of 20\% per annum compounded annually.

According to the question,
Compound interest received by him in 2\(^{nd}\) case = \(250 \times 44/100 = 110\)
Compound interest received by him in 1\(^{st}\) case = \(110 – 68 = 42\)
Amount invested by Shyam = \((42/21)*100 = 200\)

**Quantity III:** Value of R, If Ramu invested Rs. R in simple interest for 2 years at the rate of 10\% per annum and gets Rs.2.5 less interest than the interest received in the same sum invested in compound interest for same period at the same rate of interest.

According to the question,
Difference between SI and CI for 2 years = \(P*(R/100)^2\)
\[2.5 = P \times (10/100)^2\]
\[2.5*100 = P\]
\[P = 250\]

Hence, Quantity I = Quantity II < Quantity III  
Answer is (C), (B)

10) Answer: D
A alone complete a work = $1/24 = (5-2)/120 = 3/120 = 1/40$
B alone completes the work = $1/20 = 4/120 = 1/30$
LCM of 40, 30 and 60 = 120
Total work = 120 units
A = 3 units per day
B = 4 units per day
C = 2 units per day
A’s 10 days work = 10*3 = 30 units
B’s 10 days work = 10*4= 40 units
Remaining = 120 –(30+40) = 50 units
Remaining units completed by C alone = 50/2 = 25 days

Quantity I: Kalai alone can do the same of work in x days and Manoj can do the same work in (x-5) days. Find the number of days taken by Kalai and Manoj together complete the whole work
Required number of days = $1/25 + 1/20 = 9/100$ => 100/9 days

Quantity II: Pavi can do the same work in 30 days and Ravi can do the same work in (x+5) days. Find the number of days taken by Pavi and Ravi together complete the whole work
Required number of days = $1/30 + 1/30 = 1/15$ => 15 days

Quantity III: Value of x
X= 25 days
Hence, Quantity I < Quantity II < Quantity III
Answer is B, B)

11) Answer: C
Milk and water ratio initially = 200: 40 = 5: 1

Option (A):
36 litres of mixture is drawn and 12 litres of water added
According to the question,
Milk in the final solution = 200 – (36 * 5/6) = 170 litres
Water in the final solution = 40 – 36*1/6 + 12 = 46 litres
Difference of milk and water in final solution = 170 – 46 = 124 litres
This satisfies the given condition.

Option (B):
24 litres of mixture is drawn and 8 litres of water added
According to the question,
Milk in the final solution = 200 – (24 * 5/6) = 180 litres
Water in the final solution = 40 – (24*1/6) + 8 = 44 litres
Difference of milk and water in final solution = 180 – 44 = 136 litres
This not satisfies the given condition.

Option (C):
18 litres of mixture is drawn and 20 litres of water added
According to the question,
Milk in the final solution = 200 – (18 * 5/6) = 185 litres
Water in the final solution = 40 – (18*1/6) + 20 = 57 litres
Difference of milk and water in final solution = 185 – 57 = 128 litres
This not satisfies the given condition.

Option (D):
12 litres of mixture is drawn and 6 litres of water added
According to the question,
Milk in the final solution = 200 – 12 * 5/6 = 190 litres
Water in the final solution = 40 – 12*1/6 + 6 = 44 litres
Difference of milk and water in final solution = 190 – 44 = 146 litres
This not satisfies the given condition.

12) Answer: B

Cost price = 100
Marked price = 160

Option (A):
1st case:
SP = 100 + 44/100 * 100 = 144
Discount percentage = (160-144)/160 * 100 = 10%
2nd case:
SP = 100 + 28/100 * 100 = 128
Discount percentage = (160 - 128)/160 * 100 = 20%
This satisfies the given condition

Option (B):
1st case:
SP = 100 + 36/100 * 100 = 136
Discount percentage = (160-136)/160 * 100
= 15%
2nd case:
SP = 100 + 12/100 * 100 = 112
Discount percentage = (160-112)/160 * 100
= 30%
This satisfies the given condition

Option (C):
1st case:
SP = 100 + 30/100 * 100 = 130
Discount percentage = (160-130)/160 * 100
= 18.75%
2nd case:
SP = 100 + 16/100 * 100 = 116
Discount percentage = (160-116)/160 * 100
= 27.5%
This is not satisfied the given condition

Option (D):
SP = 100 + 20/100 * 100 = 120
Discount percentage = (160-120)/160 * 100 = 25%

2nd case:
SP = 100 + 12/100 * 100 = 112
Discount percentage = (160-112)/160 * 100 = 30%
This is not satisfied the given condition

13) Answer: C
Let us take speed be s km/hr and time be t hrs and distance be d km
(s+10)*(t-1) = d
(st-s+10t-10) = st
10t - s = 10 ---- (1)
(s-20)*(t+5) = d
(st+5s-20t-100) = st
(5s-20t-100) = 0
S - 4t = 20 ---- (2)
(s-15)*(t+3) = d
(st-15t+3s-45) = st
(-15t+3s-45) = 0
S - 5t = 15 ---- (3)
Simplify any of the two equations, we get s = 40 km/hr and t = 5 hrs
Distance = 40 * 5 = 200 km
Hence, we can find all the options

14) Answer: A
Let us take the length of train A be x m and train B be (x+ 170) m
According to the question,
(x+x+170)/[(72+54)*5/18] = 18
2x + 170 = 18 * (126*5/18)
2x + 170 = 630
2x = 460
X = 230 m
Length of train A = 230 m and train B = 400 m
From that we can find all the given questions

15) Answer: E
A’s investment = ½ * B’s investment
A: B investment = 1: 2
According to the question,
Profit ratio = 1200 * 12: 2400 * 4 : x * (certain months)
C joined the business after certain months (not after 4 months)
So possible months invested by C in the business is 7, 6, 5, 4, 3, 2 and 1.

Profit of A and B is equal then the options should follow the condition,

\[ 1200 \times 12 / (x \times (7, 6, 5, 4, 3, 2, 1)) = 1/1 \]

\[ 1200 \times 12 / x = \text{possible months (7, 6, 5, 4, 3, 2 and 1)} \]

Option (A):
\[ (1200 \times 12) / 4800 = 3 \text{ months} \]
This satisfies the condition.

Option (B):
\[ (1200 \times 12) / 2400 = 6 \text{ months} \]
This satisfies the condition.

Option (C):
\[ (1200 \times 12) / 1800 = 8 \text{ months} \]
This is not satisfies the condition.

Option (D):
\[ (1200 \times 12) / 3600 = 4 \text{ months} \]
This satisfies the condition.