

GRE

Quant Reasoning Assessment

RP, IE, AP, GP

Answer Explanations

SECTION-I: RATIO PROPORTION

1. If 40% of the party is male, then $\frac{4}{10}$ or $\frac{2}{5}$ of the party is male and $\frac{3}{5}$ of the party is female.

Since we have two proportions expressed with the same denominator ($\frac{2}{5}$ and $\frac{3}{5}$), we can simply express the ratio of males to females as $\frac{2}{3}$ or 2:3.

Note: If the question had asked for the proportion of females to males, the answer would be 3:2.

2. **Answer:** Option B

Explanation:

$$\frac{4}{15} A = \frac{2}{5} B$$
$$\Rightarrow A = \left(\frac{2}{5} \times \frac{15}{4} \right) B$$
$$\Rightarrow A = \frac{3}{2} B$$
$$\Rightarrow \frac{A}{B} = \frac{3}{2}$$
$$\Rightarrow A : B = 3 : 2.$$

\therefore B's share = Rs. $\left(1210 \times \frac{2}{5} \right) = \text{Rs. } 484.$

3. At first, you may think that you do not have enough information to answer this question, but you do. To answer a problem like this, just add the coefficient x to each quantity and add: $4x + 7x = 11x$.

We know that the sum of the quantities, 11, represents a fraction of the total number of party goers, so our answer MUST be a multiple of 11.

The only multiple of 11 in our choices is C. 66

4. Correct answer: B: 264,396

5. **Answer:** Option C

Explanation:

Let the third number be x .

Then, first number = 120% of $x = \frac{120x}{100} = \frac{6x}{5}$

Second number = 150% of $x = \frac{150x}{100} = \frac{3x}{2}$

\therefore Ratio of first two numbers = $\left(\frac{6x}{5} : \frac{3x}{2} \right) = 12x : 15x = 4 : 5.$

6. Let r , e and d be the number of rubies, emeralds and diamonds. They are whole numbers, and must be positive for the ratios to be defined and nonzero.

$d/r = 5/6$... the first ration given, multiply both sides by r to get:

$$d = (5/6)r$$

Since d is a whole number, then r must be a multiple of 6 (otherwise the right side is not whole).

$$\begin{aligned}\text{Similarly } r/e &= 8/3, \text{ so} \\ r &= (8/3)e \\ e &= (3/8)r\end{aligned}$$

Since e is whole, then r must be a multiple of 8 also. Taken together, these facts say that any value for r that is both a multiple of 6 and 8 will give whole numbers for $d=(5/6)r$ and $e=(3/8)r$. The smallest such number, the least common multiple (LCM) of 6 and 8, is 24.

So there are 24 rubies, $(5/6)*24= 20$ diamonds, and $(3/8)*24 = 9$ emeralds.

7. Correct answer: C: -2

8. Answer: Option C

Explanation:

Let the shares of A, B, C and D be Rs. $5x$, Rs. $2x$, Rs. $4x$ and Rs. $3x$ respectively.

$$\text{Then, } 4x - 3x = 1000$$

$$\Rightarrow x = 1000.$$

$$\therefore \text{ B's share} = \text{Rs. } 2x = \text{Rs. } (2 \times 1000) = \text{Rs. } 2000.$$

9. Answer: Option A

Explanation:

Originally, let the number of seats for Mathematics, Physics and Biology be $5x$, $7x$ and $8x$ respectively.

Number of increased seats are (140% of $5x$), (150% of $7x$) and (175% of $8x$).

$$\Rightarrow \left(\frac{140}{100} \times 5x \right), \left(\frac{150}{100} \times 7x \right) \text{ and } \left(\frac{175}{100} \times 8x \right)$$

$$\Rightarrow 7x, \frac{21x}{2} \text{ and } 14x.$$

$$\therefore \text{ The required ratio} = 7x : \frac{21x}{2} : 14x$$

$$\Rightarrow 14x : 21x : 28x$$

$$\Rightarrow 2 : 3 : 4.$$

10. Answer: Option D

Explanation:

$$\text{Quantity of milk} = \left(60 \times \frac{2}{3} \right) \text{ litres} = 40 \text{ litres.}$$

$$\text{Quantity of water in it} = (60 - 40) \text{ litres} = 20 \text{ litres. New ratio} = 1 : 2$$

Let quantity of water to be added further be x litres.

$$\text{Then, milk : water} = \left(\frac{40}{20 + x} \right).$$

$$\text{Now, } \left(\frac{40}{20+x} \right) = \frac{1}{2}$$

$$\Rightarrow 20 + x = 80$$

$$\Rightarrow x = 60.$$

∴ Quantity of water to be added = 60 litres.

11. The correct Answer is **45 years** and the correct **Choice is (D)**.

Explanatory Answer

The ratio of the ages of A and B is 3 : 5.

The ratio of the ages of B and C is 3 : 5.

B's age is the common link to both these ratio. Therefore, if we make the numerical value of the ratio of B's age in both the ratios same, then we can compare the ages of all 3 in a single ratio.

The can be done by getting the value of B in both ratios to be the LCM of 3 and 5 i.e., 15.

The first ratio between A and B will therefore be 9 : 15 and the second ratio between B and C will be 15 : 25.

Now combining the two ratios, we get A : B : C = 9 : 15 : 25.

Let their ages be 9x, 15x and 25x.

Then, the sum of their ages will be $9x + 15x + 25x = 49x$

The question states that the sum of their ages is 147.

i.e., $49x = 147$ or $x = 3$.

Therefore, B's age = $15x = 15 \times 3 = 45$

12. Answer: Option **C**

Explanation:

Originally, let the number of boys and girls in the college be 7x and 8x respectively.

Their increased number is (120% of 7x) and (110% of 8x).

$$\Rightarrow \left(\frac{120}{100} \times 7x \right) \text{ and } \left(\frac{110}{100} \times 8x \right)$$

$$\Rightarrow \frac{42x}{5} \text{ and } \frac{44x}{5}$$

$$\therefore \text{ The required ratio} = \left(\frac{42x}{5} : \frac{44x}{5} \right) = 21 : 22.$$

13. Answer: Option D

Explanation:

Let the original salaries of Ravi and Sumit be Rs. $2x$ and Rs. $3x$ respectively.

$$\text{Then, } \frac{2x + 4000}{3x + 4000} = \frac{40}{57}$$

$$\Rightarrow 57(2x + 4000) = 40(3x + 4000)$$

$$\Rightarrow 6x = 68,000$$

$$\Rightarrow 3x = 34,000$$

Sumit's present salary = $(3x + 4000) = \text{Rs.}(34000 + 4000) = \text{Rs. } 38,000$.

14. Ans C

Solution

This is expressed mathematically as:

$$x/y = 4$$

$$x+y=40$$

The first equation can be written in the form $x=4y$.

This is substituted into the second equation to yield $4y+y=40$, therefore, $y= 8$.

Since $x=4y$, we find that $x=4(8)=32$. The two numbers are 8 and 32

15. Answer: Option B

Explanation:

$$(x \times 5) = (0.75 \times 8) \Rightarrow x = \left(\frac{6}{5}\right) = 1.20$$

16. Answer: Option B

Explanation:

Let the three parts be A, B, C. Then,

$$A : B = 2 : 3 \text{ and } B : C = 5 : 8 = \left(5 \times \frac{3}{5}\right) : \left(8 \times \frac{3}{5}\right) = 3 : \frac{24}{5}$$

$$\Rightarrow A : B : C = 2 : 3 : \frac{24}{5} = 10 : 15 : 24$$

$$\Rightarrow B = \left(98 \times \frac{15}{49}\right) = 30.$$

17. Correct answer : D

$$\text{Sol: } 1/2:2/3:3/4 = 6:8:9 = 6+8+9 = 23$$

$$\text{First will be} = (782 \times 6/23) = 204$$

18. Answer: Option C

Explanation:

Let $A = 2k$, $B = 3k$ and $C = 5k$.

$$\text{A's new salary} = \frac{115}{100} \text{ of } 2k = \left(\frac{115}{100} \times 2k\right) = \frac{23k}{10}$$

$$B's \text{ new salary} = \frac{110}{100} \text{ of } 3k = \left(\frac{110}{100} \times 3k \right) = \frac{33k}{10}$$

$$C's \text{ new salary} = \frac{120}{100} \text{ of } 5k = \left(\frac{120}{100} \times 5k \right) = 6k$$

$$\therefore \text{ New ratio } \left(\frac{23k}{10} : \frac{33k}{10} : 6k \right) = 23 : 33 : 60$$

19. Answer: B

Correct answer: 10

Explanation:

since $a+5$, $3a-10$ and $2a+a/2$ are in AP, we have

$$2(3a-10) = (a+5) + (2a+a/2)$$

$$6a-20 = a+5+2a+a/2$$

$$6a-20 = (6a+a)/2+5$$

$$12a-40 = 7a+10$$

$$12a-7a = 10+40$$

$$5a = 50$$

$$a = 10$$

20. Correct answer: C: 6:4:3

21. Answer: Option C

Explanation:

$$\text{Let } 40\% \text{ of } A = \frac{2}{3} B$$

$$\text{Then, } \frac{40A}{100} = \frac{2B}{3}$$

$$\Rightarrow \frac{2A}{5} = \frac{2B}{3}$$

$$\Rightarrow \frac{A}{B} = \left(\frac{2}{3} \times \frac{5}{2} \right) = \frac{5}{3}$$

$$\therefore A : B = 5 : 3.$$

22. Answer: Option B

Explanation:

Let the fourth proportional to 5, 8, 15 be x .

$$\text{Then, } 5 : 8 : 15 : x$$

$$\Rightarrow 5x = (8 \times 15)$$

$$x = \frac{(8 \times 15)}{5} = 24.$$

23. Answer: Option B

Explanation:

Let the numbers be $3x$ and $5x$.

$$\text{Then, } \frac{3x-9}{5x-9} = \frac{12}{23}$$

$$\Rightarrow 23(3x-9) = 12(5x-9)$$

$$\Rightarrow 9x = 99$$

$$\Rightarrow x = 11.$$

$$\therefore \text{The smaller number} = (3 \times 11) = 33.$$

24. Answer: Option C

Explanation:

Let the number of 25 p, 10 p and 5 p coins be x , $2x$, $3x$ respectively.

$$\text{Then, sum of their values} = \text{Rs.} \left(\frac{25x}{100} + \frac{10 \times 2x}{100} + \frac{5 \times 3x}{100} \right) = \text{Rs.} \frac{60x}{100}$$

$$\therefore \frac{60x}{100} = 30 \Leftrightarrow x = \frac{30 \times 100}{60} = 50.$$

Hence, the number of 5 p coins = $(3 \times 50) = 150$.

25. The correct Answer is **45 years** and the correct **Choice is (D)**.

Explanatory Answer

The ratio of the ages of A and B is 3 : 5.

The ratio of the ages of B and C is 3 : 5.

B's age is the common link to both these ratio. Therefore, if we make the numerical value of the ratio of B's age in both the ratios same, then we can compare the ages of all 3 in a single ratio.

The can be done by getting the value of B in both ratios to be the LCM of 3 and 5 i.e., 15.

The first ratio between A and B will therefore be 9 : 15 and the second ratio between B and C will be 15 : 25.

Now combining the two ratios, we get A : B : C = 9 : 15 : 25.

Let their ages be $9x$, $15x$ and $25x$.

Then, the sum of their ages will be $9x + 15x + 25x = 49x$

The question states that the sum of their ages is 147.

i.e., $49x = 147$ or $x = 3$.

Therefore, B's age = $15x = 15 \times 3 = 45$

26. The correct Answer is **7 million tons** and the correct **Choice is (B)**.

Explanatory Answer

Together, California and Texas extracted $\frac{2}{7} + \frac{1}{7} = \frac{3}{7}$ th of all the Uranium ore extracted in the country.

Therefore, all the other states extracted $1 - \frac{3}{7} = \frac{4}{7}$ th of all the Uranium ore extracted in the country.

The combined production of all the other states = 28 million tons.

i.e., $\frac{4}{7}$ th of total production = 28 million tons.

So, total production = $28 * \frac{7}{4} = 49$ million tons.

Texas extracted $\frac{1}{7}$ th of the total = $\frac{1}{7} * 49 = 7$ million tons.

27. Correct answer: D

A ratio of 5 : 3 means 8 total parts. To find out how many children are in each part, divide the total enrollment by the total number of parts. (160 divided by 8 is 20); that means each part is 20 children. Three parts are boys and 3 multiplied by 20 is 60 which is the answer (d). Note that there is no need to find out how many girls there are. Also, be careful and use the correct part of the ratio that answers the question.

28. Correct answer: E

$$\begin{aligned} 2x/5x \\ 2x+12/5x = 4/9 \\ 18x + 108 = 20x \\ x = 54 \\ 54*2 = 108 \end{aligned}$$

29. To solve a problem like this, set up the two proportional ratios, one of which will have a missing piece of information. Think of the ratios like this: 10 baskets is to 50 eggs as 7 baskets is to x eggs. Then set up these ratios as proportional fractions and cross-multiply:

$$\begin{aligned} 10 : 50 \\ \text{OR } 7 : x \\ 10x = 350 \quad 10x = 350 \\ x = 35 \quad x = 35 \end{aligned}$$

Hence, the answer is (c). Note that we could have reduced the fraction 10/50 to 1/5 and made the cross- multiplication easier.

30. The key word here is "spread evenly". This implies that the relationship of fertilizer per square foot is uniform, and you can set equal the relationship of the wholes to the relationship of the parts.

$$A/F = 9600/1200 = 3600/x$$

Clearly, we can eliminate the zeros on the left side:

$$9600/1200 = 3600/x$$

$$96/12 = 3600/x$$

Then we can divide 96/12:

$$8 = 3600/x$$

Here, we can still reduce left-to-right, by canceling 4 in both:

$$2 = 900/x$$

Oh wait! There's more! Both 2 and 900 are divisible by 2!

$$1 = 450/x$$

$$x = 450$$

31. What is the sum of all 3 digit numbers that leave a remainder of '2' when divided by 3?

- A) 897
- B) 1,64,850
- C) 1,64,749
- D) 1,49,700
- E) 1,50,000

Ans: B

The smallest 3 digit number that will leave a remainder of 2 when divided by 3 is 101.

The next number that will leave a remainder of 2 when divided by 3 is 104, 107,

The largest 3 digit number that will leave a remainder of 2 when divided by 3 is 998.

So, it is an AP with the first term being 101 and the last term being 998 and common difference being 3.

We know that in an A.P., the nth term $a_n = a_1 + (n - 1)*d$

In this case, therefore, $998 = 101 + (n - 1)* 3$

i.e., $897 = (n - 1) * 3$

Therefore, $n - 1 = 299$

Or $n = 300$.

Sum of the AP will therefore, be $300(101+998)/2 = 164,850$

32. The sum of the three numbers in A.P is 21 and the product of the first and third number of the sequence is 45. What are the three numbers?

- A) 5, 7, and 9
- B) 9, 7, and 5
- C) 3, 7, and 11
- D) Both (1) and (2)
- E) None of these

Ans: D

Let the numbers are be $a - d, a, a + d$

Then $a - d + a + a + d = 21$

$3a = 21$

$a = 7$

and $(a - d)(a + d) = 45$

$a^2 - d^2 = 45$

$d^2 = 4$

$d = \pm 2$

Hence, the numbers are 5, 7 and 9 when $d = 2$ and 9, 7 and 5 when $d = -2$. In both the cases numbers are the same.

33. Quantity A: 2^{65}

$$\text{Quantity B} = (2^{64} + 2^{63} + 2^{62} + \dots + 2^0)$$

Ans: A

B is in G.P. with $a = 2^0$, $r = 2$, $n = 65$

$$\therefore S_n = \frac{a(r^n - 1)}{r - 1} = \frac{2^0(2^{65} - 1)}{2 - 1}$$

$$\therefore B = 2^{65} - 1$$

$$\Rightarrow B = A - 1$$

\therefore A is larger than B by 1

34. If a rubber ball consistently bounces back $\frac{2}{3}$ of the height from which it is dropped, what fraction of its original height will the ball bounce after being dropped and bounced four times without being stopped?

A) $\frac{16}{81}$

B) $\frac{16}{27}$

C) $\frac{4}{9}$

D) $\frac{37}{81}$

E) $\frac{9}{12}$

Ans: A

Each time the ball is dropped and it bounces back, it reaches $\frac{2}{3}$ of the height it was dropped from.

After the first bounce, the ball will reach $\frac{2}{3}$ of the height from which it was dropped - let us call it the original height.

After the second bounce, the ball will reach $\frac{2}{3}$ of the height it would have reached after the first bounce.

So, at the end of the second bounce, the ball would have reached $\frac{2}{3} * \frac{2}{3}$ of the original height = $\frac{4}{9}$ th of the original height.

After the third bounce, the ball will reach $\frac{2}{3}$ of the height it would have reached after the second bounce.

So, at the end of the third bounce, the ball would have reached $\frac{2}{3} * \frac{2}{3} * \frac{2}{3} = \frac{8}{27}$ th of the original height.

After the fourth and last bounce, the ball will reach $\frac{2}{3}$ of the height it would have reached after the third bounce.

So, at the end of the last bounce, the ball would have reached $\frac{2}{3} * \frac{2}{3} * \frac{2}{3} * \frac{2}{3}$ of the original height
= $\frac{16}{81}$ of the original height.

35. x , 17, $3x - y^2 - 2$ and $3x + y^2 - 30$ are four terms of an increasing arithmetic sequence. The sum of the four numbers is divisible by:

- A. 2
- B. 3
- C. 5
- D. 7
- E. 11

Ans: A

Of the 4 terms in AP, the second term is 17, which is an odd number.

The common difference has to be either odd or even

Possibility 1: If the common difference is odd, the first term will be even, the third term will be even and the fourth term will be odd.

i.e., two of the terms of the sequence are odd and two are even.

Sum of two odd numbers and two even numbers is even.

Possibility 2: If the common difference is even, all four terms will be odd.

Sum of 4 odd numbers is even.

So, irrespective of whether the common difference is odd or even, the sum of the four terms is even.

Hence, the sum will be divisible by 2

36. If $|-x/3 + 1| < 2$, which of the following must be true?

- (A) $x > 0$
- (B) $x < 8$
- (C) $x > -4$
- (D) $0 < x < 3$
- (E) None of the above

Ans: C

$$|x/3 - 1| < 2$$

$$(1/3) * |x - 3| < 2$$

$$|x - 3| < 6$$

The distance of x from 3 is less than 6, so $-3 < x < 9$. Now we know that every value that x can take will lie within this range.

Hence only C satisfies the above.

37. Which of the following represents the complete range of x over which $x^3 - 4x^5 < 0$?

- (A) $0 < |x| < \frac{1}{2}$
- (B) $|x| > \frac{1}{2}$
- (C) $-\frac{1}{2} < x < 0$ or $\frac{1}{2} < x$
- (D) $x < -\frac{1}{2}$ or $0 < x < \frac{1}{2}$
- (E) $x < -\frac{1}{2}$ or $x > 0$

Ans: C

We are given that $x^3 - 4x^5 < 0$. This inequality can be solved to:

$$x^3 (1 - 4x^2) < 0$$
$$x^3(2x + 1)(2x - 1) > 0$$
$$x > \frac{1}{2} \text{ or } -\frac{1}{2} < x < 0$$

Hence C is the correct answer.

38. Let m be a number such that $20 < m < 40$, and let n be a number such that $50 < n < 80$. Which of the following represents all possible values of $m - n$?

- (A) $-60 < m - n < -40$
- (B) $-60 < m - n < -10$
- (C) $-30 < m - n < -40$
- (D) $-30 < m - n < 40$
- (E) $-10 < m - n < 60$

Ans: B

$$20 < m < 40 \text{ and } 50 < n < 80$$

Hence $m - n$ will be largest if m is largest and n is smallest. So $m - n$ largest value is -10

$m - n$ will be smallest if m is smallest and n is largest. So $m - n$ smallest value is -60 .

39. If $4a + 2b < n$ and $4b + 2a > m$, then $b - a$ must be

- A. $< (m - n)/2$
- B. $\leq (m - n)/2$
- C. $> (m - n)/2$
- D. $\geq (m - n)/2$
- E. $\leq (m + n)/2$

Ans: C

Given $4a + 2b < n$ and $4b + 2a > m$. We can always add like inequalities.

Multiplying the second inequality

$$4b + 2a > m \text{ by } -1 \text{ we get } -4b - 2a < -m.$$

Now adding the two inequalities

$$4a + 2b < n \text{ and } -4b - 2a < -m$$

$$4a + 2b < n$$

$$-4b - 2a < -m$$

$$2a - 2b < n - m$$

Dividing both sides by 2

$$a - b < (n - m)/2$$

Multiplying both sides by -1

$$b - a > (m - n)/2$$

40. $1/2 < x < 2/3$, and $y^2 < 100$

Quantity A: xy

Quantity B: 6

Ans: D

Since $y^2 < 100 \rightarrow -10 < y < 10$

Now placing the two ranges one below the other and finding out the extreme values of xy

$$1/2 < x < 2/3$$

$$-10 < y < 10$$

The four extreme values of xy here are -5 , $-20/3$, 5 , $20/3$. Out of these the maximum value of xy is $20/3$ and the minimum value of xy is $-20/3$. Now since Quantity A can take values from $-20/3$ to $20/3$ a definite relationship cannot be determined with Quantity B.