Simplification & Approximation for IBPS RRB & PO Prelims

Questions

Instructions

For the following questions answer them individually

Question 1

Simplify the following expression:

$\left(\frac{3}{4} - \frac{1}{4} \div \frac{1}{4} \text{ of } \frac{2}{5}\right) \div \left(\frac{3}{4} \div \frac{2}{3} \text{ of } \frac{3}{5}\right)$

A $\frac{14}{75}$

B $\frac{32}{75}$

C $-\frac{70}{27}$

D $-\frac{14}{15}$

Answer: D

Explanation:

$\left(\frac{3}{4} - \frac{1}{4} \div \frac{1}{4} \text{ of } \frac{2}{5}\right) \div \left(\frac{3}{4} \div \frac{2}{3} \text{ of } \frac{3}{5}\right)$

$= \left(\frac{3}{4} - \frac{1}{4} \div \frac{2}{20}\right) \div \left(\frac{3}{4} \div \frac{6}{15}\right)$

$= \left(\frac{3}{4} - \frac{1}{4} \times \frac{20}{2}\right) \div \left(\frac{3}{4} \times \frac{15}{6}\right)$

$= \left(\frac{3}{4} - \frac{5}{2}\right) \div \left(\frac{15}{8}\right)$

$= \left(\frac{3-10}{4}\right) \div \left(\frac{15}{8}\right)$

$= \left(\frac{-7}{4}\right) \div \left(\frac{15}{8}\right)$

$= \left(\frac{-7}{4}\right) \times \left(\frac{8}{15}\right)$

$= -\frac{14}{15}$

Hence, the correct answer is Option D

Question 2

Simplify the following expression:

$\frac{7}{12} \div \frac{1}{10} \text{ of } \frac{2}{3} - \frac{5}{3} \times \frac{9}{10} + \frac{5}{8} \div \frac{3}{4} \text{ of } \frac{2}{3}$

A $8\frac{1}{2}$

B -4

C $3\frac{23}{36}$

D $7\frac{29}{36}$

Answer: A

Explanation:

$\frac{7}{12} \div \frac{1}{10} \text{ of } \frac{2}{3} - \frac{5}{3} \times \frac{9}{10} + \frac{5}{8} \div \frac{3}{4} \text{ of } \frac{2}{3}$

$= \frac{7}{12} \div \frac{1}{15} - \frac{5}{3} \times \frac{9}{10} + \frac{5}{8} \div \frac{1}{2}$

$= \frac{7}{12} \times \frac{15}{1} - \frac{5}{3} \times \frac{9}{10} + \frac{5}{8} \times \frac{2}{1}$

$= \frac{35}{4} - \frac{3}{2} + \frac{5}{4}$

$= \frac{35-6+5}{4}$

$= \frac{34}{4}$

$= \frac{17}{2}$

$= 8\frac{1}{2}$

Hence, the correct answer is Option A

Question 3

The value of $3\frac{1}{5} \div 4\frac{1}{2}$ of $5\frac{1}{3} - \frac{1}{8} \div \frac{1}{2}$ of $\frac{1}{4} + \frac{1}{4}\left(\frac{1}{2} \div \frac{1}{8} \times \frac{1}{4}\right)$ is:

A $-\frac{37}{60}$

B $-\frac{17}{60}$

C $\frac{17}{60}$

D $\frac{37}{60}$

Answer: A

Explanation:

$3\frac{1}{5} \div 4\frac{1}{2}$ of $5\frac{1}{3} - \frac{1}{8} \div \frac{1}{2}$ of $\frac{1}{4} + \frac{1}{4}\left(\frac{1}{2} \div \frac{1}{8} \times \frac{1}{4}\right)$

$= \frac{16}{5} \div \frac{9}{2}$ of $\frac{16}{3} - \frac{1}{8} \div \frac{1}{2}$ of $\frac{1}{4} + \frac{1}{4}\left(\frac{1}{2} \times \frac{8}{1} \times \frac{1}{4}\right)$

$= \frac{16}{5} \div 24 - \frac{1}{8} \div \frac{1}{8} + \frac{1}{4}(1)$

$= \frac{16}{5 \times 24} - 1 + \frac{1}{4}$

$= \frac{2}{15} - 1 + \frac{1}{4}$

$= \frac{8 - 60 + 15}{60}$

$= -\frac{37}{60}$

Hence, the correct answer is Option A

Question 4

The value of $423 \div \left[270 \div \frac{3}{7} \times 35 + \left(17 \div \frac{1}{3}\right) - \left(8\frac{1}{2} - \frac{5}{2}\right)\right]$ is:

A $\frac{51}{2455}$

B $\frac{47}{2455}$

C $\frac{43}{2455}$

D $\frac{41}{2455}$

Answer: B

Explanation:

$423 \div \left[270 \div \frac{3}{7} \times 35 + \left(17 \div \frac{1}{3}\right) - \left(8\frac{1}{2} - \frac{5}{2}\right)\right]$

$= 423 \div \left[270 \div \frac{3}{7} \times 35 + 51 - 6\right]$

$= 423 \div \left[270 \times \frac{7}{3} \times 35 + 51 - 6\right]$

$= 423 \div [22050 + 51 - 6]$

$= 423 \div 22095$

$= \frac{423}{22095}$

$= \frac{47}{2455}$

Hence, the correct answer is Option B

Question 5

The value of $\frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} - \frac{1}{5} \times \left(\frac{7}{8} - \frac{5}{4}\right)\right]$ is:

A 10

B 0

C 1

D 5

Answer: C

Explanation:

$\frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} - \frac{1}{5} \times \left(\frac{7}{8} - \frac{5}{4}\right)\right] = \frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} - \frac{1}{5} \times \left(\frac{7-10}{8}\right)\right]$

$= \frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} - \frac{1}{5} \times \left(\frac{-3}{8}\right)\right]$

$= \frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} - \left(\frac{-3}{40}\right)\right]$

$= \frac{33}{40} + \frac{1}{5}\left[\frac{4}{5} + \frac{3}{40}\right]$

$= \frac{33}{40} + \frac{1}{5}\left[\frac{32+3}{40}\right]$

$= \frac{33}{40} + \frac{1}{5}\left[\frac{35}{40}\right]$

$= \frac{33}{40} + \frac{7}{40}$

$= \frac{40}{40}$

$= 1$

Hence, the correct answer is Option C

Question 6

If the numerator of a fraction is increased by 15% and denominator is decreased by 20%, then the fraction, so obtained, is $\frac{17}{65}$ What is the original fraction?

A $\frac{272}{1495}$

B $\frac{267}{1495}$

C $\frac{278}{1495}$

D $\frac{281}{1495}$

Answer: A

Explanation:

Let the numerator of the fraction = x

Denominator of the fraction = y

Numerator when increased by 15% = $\frac{115}{100}x$

Denominator when decreased by 20% = $\frac{80}{100}y$

Given, new fraction = $\frac{17}{65}$

$\Rightarrow \frac{\frac{115}{100}x}{\frac{80}{100}y} = \frac{17}{65}$

$\Rightarrow \frac{115x}{80y} = \frac{17}{65}$

$\Rightarrow \frac{x}{y} = \frac{17 \times 80}{65 \times 115}$

$\Rightarrow \frac{x}{y} = \frac{272}{1495}$

$\therefore$The original fraction $= \frac{x}{y} = \frac{272}{1495}$

Hence, the correct answer is Option A

Question 7

The value of $\frac{1}{(9-4\sqrt{5})^2} + \frac{1}{(9+4\sqrt{5})^2}$ **is:**

A 322

B 424

C 246

D 286

Answer: A

Explanation:

$\frac{1}{(9-4\sqrt{5})^2} + \frac{1}{(9+4\sqrt{5})^2} = \frac{1}{81+80-72\sqrt{5}} + \frac{1}{81+80+72\sqrt{5}}$

$= \frac{1}{161-72\sqrt{5}} + \frac{1}{161+72\sqrt{5}}$

$= \frac{161+72\sqrt{5}+161-72\sqrt{5}}{161^2-(72\sqrt{5})^2}$

$= \frac{322}{25921-25920}$

$= 322$

Question 8

The value of $\frac{5\frac{1}{2} \div 3\frac{2}{3} of \frac{1}{4} + \left(5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}\right) \times \frac{9}{11}}{5 \div 5 of \frac{1}{10} - 10 \times 10 \div 20}$ **is:**

A $1\frac{4}{5}$

B $1\frac{9}{10}$

C $3\frac{4}{5}$

D $9\frac{1}{2}$

Answer: B

Explanation:

$\frac{5\frac{1}{2} \div 3\frac{2}{3} of \frac{1}{4} + \left(5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}\right) \times \frac{9}{11}}{5 \div 5 of \frac{1}{10} - 10 \times 10 \div 20}$

$\frac{11}{2} \div \frac{11}{3} of \frac{1}{4} + \left(\frac{46}{9} - \frac{63}{8} \div \frac{189}{20}\right) \times \frac{9}{11}$

$= 5 \div 5 of \frac{1}{10} - 10 \times 10 \div 20$

$\frac{11}{2} \div \frac{11}{12} + \left(\frac{46}{9} - \frac{63}{8} \div \frac{189}{20}\right) \times \frac{9}{11}$

$= 5 \div \frac{1}{2} - 10 \times 10 \div 20$

$6 + \left(\frac{46}{9} - \frac{5}{6}\right) \times \frac{9}{11}$

$= 10 - 10 \times 0.5$

$6 + \left(\frac{77}{18}\right) \times \frac{9}{11}$

$= 5$

$6 + \left(\frac{7}{2}\right)$

$= 5$

$= 10\frac{19}{10} = 1\frac{9}{10}$

Question 9

The value ok $\left(1\frac{1}{9} \times 1\frac{\frac{1}{20} \div \frac{21}{38}}{\frac{1}{5} of \frac{1}{5}} - \frac{1}{3}\right) \div \left(2\frac{4}{9} \div 1\frac{\frac{7}{15} of \frac{3}{5}}{\frac{1}{125} - \frac{1}{25} \div \frac{1}{5} of \frac{1}{5}}\right)$ lies between .....

A 0.1 and 0.15

B 0.2 and 0.25

C 0.15 and 0.2

D 0.25 and 0.3

Answer: C

Explanation:

$\left(1\frac{1}{9} \times 1\frac{\frac{1}{20} \div \frac{21}{38}}{\frac{1}{5} of \frac{1}{5}} - \frac{1}{3}\right) \div \left(2\frac{4}{9} \div 1\frac{\frac{7}{15} of \frac{3}{5}}{\frac{1}{125} - \frac{1}{25} \div \frac{1}{5} of \frac{1}{5}}\right)$

$\left(\frac{10}{9} \times \frac{\frac{21}{20} \div \frac{21}{38}}{\frac{1}{25} \div \frac{1}{125}} - \frac{1}{3}\right) \div \left(\frac{22}{9} \div \frac{22}{25}\right)$

$= \left(\frac{10}{9} \times \frac{19}{10} - \frac{1}{3}\right) \div \left(\frac{25}{9}\right)$

$= 5 - 1$

$\left(\frac{19}{9} - \frac{1}{3}\right) \div \left(\frac{25}{9}\right)$

$= 4$

$\left(\frac{16}{9}\right) \times \left(\frac{9}{25}\right)$

$= 4$

$= \frac{4}{25} = 0.16$

Question 10

In an office, $\frac{5}{8}$ of the total number of employees are males and the rest are females. $\frac{2}{5}$ of the number of males are non technical workers while $\frac{2}{3}$ of the number of females are technical workers, What fraction of the total number of employees are technical workers?

A $\frac{5}{8}$

B $\frac{2}{5}$

C $\frac{1}{2}$

D $\frac{3}{8}$

Answer: A

Explanation:

Let the total number of employees be 8.

Total number of males employee = $8 \times \frac{5}{8} = 5$

Total number of females employee = 8 - 5 = 3

Non technical males workers = $5 \times \frac{2}{5} = 2$

Technical males workers = 5 - 2 = 3

Technical females workers = $3 \times \frac{2}{3} = 2$

total number of technical worker = 3 + 2 = 5

Fraction of the total number of technical workers = $\frac{totalnumberoftechnicalworkers}{totalnumberofemployee} = \frac{5}{8}$

Question 11

a, b and c are three fractions such that a < b < c. If c is divided by a, the result is $\frac{9}{2}$, which exceeds b by $\frac{23}{6}$. The sum of a, b and c is $\frac{19}{12}$ What is the value of (2a + b - c)?

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{12}$

D $\frac{1}{4}$

Answer: D

Explanation:

$\frac{c}{a} = \frac{9}{2}$

$c = \frac{9a}{2}$

$b + \frac{23}{6} = \frac{9}{2}$

$b = \frac{9}{2} - \frac{23}{6} = \frac{2}{3}$

a + b + c = 19/12

$a + \frac{2}{3} + \frac{9a}{2} = \frac{19}{2}$

$\frac{11a}{2} = \frac{19}{2} - \frac{2}{3}$

$\frac{11a}{2} = \frac{11}{12}$

$a = \frac{1}{6}$

$c = \frac{9}{2} \times \frac{1}{6} = \frac{3}{4}$

$2a + b - c = \frac{2}{6} + \frac{2}{3} - \frac{3}{4} = \frac{3}{12} = \frac{1}{4}$

Question 12

Three fractions x, y and z are such that $x > y > z$.When small of them divided by the greatest, the result is $\frac{9}{16}$, which exceeds y by 0.0625.If $x + y + z = 1\frac{13}{24}$,then the value of $x + z$ is

A $\frac{7}{8}$

B 1

C $\frac{25}{24}$

D $\frac{7}{6}$

Answer: C

Explanation:

$\frac{z}{x} = \frac{9}{16}$

$\frac{9}{16} = y + 0.00625$

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

x + y + z = $1\frac{13}{24}$

x + $\frac{1}{z} + z = \frac{37}{24}$

x + z = $\frac{37}{24} - \frac{12}{24} = \frac{25}{14}$

Question 13

Two-third of the number of employees of a companyare males andthe rest are females. If $\frac{3}{8}$ of the male employees and $\frac{2}{5}$ of the female employees are temporary employees and the total number of permanent employees is 740. then $\frac{7}{15}$ of the total number of employees exceeds the number of temporary female employees by:

A 400

B 340

C 308

D 320

Answer: A

Explanation:

let the total employees be x.

Male employees = $\frac{2x}{3}$

Female employees = x - $\frac{2x}{3} = \frac{x}{3}$

Permanent male employees = 1 - $\frac{3}{8} = \frac{5}{8}$ of the male employee = $\frac{2x}{3} \times \frac{5}{8} = \frac{5x}{12}$

Permanent female employees = 1 - $\frac{2}{5} = \frac{3}{5}$ of the male employee = $\frac{x}{3} \times \frac{3}{5} = \frac{x}{5}$

Total number of permanent employees = 740

$\frac{5x}{12} + \frac{x}{5} = 740$

$\frac{37x}{60} = 740$

x = $740 \times \frac{60}{37} = 1200$

$\frac{7}{15}$ of the total number of employees = $1200 \times \frac{7}{15} = 560$

Number of temporary female employees = $\frac{x}{3} \times \frac{2}{5} = \frac{2x}{15}$

= $\frac{2 \times 1200}{15} = 160$

$\frac{7}{15}$ of the total number of employees exceeds the number of temporary female employees by = 560 - 160 = 400

Question 14

If $\sqrt{33} = 5.745$, then the value of the following is approximately:

$\sqrt{\left(\frac{3}{11}\right)}$

A 6.32

B 2.035

C 1

D 0.5223

Answer: D

Explanation:

Given, $\sqrt{33} = 5.745$

$=> \sqrt{\frac{3}{11}} = \sqrt{\frac{3}{11} \times \frac{11}{11}} = \frac{\sqrt{33}}{11} = \frac{5.745}{11} = 0.5223$

Question 15

Ali had ₹ 320. He spent $\frac{3}{4}$ of it to buy a watch. Of the remainder, he used $\frac{1}{8}$ of it to buy a pen. How much money is left?

A 70

B 120

C 90

D 100

Answer: A

Explanation:

Money spent to buy a watch = $\frac{3}{4} \times 320$ = ₹ 240

Remaining Amount = 320 - 240 = ₹ 80

Money spent to buy a pen = $\frac{1}{8} \times 80$ = ₹ 10

∴ Money left with Ali after buying a watch and a pen = 320 - 240 -10 = ₹ 70

Hence, the correct answer is Option A

Question 16

Which one of the following is true?

A $0 > \frac{7}{17} > \frac{3}{7} > \frac{3}{5}$

B $0.5 < \frac{2}{3} < \frac{3}{4} < \left(\frac{16}{25}\right)^{0.5}$

C $\frac{7}{24} > \frac{1}{3} > \frac{3}{8} > \frac{5}{12}$

D $\frac{1}{2} > \frac{2}{3} > \frac{3}{4} > \frac{4}{5}$

Answer: B

Explanation:

Option A

$0 > \frac{7}{17} > \frac{3}{7} > \frac{3}{5}$

$=> 0 > \frac{7}{17} \times \frac{35}{35} > \frac{3}{7} \times \frac{85}{85} > \frac{3}{5} \times \frac{119}{119}$

$=> 0 > \frac{245}{525} > \frac{255}{525} > \frac{357}{525}$

Option B

$0.5 < \frac{2}{3} < \frac{3}{4} < \left(\frac{16}{25}\right)^{0.5}$

$\frac{1}{2} < \frac{2}{3} < \frac{3}{4} < \frac{4}{5}$

$\Rightarrow \frac{30}{60} < \frac{40}{60} < \frac{45}{60} < \frac{48}{60}$

Option C

$\frac{7}{24} > \frac{1}{3} > \frac{3}{8} > \frac{5}{12}$

$\Rightarrow \frac{7}{24} > \frac{8}{24} > \frac{9}{24} > \frac{10}{24}$

Option D

$\frac{1}{2} > \frac{2}{3} > \frac{3}{4} > \frac{4}{5}$

$\Rightarrow \frac{30}{60} > \frac{40}{60} > \frac{45}{60} > \frac{48}{60}$

Hence, the correct answer is Option B

Question 17

In an office, there are 216 tables and 264 chairs. If $\frac{1}{6}$ of the tables and $\frac{1}{4}$ of the chairs are broken then how many people can work in the office if each person requires one table and one chair?

A 180

B 186

C 100

D 198

Answer: A

Explanation:

In an office, there are 216 tables and 264 chairs. If $\frac{1}{6}$ of the tables and $\frac{1}{4}$ of the chairs are broken.

Remaining tables = 216 of $\left(1-\frac{1}{6}\right)$ = 216 of $\frac{5}{6}$ = 180

Remaining chairs = 264 of $\left(1-\frac{1}{4}\right)$ = 264 of $\frac{3}{4}$ = 198

In question, it is given that each person requires one table and one chair to work in the office. There are 180 tables and 198 chairs remaining. So we can say that 180 people can work in the office.

Question 18

A fraction is such that the numerator is five less than the denominator. Also four times the numerator is one more than the denominator. The fraction is:

A $\frac{4}{7}$

B $\frac{3}{8}$

C $\frac{7}{12}$

D $\frac{2}{7}$

Answer: D

Explanation:

Let's assume the fraction is $\frac{P}{Q}$.

A fraction is such that the numerator is five less than the denominator.

P = Q-5

Q = P+5 Eq.(i)

Also four times the numerator is one more than the denominator.

4P = Q+1 Eq.(ii)

Put the value of 'Q' from Eq.(i) to Eq.(ii).

4P = P+5+1

4P-P = 6

3P = 6

P = 2

Put the value of 'P' in Eq.(i).

Q = P+5 = 2+5 = 7

fraction = $\frac{P}{Q} = \frac{2}{7}$

Question 19

The median of the given data $\frac{1}{2}, \frac{2}{7}, \frac{3}{4}, \frac{1}{3}, \frac{5}{8}$ is:

A $\frac{3}{4}$

B $\frac{1}{3}$

C $\frac{2}{7}$

D $\frac{1}{2}$

Answer: D

Explanation:
Median is the middle term when the given data is arranged in ascending order from left to right.

Here the given data is in fraction. So first we need to take the LCM of the denominator.

LCM of (2, 7, 4, 3, 8) = 168

$\frac{1}{2} = \frac{84}{168}$

$\frac{2}{7} = \frac{48}{168}$

$\frac{3}{4} = \frac{126}{168}$

$\frac{1}{3} = \frac{56}{168}$

$\frac{5}{8} = \frac{105}{168}$

Now arrange the given data in ascending order.

$\frac{48}{168}, \frac{56}{168}, \frac{84}{168}, \frac{105}{168}, \frac{126}{168}$

So medium = 3rd term = $\frac{84}{168}$

$= \frac{1}{2}$

Question 20

What is the value of: $\frac{12\ of\ 3\div6+12\times2-(2\times4-5)}{12\div3\times4+(2\times4-5)}$ **?**

A $\frac{27}{22}$

B $\frac{23}{17}$

C $\frac{27}{19}$

D $\frac{21}{9}$

Answer: C

Explanation:

$= \frac{12 \times \overset{3}{6} + 24 - (8-5)}{\underset{12}{3} \times 4 + (8-5)}$

$= \frac{6+24-3}{16+3}$

$= \frac{27}{19}$