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NFL Math Aptitude Sample Paper 2016 PDF Download



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(1) A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in :

- [A] 8 days
- [B] 10 days
- [C] 12 days
- [D] 15 days

Answer : [C]

Explanation:

$$(A + B)\text{'s 1 day's work} = \left(\frac{1}{15} + \frac{1}{10}\right) = \frac{1}{6}$$

$$\text{Work done by A and B in 2 days} = \left(\frac{1}{6} \times 2\right) = \frac{1}{3}$$

$$\text{Remaining work} = \left(1 - \frac{1}{3}\right) = \frac{2}{3}$$

Now, $\frac{1}{15}$ work is done by A in 1 day.

$$\therefore \frac{2}{3} \text{ work will be done by a in } \left(15 \times \frac{2}{3}\right) = 10 \text{ days.}$$

Hence, the total time taken = $(10 + 2) = 12$ days.

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(2) A takes twice as much time as B or thrice as much time as C to finish a piece of work. Working together, they can finish the work in 2 days. B can do the work alone in:

- [A] 4 days
- [B] 6 days
- [C] 8 days
- [D] 12 days

Answer : [B]

Explanation:

Suppose A, B and C take x , $\frac{x}{2}$ and $\frac{x}{3}$ days respectively to finish the work.

$$\text{Then, } \left(\frac{1}{x} + \frac{2}{x} + \frac{3}{x}\right) = \frac{1}{2}$$

$$\Rightarrow \frac{6}{x} = \frac{1}{2}$$

$$\Rightarrow x = 12.$$

So, B takes $(12/2) = 6$ days to finish the work.

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(3) Twenty women can do a work in sixteen days. Sixteen men can complete the same work in fifteen days. What is the ratio between the capacity of a man and a woman?

- [A] 3 : 4
- [B] 4 : 3
- [C] 5 : 3
- [D] Data inadequate

Answer : [B]

Explanation:

(20×16) women can complete the work in 1 day.

$$\therefore 1 \text{ woman's 1 day's work} = \frac{1}{320}$$

(16 x 15) men can complete the work in 1 day.

$$\therefore 1 \text{ man's } 1 \text{ day's work} = \frac{1}{240}$$

$$\text{So, required ratio} = \frac{1}{240} : \frac{1}{320}$$

$$= \frac{1}{3} : \frac{1}{4}$$

$$= 4 : 3 \text{ (cross multiplied)}$$

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(4) A and B together can do a piece of work in 30 days. A having worked for 16 days, B finishes the remaining work alone in 44 days. In how many days shall B finish the whole work alone?

[A] 30 days

[B] 40 days

[C] 60 days

[D] 70 days

Answer : [C]

Explanation:

Let A's 1 day's work = x and B's 1 day's work = y .

$$\text{Then, } x + y = \frac{1}{30} \text{ and } 16x + 44y = 1.$$

$$\text{Solving these two equations, we get: } x = \frac{1}{60} \text{ and } y = \frac{1}{60}$$

$$\therefore \text{ B's } 1 \text{ day's work} = \frac{1}{60}.$$

Hence, B alone shall finish the whole work in 60 days.

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(5) A can finish a work in 24 days, B in 9 days and C in 12 days. B and C start the work but are forced to leave after 3 days. The remaining work was done by A in:

[A] 5 days

[B] 6 days

[C] 10 days

[D]

$10\frac{1}{2}$ days

Answer : [C]

Explanation:

$$\text{(B + C)'s } 1 \text{ day's work} = \left(\frac{1}{9} + \frac{1}{12} \right) = \frac{7}{36}$$

$$\text{Work done by B and C in 3 days} = \left(\frac{7}{36} \times 3 \right) = \frac{7}{12}$$

$$\text{Remaining work} = \left(1 - \frac{7}{12} \right) = \frac{5}{12}$$

Now, $\frac{1}{24}$ work is done by A in 1 day.

$$\text{So, } \frac{5}{12} \text{ work is done by A in } \left(24 \times \frac{5}{12} \right) = 10 \text{ days.}$$

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(6) What is the difference between the compound interests on Rs. 5000 for $1\frac{1}{2}$ years at 4% per annum compounded yearly and half-yearly?

[A] Rs. 2.04

[B] Rs. 3.06

[C] Rs. 4.80

[D] Rs. 8.30

Answer : [A]

Explanation:

$$\begin{aligned}\text{C.I. when interest compounded yearly} &= \text{Rs. } \left[5000 \times \left(1 + \frac{4}{100} \right) \times \left(1 + \frac{\frac{1}{2} \times 4}{100} \right) \right] \\ &= \text{Rs. } \left(5000 \times \frac{26}{25} \times \frac{51}{50} \right) \\ &= \text{Rs. } 5304.\end{aligned}$$

$$\begin{aligned}\text{C.I. when interest is compounded half-yearly} &= \text{Rs. } \left[5000 \times \left(1 + \frac{2}{100} \right)^3 \right] \\ &= \text{Rs. } \left(5000 \times \frac{51}{50} \times \frac{51}{50} \times \frac{51}{50} \right) \\ &= \text{Rs. } 5306.04\end{aligned}$$

$$\therefore \text{Difference} = \text{Rs. } (5306.04 - 5304) = \text{Rs. } 2.04$$

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(7) There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?

[A] Rs. 2160

[B] Rs. 3120

[C] Rs. 3972

[D] Rs. 6240

[E] None of these

Answer : [C]

Explanation:

Let P = Rs. 100. Then, S.I. Rs. 60 and T = 6 years.

$$\therefore R = \left(\frac{100 \times 60}{100 \times 6} \right) = 10\% \text{ p.a.}$$

Now, P = Rs. 12000. T = 3 years and R = 10% p.a.

$$\begin{aligned}\therefore \text{C.I.} &= \text{Rs. } \left[12000 \times \left\{ \left(1 + \frac{10}{100} \right)^3 - 1 \right\} \right] \\ &= \text{Rs. } \left(12000 \times \frac{331}{1000} \right) \\ &= 3972.\end{aligned}$$

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(8) A bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:

[A] Rs. 120

[B] Rs. 121

[C] Rs. 122

[D] Rs. 123

Answer : [B]

Explanation:

$$\begin{aligned}\text{Amount} &= \text{Rs.} \left[1600 \times \left(1 + \frac{5}{2 \times 100} \right)^2 + 1600 \times \left(1 + \frac{5}{2 \times 100} \right) \right] \\ &= \text{Rs.} \left[1600 \times \frac{41}{40} \times \frac{41}{40} + 1600 \times \frac{41}{40} \right] \\ &= \text{Rs.} \left[1600 \times \frac{41}{40} \left(\frac{41}{40} + 1 \right) \right] \\ &= \text{Rs.} \left[\frac{1600 \times 41 \times 81}{40 \times 40} \right] \\ &= \text{Rs.} 3321.\end{aligned}$$

\therefore C.I. = Rs. (3321 - 3200) = Rs. 121

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(9) At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?

[A] 6%

[B] 6.5%

[C] 7%

[D] 7.5%

Answer : [A]

Explanation:

Let the rate be R% p.a.

$$\text{Then, } 1200 \times \left(1 + \frac{R}{100} \right)^2 = 1348.32$$

$$\Rightarrow \left(1 + \frac{R}{100} \right)^2 = \frac{134832}{120000} = \frac{11236}{10000}$$

$$\therefore \left(1 + \frac{R}{100} \right)^2 = \left(\frac{106}{100} \right)^2$$

$$\Rightarrow 1 + \frac{R}{100} = \frac{106}{100}$$

$$\Rightarrow R = 6\%$$

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(10) If the simple interest on a sum of money for 2 years at 5% per annum is Rs. 50, what is the compound interest on the same at the same rate and for the same time?

[A] Rs. 51.25

[B] Rs. 52

[C] Rs. 54.25

[D] Rs. 60

Answer : [A]

Explanation:

$$\text{Sum} = \text{Rs.} \left(\frac{50 \times 100}{2 \times 5} \right) = \text{Rs.} 500.$$

$$\begin{aligned}\text{Amount} &= \text{Rs.} \left[500 \times \left(1 + \frac{5}{100} \right)^2 \right] \\ &= \text{Rs.} \left(500 \times \frac{21}{20} \times \frac{21}{20} \right)\end{aligned}$$

$$= \text{Rs. } 551.25$$

$$\therefore \text{C.I.} = \text{Rs. } (551.25 - 500) = \text{Rs. } 51.25$$

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(11) A fires 5 shots to B's 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed:

[A] 30 birds

[B] 60 birds

[C] 72 birds

[D] 90 birds

Answer : [A]

Explanation:

Let the total number of shots be x . Then,

$$\text{Shots fired by A} = \frac{5}{8}x$$

$$\text{Shots fired by B} = \frac{3}{8}x$$

$$\text{Killing shots by A} = \frac{1}{3} \text{ of } \frac{5}{8}x = \frac{5}{24}x$$

$$\text{Shots missed by B} = \frac{1}{2} \text{ of } \frac{3}{8}x = \frac{3}{16}x$$

$$\therefore \frac{3x}{16} = 27 \text{ or } x = \left(\frac{27 \times 16}{3} \right) = 144.$$

$$\text{Birds killed by A} = \frac{5x}{24} = \left(\frac{5}{24} \times 144 \right) = 30.$$

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(12) One-third of Rahul's savings in National Savings Certificate is equal to one-half of his savings in Public Provident Fund. If he has Rs. 1,50,000 as total savings, how much has he saved in Public Provident Fund ?

[A] Rs. 30,000

[B] Rs. 50,000

[C] Rs. 60,000

[D] Rs. 90,000

Answer : [C]

Explanation:

Let savings in N.S.C and P.P.F. be Rs. x and Rs. $(150000 - x)$ respectively. Then,

$$\frac{1}{3}x = \frac{1}{2}(150000 - x)$$

$$\Rightarrow \frac{x}{3} + \frac{x}{2} = 75000$$

$$\Rightarrow \frac{5x}{6} = 75000$$

$$\Rightarrow x = \frac{75000 \times 6}{5} = 90000$$

$$\therefore \text{Savings in Public Provident Fund} = \text{Rs. } (150000 - 90000) = \text{Rs. } 60000$$

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(13)

$$\frac{(469 + 174)^2 - (469 - 174)^2}{(469 \times 174)} = ?$$

[A] 2

- [B] 4
[C] 295
[D] 643

Answer : [B]

Explanation:

$$\text{Given exp.} = \frac{(a + b)^2 - (a - b)^2}{ab}$$

$$= \frac{4ab}{ab}$$

$$= 4 \text{ (where } a = 469, b = 174.)$$

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(14) David gets on the elevator at the 11th floor of a building and rides up at the rate of 57 floors per minute. At the same time, Albert gets on an elevator at the 51st floor of the same building and rides down at the rate of 63 floors per minute. If they continue travelling at these rates, then at which floor will their paths cross ?

- [A] 19
[B] 28
[C] 30
[D] 37

Answer : [C]

Explanation:

Suppose their paths cross after x minutes.

$$\text{Then, } 11 + 57x = 51 - 63x \Leftrightarrow 120x = 40$$

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

$$\text{Number of floors covered by David in } (1/3) \text{ min.} = \left(\frac{1}{3} \times 57\right) = 19.$$

So, their paths cross at $(11 + 19)$ i.e., 30th floor.

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(15) In a regular week, there are 5 working days and for each day, the working hours are 8. A man gets Rs. 2.40 per hour for regular work and Rs. 3.20 per hours for overtime. If he earns Rs. 432 in 4 weeks, then how many hours does he work for ?

- [A] 160
[B] 175
[C] 180
[D] 195

Answer : [B]

Explanation:

Suppose the man works overtime for x hours.

$$\text{Now, working hours in 4 weeks} = (5 \times 8 \times 4) = 160.$$

$$\therefore 160 \times 2.40 + x \times 3.20 = 432$$

$$\Rightarrow 3.20x = 432 - 384 = 48$$

$$\Rightarrow x = 15.$$

$$\text{Hence, total hours of work} = (160 + 15) = 175.$$

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(16) Three times the first of three consecutive odd integers is 3 more than twice the third. The third integer is:

- [A] 9
[B] 11
[C] 13

[D] 15

Answer : [D]

Explanation:

Let the three integers be x , $x + 2$ and $x + 4$.

Then, $3x = 2(x + 4) + 3 \Leftrightarrow x = 11$.

\therefore Third integer = $x + 4 = 15$.

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(17) A two-digit number is such that the product of the digits is 8. When 18 is added to the number, then the digits are reversed. The number is:

[A] 18

[B] 24

[C] 42

[D] 81

Answer : [B]

Explanation:

Let the ten's and unit digit be x and $\frac{8}{x}$ respectively.

Then, $\left(10x + \frac{8}{x}\right) + 18 = 10 \times \frac{8}{x} + x$

$$\Rightarrow 10x^2 + 8 + 18x = 80 + x^2$$

$$\Rightarrow 9x^2 + 18x - 72 = 0$$

$$\Rightarrow x^2 + 2x - 8 = 0$$

$$\Rightarrow (x + 4)(x - 2) = 0$$

$$\Rightarrow x = 2.$$

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(18) If one-third of one-fourth of a number is 15, then three-tenth of that number is:

[A] 35

[B] 36

[C] 45

[D] 54

Answer : [D]

Explanation:

Let the number be x .

Then, $\frac{1}{3}$ of $\frac{1}{4}$ of $x = 15 \Leftrightarrow x = 15 \times 12 = 180$.

So, required number = $\left(\frac{3}{10} \times 180\right) = 54$.

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(19) In a two-digit, if it is known that its unit's digit exceeds its ten's digit by 2 and that the product of the given number and the sum of its digits is equal to 144, then the number is:

[A] 24

[B] 26

[C] 42

[D] 46

Answer : [A]

Explanation:

Let the ten's digit be x .

Then, unit's digit = $x + 2$.

$$\text{Number} = 10x + (x + 2) = 11x + 2.$$

$$\text{Sum of digits} = x + (x + 2) = 2x + 2.$$

$$\therefore (11x + 2)(2x + 2) = 144$$

$$\Rightarrow 22x^2 + 26x - 140 = 0$$

$$\Rightarrow 11x^2 + 13x - 70 = 0$$

$$\Rightarrow (x - 2)(11x + 35) = 0$$

$$\Rightarrow x = 2.$$

$$\text{Hence, required number} = 11x + 2 = 24.$$

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(20) Find a positive number which when increased by 17 is equal to 60 times the reciprocal of the number.

[A] 3

[B] 10

[C] 17

[D] 20

Answer : [A]

Explanation:

Let the number be x .

$$\text{Then, } x + 17 = \frac{60}{x}$$

$$\Rightarrow x^2 + 17x - 60 = 0$$

$$\Rightarrow (x + 20)(x - 3) = 0$$

$$\Rightarrow x = 3.$$

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