1. Which one of the following is not a prime number? <u>A.</u>31 **B**.61 <u>C.</u>71 **D**.91

2. $(112 \times 5^4) = ?$	
<u>A.</u> 67000	<u>B.</u> 70000
<u>C.</u> 76500	<u>D.</u> 77200
Answer: Option B	
Explanation:	
$(112 \text{ x } 5^4) = 112 \text{ x}$	$ \begin{pmatrix} 10\\2 \end{pmatrix}^4 = \frac{112 \times 10^4}{2^4} = \frac{1120000}{16} = 70000 $

3. It is being given that $(2^{32} + 1)$ is completely divisible by a whole number. Which of the following numbers is completely divisible by this number? $\frac{\underline{B.}(2^{16} - 1)}{\underline{D.}(2^{96} + 1)}$ <u>A.</u> $(2^{16} + 1)$ $C.(7 \times 2^{23})$

Answer: Option D **Explanation:**

Let $2^{32} = x$. Then, $(2^{32} + 1) = (x + 1)$. Let (x + 1) be completely divisible by the natural number N. Then, $(2^{96} + 1) = [(2^{32})^3 + 1] = (x^3 + 1) = (x + 1)(x^2 - x + 1),$ which is completely divisible by N, since (x + 1) is divisible by N.

4. What least number must be added to 1056, so that the sum is completely divisible by 23 ? A.2 B.3 C.18 D.21 E. None of these Answer: Option A Explanation: 23) 1056 (45 92 136 115 Required number = (23 - 21) = 2. 5. 1397 x 1397 = ? A.1951609 B.1981709 C.18362619 D.2031719 E. None of these Answer: Option A Explanation: 1397 x 1397= (1397) ² = (1400 - 3) ² = (1400 - 3) ² = (1400 - 3) ² = 1960000 + 9 - 8400 = 1960009 - 8400 = 1951609.	1 What least	number must k	e added to 1056, so the	at the
A.2 B.3 C.18 D.21 E. None of these Answer: Option A Explanation: 23) 1056 (45 92 136 115 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? A.1951609 B.1981709 C.18362619 D.2031719 E. None of these Answer: Option A Explanation: 1397 x 1397= (1397) ² = (1400 - 3) ² = (1400 - 3) ² = (1400 - 3) ² = 1960000 + 9 - 8400 = 1960009 - 8400				at the
C. 18 D. 21 E. None of these Answer: Option A Explanation: 23) 1056 (45 92 136 115 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? A.1951609 B.1981709 C.18362619 D.2031719 E. None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$		pietery divisio		
E. None of these Answer: Option A Explanation: 23) 1056 (45 92 136 115 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? A.1951609 E. 1981709 C.18362619 D.2031719 E. None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = 1960000 + 9 - 8400 = 1960009 - 8400				
Explanation: 23) 1056 (45 92 136 115 21 Required number = (23 - 21) = 2. 5. 1397 x 1397 = ? <u>A.1951609</u> <u>B.1981709</u> <u>C.18362619</u> <u>D.2031719</u> <u>E. None of these</u> Answer: Option A Explanation: 1397 x 1397= (1397) ² = (1400 - 3) ² = (1400) ² + (3) ² - (2 x 1400 x 3) = 1960000 + 9 - 8400 = 1960009 - 8400		these	<u></u> 21	
23) 1056 (45 92 136 115 Required number = (23 - 21) = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= (1397) ² = (1400 - 3) ² = (1400) ² + (3) ² - (2 x 1400 x 3) = 1960000 + 9 - 8400 = 1960009 - 8400	Answer: O	ption A		
92 136 115 21 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$	-			
136 115 21 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$		45		
115 115 21 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$	92			
115 115 21 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$				
$\begin{array}{c} & & & \\ & & & & \\ & & & \\ & & & &$	100			
21 Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397 = $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$				
Required number = $(23 - 21)$ = 2. 5. 1397 x 1397 = ? <u>A.1951609</u> <u>B.1981709</u> <u>C.18362619</u> <u>D.2031719</u> <u>E. None of these</u> Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$				
= 2. 5. 1397 x 1397 = ? <u>A.</u> 1951609 <u>B.</u> 1981709 <u>C.</u> 18362619 <u>D.</u> 2031719 <u>E.</u> None of these Answer: Option A Explanation: 1397 x 1397= (1397) ² = (1400 - 3) ² = (1400) ² + (3) ² - (2 x 1400 x 3) = 1960000 + 9 - 8400 = 1960009 - 8400	21			
A.1951609 B.1981709 C.18362619 D.2031719 E. None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$		= 2.	3 - 21)	
C. 18362619 E. None of these Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$			D 1081700	
E. None of these Answer: Option A Explanation: $1397 \ge 1397 = (1397)^2$ $= (1400 - 3)^2$ $= (1400)^2 + (3)^2 - (2 \ge 1400 \ge 3)$ = 1960000 + 9 - 8400 = 1960009 - 8400				
Answer: Option A Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$			<u>D.</u> 2031719	
Explanation: 1397 x 1397= $(1397)^2$ = $(1400 - 3)^2$ = $(1400)^2 + (3)^2 - (2 x 1400 x 3)$ = $1960000 + 9 - 8400$ = $1960009 - 8400$				
$1397 \times 1397 = (1397)^{2}$ = (1400 - 3) ² = (1400) ² + (3) ² - (2 x 1400 x 3) = 1960000 + 9 - 8400 = 1960009 - 8400				
$= (1400 - 3)^{2}$ = (1400) ² + (3) ² - (2 x 1400 x 3) = 1960000 + 9 - 8400 = 1960009 - 8400				
$= (1400)^{2} + (3)^{2} - (2 \times 1400 \times 3)$ = 1960000 + 9 - 8400 = 1960009 - 8400				
= 1960000 + 9 - 8400 = 1960009 - 8400			$(3)^2 - (2 \times 1400 \times 3)$	
= 1951609.		= 1960009 - 8	8400	
		= 1951609.		

6. How many of the following numbers are divisible by 132 ? 264, 396, 462, 792, 968, 2178, 5184, 6336 **A**.4 <u>B.</u>5 <u>C.</u>6 <u>D.</u>7

Answer: Option D **Explanation:**

91 is divisible by 7. So, it is not a prime number.

Answer: Option A

- **Explanation:** $132 = 4 \ge 3 \ge 11$ So, if the number divisible by all the three number 4, 3 and 11, then the number is divisible by 132 also. 264 →11,3,4 (/) 396 →11,3,4 (/) $462 \rightarrow 11,3 (X)$ 792 →11,3,4 (/) $968 \rightarrow 11,4 (X)$ $2178 \rightarrow 11,3 (X)$ $5184 \rightarrow 3,4 (X)$ $6336 \rightarrow 11,3,4 (/)$ Therefore the following numbers are divisible by 132 : 264, 396, 792 and 6336. Required number of number = 4.
- 7. (935421 x 625) = ? A.575648125 B.584638125 C.584649125 D.585628125 Answer: Option B **Explanation:** 935421 x 625 = 935421 x 5⁴ = 935421 x $\binom{10}{2}^4$ $= \frac{935421 \times 10^4}{2^4} = \frac{9354210000}{16}$ = 584638125

8. The largest 4 digit number exactly divisible by 88 is: <u>A.</u>9944 **B**.9768

D.8888

<u>C.</u>9988 E. None of these

Answer: Option A

Explanation: Largest 4-digit number = 9999

88) 9999 (113 88 ____ 1199 88 319 264 55 Required number = (9999 - 55)= 9944.

9. Which of the following is a prime number? <u>A.</u>33 <u>B.</u>81 <u>C.</u>93 <u>D.</u>97

Answer: Option D **Explanation:** Clearly, 97 is a prime number. 10. What is the unit digit in $\{(6374)^{1793} \times (625)^{317} \times (625)^{17} \times (625)^{$ (341^{491}) ? <u>A.</u>0 <u>**B.</u>2</u></u>** <u>C.</u>3 **D**.5

Answer: Option A

Explanation: Unit digit in $(6374)^{1793}$ = Unit digit in $(4)^{1793}$ = Unit digit in $[(4^2)^{896} \times 4]$ = Unit digit in $(6 \times 4) = 4$ Unit digit in $(625)^{317}$ = Unit digit in $(5)^{317} = 5$ Unit digit in $(341)^{491}$ = Unit digit in $(1)^{491}$ = 1 Required digit = Unit digit in $(4 \times 5 \times 1) = 0$. 11. 5358 x 51 = ? <u>A.</u>273258 <u>B.</u>273268 <u>C.</u>273348 D.273358

Answer: Option A **Explanation:** $5358 \ge 51 = 5358 \ge (50 + 1)$ = 5358 x 50 + 5358 x 1 = 267900 + 5358= 273258.

12. The sum of first five prime numbers is: <u>A.</u>11 <u>B.</u>18 <u>C.</u>26 **D**.28

Answer: Option D **Explanation:** Required sum = (2 + 3 + 5 + 7 + 11) = 28. Note: 1 is not a prime number. **Definition:** A prime number (or a prime) is a natural number that has exactly two distinct natural number divisors: 1 and itself.

13. The difference of two numbers is 1365. On dividing the larger number by the smaller, we get 6 as quotient and the 15 as remainder. What is the smaller number? A.240 **B**.270 C.295 **D**.360

Answer: Option B **Explanation:** Let the smaller number be x. Then larger number = (x + x)1365). x + 1365 = 6x + 15 \Rightarrow 5*x* = 1350 $\Rightarrow x = 270$ \therefore Smaller number = 270.

14. $(12)^3 \ge 6^4 \div 432 = ?$ <u>A.</u>5184 <u>C.</u>5148 E. None of these

B.5060 **D**.5084

Answer: Option A **Explanation:**

 $(12)^3 x$ $(12)^{3}$ x $=(12)^2 \times 6^2 = (72)^2 =$ Given Exp. 6^{4} $=6^{4}$ $12 \ge 6^2 = 5184$ = 432

15. 72519 x 9999 = ? A.725117481 B.674217481 D.696217481 C.685126481 E. None of these Answer: Option A **Explanation:** 72519 x 9999= 72519 x (10000 - 1) = 72519 x 10000 - 72519 x 1 = 725190000 - 72519= 725117481.16. If the number 517 * 324 is completely divisible by 3, then the smallest whole number in the place of * will be: <u>A.</u>0 <u>B.</u>1 **C**.2 D.None of these Answer: Option C **Explanation:** Sum of digits = (5 + 1 + 7 + x + 3 + 2 + 4) = (22 + x), which must be divisible by 3. $\therefore x = 2.$ 17. The smallest 3 digit prime number is: <u>A.</u>101 <u>**B**</u>.103 <u>C.</u>109 <u>D.</u>113 Answer: Option A **Explanation:** The smallest 3-digit number is 100, which is divisible by •• 100 is not a prime number. 101 < 11 and 101 is not divisible by any of the prime numbers 2, 3, 5, 7, 11. •• 101 is a prime number. Hence 101 is the smallest 3-digit prime number. 18. Which one of the following numbers is exactly divisible by 11? A.235641 **B**.245642 C.315624 D.415624 Answer: Option D **Explanation:** (4+5+2) - (1+6+3) = 1, not divisible by 11. (2+6+4) - (4+5+2) = 1, not divisible by 11. (4+6+1) - (2+5+3) = 1, not divisible by 11. (4+6+1) - (2+5+4) = 0, So, 415624 is divisible by 19. (?) - 19657 - 33994 = 9999 <u>A.</u>63650 **B**.53760 <u>C.</u>59640 D.61560 E. None of these Answer: Option A

2.

11.

Explanation: Let x - 53651 = 999919657 33994 Then, x = 9999 + 53651 = 63650____ 53651

 A.1035
 B.1280

 C.2070
 D.2140

Answer: Option A

Explanation:

Let $S_n = (1 + 2 + 3 + ... + 45)$. This is an A.P. in which a =1, d =1, n = 45. $S_n \frac{n[2a + (n - \frac{45x}{2} [2x1 + (45 - \frac{45x}{2}] = (45x - \frac{45x}{2}]$

- = 900 + 135
- = 1035.

Shorcut Method:

 $S_n = \frac{n(n+1)}{2} = \frac{45(45+1)}{2} = 1035.$

21. Which of the following number is divisible by 24 ? <u>A.35718</u> <u>B.63810</u> <u>C.537804</u> <u>D.3125736</u> <u>Answer: Option D</u>

Explanation:

24 = 3 x8, where 3 and 8 co-prime.

Clearly, 35718 is not divisible by 8, as 718 is not

divisible by 8. Similarly, 63810 is not divisible by 8 and 537804 is not divisible by 8.

Cibsuder oart (d). Sum of digits = (3 + 1 + 2 + 5 + 7 + 3 + 6) = 27, which is divisible by 3. Also, 736 is divisible by 8.

••• 3125736 is divisible by (3 x 8), *i.e.*, 24.

22. $753 \times 753 + 247 \times 247 - 753 \times 247 = ?$ $753 \times 753 \times 753 + 247 \times 247 \times 247 = ?$ <u>A.1</u> <u>1000</u> <u>B.1</u> <u>506</u> <u>C.253</u> <u>D.</u>None of these

Answer: Option A

Explanation: Given Exp. $= \stackrel{(a^2 + b^2 - ab)}{(a^3 + b^3)} = \stackrel{1}{(a + b)} = \stackrel{1}{(753 + 247)} = \stackrel{1}{1000}$

 $\begin{array}{c} 23. (?) + 3699 + 1985 - 2047 = 31111 \\ \underline{A.34748} & \underline{B.27474} \\ \underline{C.30154} & \underline{D.27574} \\ \underline{E.} \text{ None of these} \end{array}$

Answer: Option B Explanation: x + 3699 + 1985 - 2047 = 31111 $\Rightarrow x + 3699 + 1985 = 31111 + 2047$ $\Rightarrow x + 5684 = 33158$ $\Rightarrow x = 33158 - 5684 = 27474.$

24. If the number 481 * 673 is completely divisible by 9, then the smallest whole number in place of * will be: <u>A.2</u> <u>B.5</u> <u>C.6</u> <u>D.7</u> <u>E.</u> None of these

Answer: Option D

Sum of digits = (4 + 8 + 1 + x + 6 + 7 + 3) = (29 + x), which must be divisible by 9. $\therefore x = 7$.

25. The difference between the local value and the face value of 7 in the numeral 32675149 is

<u>A.</u> /J142	<u>D.</u> 04651
<u>C.</u> 5149	<u>D.</u> 69993
E. None of these	

Answer: Option **D Explanation:** (Local value of 7) - (Face value of 7) = (70000 - 7) = 69993

26. The difference between a positive proper fraction and its reciprocal is 9/20. The fraction is:

$$\underline{A.5}^{3} \qquad \underline{B.10}^{3} \\ \underline{C.5}^{4} \qquad \underline{D.3}^{4}$$

Answer: Option C Explanation:

Let the required fraction be x. Then $\frac{1}{x} - x = \frac{9}{20}$

$$\therefore \frac{1 - x^2}{x} = \frac{9}{20}$$

$$\Rightarrow 20 - 20x^2 = 9x$$

$$\Rightarrow 20x^2 + 9x - 20 = 0$$

$$\Rightarrow 20x^2 + 25x - 16x - 20 = 0$$

$$\Rightarrow 5x(4x + 5) - 4(4x + 5) = 0$$

$$\Rightarrow (4x + 5)(5x - 4) = 0$$

$$x = \frac{4}{5}$$

27. On dividing a number by 56, we get 29 as remainder. On dividing the same number by 8, what will be the remainder ?

$$\frac{A.4}{C.6} \qquad \frac{B.5}{D.7}$$

Answer: Option B Explanation: No answer description available for this question. Let us discuss.

28. If n is a natural number, then $(6n^2 + 6n)$ is always
divisible by:A.6 onlyC.12 onlyD.by 18 only

Answer: Option B

Explanation:

 $(6n^2 + 6n) = 6n(n + 1)$, which is always divisible by 6 and 12 both, since n(n + 1) is always even.

29. 107 x 107 + 93 x 93 = ? <u>A.19578</u> <u>C.20098</u> <u>D.21908</u> <u>E. None of these</u>

Answer: Option C

 $\begin{array}{rcl}
107 & x & 107 + \\
93 & x & 93 \\
&= (107)^2 + (93)^2 \\
&= (100 + 7)^2 + (100 - 7)^2 \\
&= 2 & x \left[(100)^2 + 7^2 \right] \\
&- b)^2 = 2(a^2 + b^2) \\
&= 20098
\end{array}$ [Ref: $(a + b)^2 + (a + b^2)^2 + ($

30. What will be re	emainder when $(67^{67} + 67)$ is divided by
68 ?	
<u>A.</u> 1	<u>B.</u> 63
<u>C.</u> 66	<u>D.</u> 67

Answer: Option C

Explanation:

 $(x^{n} + 1)$ will be divisible by (x + 1) only when *n* is odd. $\cdot \cdot (67^{67} + 1)$ will be divisible by (67 + 1)

•• $(67^{67} + 1) + 66$, when divided by 68 will give 66 as remainder.

31. On dividing a number by 5, we get 3 as remainder. What will the remainder when the square of the this number is divided by 5 ?

<u>A.</u> 0	<u>B.</u> 1
<u>C.</u> 2	<u>D.</u> 4

Answer: Option D

Explanation:

Let the number be *x* and on dividing *x* by 5, we get *k* as quotient and 3 as remainder.

 $=5(5k^2+6k+1)+4$

•• On dividing x^2 by 5, we get 4 as remainder.

32. How many 3-	-digit numbers are completely divisible 6?
<u>A.</u> 149	<u>B.</u> 150
<u>C.</u> 151	<u>D.</u> 166

Answer: Option B Explanation:

3-digit number divisible by 6 are: 102, 108, 114,..., 996 This is an A.P. in which a = 102, d = 6 and l = 996Let the number of terms be n. Then $t_n = 996$. $\therefore a + (n - 1)d = 996$ $\Rightarrow 102 + (n - 1) \ge 6 = 996$ $\Rightarrow 6 \le (n - 1) = 894$ $\Rightarrow (n - 1) = 149$ $\Rightarrow n = 150$ \therefore Number of terms = 150.

33. How many natural numbers are there between 23 and 100 which are exactly divisible by 6 ?
<u>A.8</u>
<u>B.11</u>
<u>C.12</u>
<u>D.13</u>
E. None of these

Answer: Option **D** Explanation:

Required numbers are 24, 30, 36, 42, ..., 96 This is an A.P. in which a = 24, d = 6 and l = 96Let the number of terms in it be *n*. Then $t_n = 96 \implies a + (n - 1)d = 96$ 34. How many of the following numbers are divisible by 3 but not by 9 ?

2133, 2343, 3474, 4131, 5286, 5340, 6336, 7347, 8115, 9276

<u>A.</u>5

<u>C.</u>7

<u>B.</u>6 <u>D.</u>None of these

Answer: Option **B** Explanation:

Marking (/) those which are are divisible by 3 by not by 9 and the others by (X), by taking the sum of digits, we get:s

2133 →9 (X) 2343 →12 (/) 3474 →18 (X) 4131 →9 (X) 5286 →21 (/) 5340 →12 (/) 6336 →18 (X) 7347 →21 (/) 8115 →15 (/) 9276 →24 (/) Required number of numbers = 6.

$35. (963 + 476)^2 + (963 - 476)$	2 - 2
(963 x 963 + 476 x 476)	- :
<u>A.</u> 1449	<u>B.</u> 497
<u>C.</u> 2	<u>D.</u> 4
E. None of these	

Answer: Option C Explanation: Given Exp. $= \frac{(a+b)^2 + (a-b)^2}{(a^2+b^2)} = \frac{2(a^2+b^2)}{(a^2+b^2)}$ 36. How many 3 digit numbers are divisible by 6 in all ? <u>A.149</u> <u>B.150</u> <u>C.151</u> <u>D.166</u>

Answer: Option B

Explanation: Required numbers are 102, 108, 114, ..., 996 This is an A.P. in which a = 102, d = 6 and l = 996Let the number of terms be n. Then, a + (n - 1)d = 996 $\Rightarrow 102 + (n - 1) \ge 6 = 996$ $\Rightarrow 6 \ge (n - 1) = 894$ $\Rightarrow (n - 1) = 149$ $\Rightarrow n = 150$.

37. A 3-digit number 4a3 is added to another 3-digit number 984 to give a 4-digit number 13b7, which is divisible by 11. Then, (a + b) = ?

<u>A.</u> 10	<u>B.</u> 11
<u>C.</u> 12	<u>D.</u> 15

Answer: Option A

 $\begin{array}{l} 4 \ a \ 3 \ | \\ 9 \ 8 \ 4 \ \} \implies a + 8 = b \implies b - a = 8 \\ 13 \ b \ 7 \ | \\ Also, 13 \ b \ 7 \ is divisible by 11 \implies (7 + 3) - (b + 1) = \\ (9 - b) \implies (9 - b) = 0 \\ \implies b = 9 \\ \therefore \ (b = 9 \ \text{and} \ a = 1) \implies (a + b) = 10. \end{array}$

38. 8597 - ? = 7429 - 4358 <u>A.</u>5426 **B**.5706 <u>C.</u>5526 <u>D.</u>5476 E. None of these Answer: Option C **Explanation:** 7429 Let 8597 - x = 3071-4358 Then, x = 8597 - 3071= 5526 ____ 3071 ----

39. The smallest prime number is: <u>A.1</u> <u>B.2</u> <u>C.3</u> <u>D.4</u> <u>Answer: Option B</u> <u>Explanation:</u> The smallest prime number is 2.

- 40. $(12345679 \ge 72) = ?$ <u>A.888888888</u> <u>C.8989898988</u> <u>Answer: Option B</u> Explanation: 12345679 $\ge 72 = 12345679 \ge (70 + 2)$ $= 12345679 \ge 70 + 12345679 \ge 2$ = 864197530 + 24691358= 888888888
- 41. On dividing a number by 357, we get 39 as remainder. On dividing the same number 17, what will be the remainder ?
 A.0
 B.3

<u>D.</u>11

<u>C.</u>5

Answer: Option C Explanation: Let x be the number and y be the quotient. Then, x = 357 x y + 39= (17 x 21 x y) + (17 x 2) + 5= 17 x (21y + 2) + 5)

 \therefore Required remainder = 5.

42. If the product 4864 x 9 P 2 is divisible by 12, then the value of P is:
A.2
B.5
C.6
D.8

<u>E.</u>None of these

Answer: Option E Explanation:

Clearly, 4864 is divisible by 4. So, 9P2 must be divisible by 3. So, (9 + P + 2) must be divisible by 3. $\therefore P = 1$. 43. Which one of the following is the common factor of $(47^{43} + 43^{43})$ and $(47^{47} + 43^{47})$? <u>A.</u>(47 - 43) <u>B.</u>(47 + 43) <u>C.</u>(47⁴³ + 43⁴³) <u>D.</u>None of these

Answer: Option B Explanation:

When *n* is odd, $(x^n + a^n)$ is always divisible by (x + a). \therefore Each one of $(47^{43} + 43^{43})$ and $(47^{47} + 43^{43})$ is divisible by (47 + 43).

 44. $-84 \ge 29 + 365 = ?$

 <u>A.2436</u>
 <u>B.</u>2801

 <u>C.</u>-2801
 <u>D.</u>-2071

 <u>E.</u> None of these

Answer: Option D Explanation: Given Exp.= -84 x (30 - 1) + 365 = -(84 x 30) + 84 + 365 = -2520 + 449 = -2071

45. A number when divided by 296 leaves 75 as remainder. When the same number is divided by 37, the remainder will be:

<u>A.</u> 1	<u>D.</u> Z
<u>C.</u> 8	<u>D.</u> 11

Answer: Option A Explanation: Let x = 296q + 75 $= (37 \times 8q + 37 \times 2) + 1$ = 37 (8q + 2) + 1Thus, when the number is divided by 37, the remainder is 1.

46. In dividing a number by 585, a student employed the method of short division. He divided the number successively by 5, 9 and 13 (factors 585) and got the remainders 4, 8, 12 respectively. If he had divided the number by 585, the remainder would have been <u>A.24</u> <u>B.144</u> <u>C.292</u> <u>D.584</u>

Answer: Option D

Explanation:	
$5 \mid x$	z = 13 x 1 + 12 = 25
9 y - 4	y = 9 x z + 8 = 9 x 25 + 8 = 233
13 <i>z</i> - 8	x = 5 x y + 4 = 5 x 233 + 4 = 1169
1 -12	
585) 1169 (1	
585	
584	
Therefor	e, on dividing the number by 585,
remainder = 5	84.

- 47. In a division sum, the divisor is 10 times the quotient and 5 times the remainder. If the remainder is 46, what is the dividend ? A.4236 **B**.4306 C.4336 **D**.5336 E. None of these Answer: Option D **Explanation:** $Divisor = (5 \times 46) = 230$ \therefore 10 x Quotient = 230 $\implies = \frac{230}{10} = 23$ Dividend = (Divisor x Quotient) + Remainder $= (230 \times 23) + 46$ = 5290 + 46= 5336. 48. 4500 x ? = 3375 <u>B.</u>3 2 <u>A.</u>5 <u>C.</u>¹₄ E. None of these Answer: Option B **Explanation:** 4500 x $x = 3375 \implies x = \frac{3375^{75}}{4500_{100}} = \frac{3}{4}$
- 49. What smallest number should be added to 4456 so that the sum is completely divisible by 6? <u>A.</u>4 <u>C.</u>2 <u>B.</u>3 **D**.1 E. None of these Answer: Option C **Explanation:** 6) 4456 (742 42 ---25 24 Therefore, Required number = (6 - 4) = 2. ---16 12 ---4
- 50. What least number must be subtracted from 13601, so that the remainder is divisible by 87?

<u>A.</u> 23 <u>C.</u> 29 <u>E.</u> 49	<u>B.</u> 31 <u>D.</u> 37
Answer: Option C Explanation: 87) 13601 (156 87	
490 435	
551 522	
 29	

- 51. 476 ** 0 is divisible by both 3 and 11. The non-zero digits in the hundred's and ten's places are respectively: **B**.7 and 5
 - A.7 and 4 C.8 and 5 D.None of these

Answer: Option C **Explanation:** Let the given number be 476 xy 0. Then (4 + 7 + 6 + x + y + 0) = (17 + x + y) must be divisible by 3. And, (0 + x + 7) - (y + 6 + 4) = (x - y - 3) must be either 0 or 11. $x - y - 3 = 0 \implies y = x - 3$ (17 + x + y) = (17 + x + x - 3) = (2x + 14) $\Rightarrow x=2 \text{ or } x=8.$ $\therefore x = 8$ and y = 5.

52. If the number 97215 * 6 is completely divisible by 11, then the smallest whole number in place of * will he:

<u>A.</u> 3	<u>B.</u> 2
<u>C.</u> 1	<u>D.</u> 5
E. None of these	

Answer: Option A **Explanation:**

Given number = 97215x6(6+5+2+9) - (x+1+7) = (14 - x), which must be divisible by 11. $\therefore x = 3$

53. $(11^2 + 12^2 + 13^2)$	$+ \dots + 20^2) = ?$
<u>A.</u> 385	<u>B.</u> 2485
<u>C.</u> 2870	D.3255

Answer: Option B **Explanation:** $(11^{2} + 12^{2} + 13^{2} + ... + 20^{2}) = (1^{2} + 2^{2} + 3^{2} + ... + 20^{2})$ 20^2) - $(1^2 + 2^2 + 3^2 + ... + 10^2)$ **Ref:** $(1^2 + 2^2 + 3^2 + ... + n^2) \quad \frac{1}{n(n+1)(2n+1)}$ = 61) 20 x 21 x 41 10 x 11 x 21 = 6 6 =(2870 - 385)= 2485.

54. If the number 5 * 2 is divisible by 6, then * = ?<u>A.</u>2 <u>B.</u>3 <u>C.</u>6 <u>D.</u>7

Answer: Option A **Explanation:** $6 = 3 \times 2$. Clearly, 5 * 2 is divisible by 2. Replace * by x. Then, (5 + x + 2) must be divisible by 3. So, x = 2.

55. Which of the following numbers will completely divide $(49^{15} - 1)$?

Answer: Option A Explanation:

 $(x^n - 1)$ will be divisibly by (x + 1) only when *n* is even. $(49^{15} - 1) = \{(7^2)^{15} - 1\} = (7^{30} - 1)$, which is divisible by (7 + 1), *i.e.*, 8.

56.
$$3 \ 2 \ 4^{+} 7 \ 4^{-} 7 \ 9^{-} \left(9 \ 4^{-} 15\right) = ?$$

A.7 $\ 4^{-} 1020$
C.9 $\ 4^{-} 719$
D.7 $\ 4^{-} 817$
D.7 $\ 4^{-} 817$
D.7 $\ 4^{-} 817$

<u>E.</u>None of these

Answer: Option D Explanation:

Given sum=
$$9 + \frac{3}{4} + 7 + \frac{2}{17} \cdot \left(9 + \frac{1}{15}\right)$$

= $(9 + 7 - 9) + \left(\frac{3}{4} + \frac{2}{17} + \frac{1}{15}\right)$
= $7 + \frac{765 + 120 - 68}{1020}$
= $7 + \frac{817}{1020}$

57.
$$\begin{pmatrix} 1 \\ 1 \\ -n \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \\ -n \end{pmatrix} + \begin{pmatrix} 3 \\ 1 \\ -n \end{pmatrix} + \dots \text{ up to n terms} = ?$$

$$\underline{A} \cdot \frac{1}{2}n \qquad \qquad \underline{B} \cdot \frac{1}{2}(n-1)$$

$$\underline{C} \cdot \frac{1}{2}n(n-1) \qquad \qquad \underline{D} \cdot \text{None of these}$$

Answer: Option B Explanation:

Given =
$$(1 + 1 + 1 + ... \text{ to } - \begin{pmatrix} 1 & 2 & 3 + ... \text{ to } n \\ n & n \text{ terms} \end{pmatrix}$$

= $n n (n + 1) [$ **Ref**: n th terms = $(n/n) = (n/n) = (n + 1) = (n +$

58. On dividing 2272 as well as 875 by 3-digit number N, we get the same remainder. The sum of the digits of N is:
<u>A.</u>10 <u>B.</u>11 C.12 <u>D.</u>13

Answer: Option A Explanation:

Clearly, (2272 - 875) = 1397, is exactly divisible by N. Now, $1397 = 11 \times 127$ \therefore The required 3-digit number is 127, the sum of whose digits is 10. 59. A boy multiplied 987 by a certain number and obtained 559981 as his answer. If in the answer both 98 are wrong and the other digits are correct, then the correct answer would be:

Answer: Option C Explanation: 987 = 3 x 7 x 47 So, the required number must be divisible by each one of 3, 7, 47 553681 \rightarrow (Sum of digits = 28, not divisible by 3) 555181 \rightarrow (Sum of digits = 25, not divisible by 3) 555681 is divisible by 3, 7, 47.

60. How many pr	ime numbers are less than 50?
<u>A.</u> 16	<u>B.</u> 15
<u>C.</u> 14	<u>D.</u> 18

Answer: Option B Explanation: Prime numbers less than 50 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47 Their number is 15

Therefore, the required number = 29.

61. When a number is divided by 13, the remainder is 11. When the same number is divided by 17, then remainder is 9. What is the number ?
<u>A.</u>339
<u>B.</u>349

D.Data inadequate

Answer: Option B **Explanation:** x = 13p + 11 and x = 17q + 913p + 11 = 17q + 9 \Rightarrow 17q - 13p = 2 $\Rightarrow q = \frac{2+13p}{17}$ 2 +The least value of p for is a whole number is p 13p which q == 2617 $\therefore x = (13 \text{ x } 26 + 11)$ =(338+11)= 349

62. (51 + 52 + 53 + ... + 100) = ?<u>A.</u>2525 <u>B.</u>2975 C.3225 D.3775

Answer: Option D

Explanation:

$$\begin{split} S_n &= (1+2+3+...+50+51+52+...+100) - (1+2+3+...+50) \\ &= \frac{100}{2} x \; (1+100) - \frac{50}{2} x \; (1+50) \\ &= (50 \; x \; 101) - (25 \; x \; 51) \\ &= (5050-1275) \\ &= 3775. \end{split}$$

 $63. (800 \div 64) \times (1296 \div 36) = ?$ <u>A.420</u>
<u>B.460</u>
<u>C.500</u>
<u>D.540</u>
<u>E.</u>None of these

Answer: Option E Explanation: Given Exp. $= \frac{800}{64} \times \frac{1296}{36} = 450$

64. Which natural number is nearest to 8485, which is		
completely divisible	by 75 ?	
<u>A.</u> 8475	<u>B.</u> 8500	
<u>C.</u> 8550	<u>D.</u> 8525	
E. None of these		

Answer: Option A

Explanation:

On dividing, we get

75) 8485 (113 75

Required number = (8485 - 10)= 8475.

65. If the number 42573 * is exactly divisible by 72, then the minimum value of * is: <u>A.4</u> <u>B.5</u> <u>C.6</u> <u>D.7</u>

<u>E.</u>8

Answer: Option C Explanation: $72 = 9 \times 8$, where 9 and 8 are co-prime. The minimum value of x for which 73x for which 73x is divisible by 8 is, x = 6. Sum of digits in 425736 = (4 + 2 + 5 + 7 + 3 + 6) = 27, which is divisible by 9. \therefore Required value of * is 6.

66. Which of the following numbers is divisible by each one of 3, 7, 9 and 11 ?

<u>A.639</u>
<u>B.2079</u>
<u>C.3791</u>
<u>D.37911</u>

<u>E.</u> None of these

Answer: Option B Explanation:

639 is not divisible by 7 2079 is divisible by each of 3, 7, 9, 11. 67. Which natural number is nearest to 9217, which is completely divisible by 88 ?
A.9152 B.9240
C.9064 D.9184
E. None of these

Answer: Option B Explanation:

On dividing we get,

88) 9217 (104

Therefore, Required number = 9217 + (88 - 65)= 9217 + 23= 9240.

68. (4300731) - ? = 2535618 <u>A.1865113</u> <u>C.1765113</u> <u>E.</u>None of these <u>B.1775123</u> <u>D.1675123</u>

Answer: Option C Explanation: Let 4300731 - *x* = 2535618 Then *x*, = 4300731 - 2535618 = 1765113

69. *n* is a whole number which when divided by 4 gives 3 as remainder. What will be the remainder when 2*n* is divided by 4 ?

<u>A.</u> 3	<u>B.</u> 2
<u>C.</u> 1	<u>D.</u> 0

Answer: Option B Explanation:

Let n = 4q + 3. Then 2n = 8q + 6 = 4(2q + 1) + 2. Thus, when 2n is divided by 4, the remainder is 2.

70. $(489 + 375)^2 - (489 - 375)^2 - 2$ (489 x 375) <u>A.</u>144 **B**.864 **C**.2 <u>D.</u>4 E. None of these Answer: Option D **Explanation:** Given Exp. $=_{ab}^{(a+b)^2 - (a-b)^2} =_{ab}^{4ab=4} =_{ab}^{4ab=4}$ 71. 397 x 397 + 104 x 104 + 2 x 397 x 104 = ? <u>A.</u>250001 **B**.251001 C.260101 D.261001 Answer: Option B

Explanation: Given Exp.= $(397)^2 + (104)^2 + 2 \times 397 \times 104$ = $(397 + 104)^2$ = $(501)^2 = (500 + 1)^2$

$$= (5002) + (1)2 + (2 x 500 x 1)$$

= 250000 + 1 + 1000
= 251001

72. $(35423 + 7164 + 41720) - (317 \times 89) = ?$ <u>A.</u>28213 **B**.84307 <u>C.</u>50694 D.56094 E. None of these

Answer: Option D **Explanation:**

35423 317 x 89 = 317 x (90 - 1) + 7164 $= (317 \times 90 - 317)$ +41720=(28530 - 317)= 28213_____ 84307 - 28213 ____ 56094 _____

73. $(x^n - a^n)$ is completely divisible by (x - a), when $\underline{\mathbf{B}}_{number}^{n \text{ is an even natural}}$ A.*n* is any natural number

D.*n* is prime

 $\underline{\mathbf{C}}_{number}^{n \text{ is and odd natural}}$

Answer: Option A **Explanation:**

For every natural number n, $(x^n - a^n)$ is completely divisible by (x - a).

74. Which one of the following numbers is completely		
divisible by 45?		
<u>A.</u> 181560	<u>B.</u> 331145	
<u>C.</u> 202860	<u>D.2033555</u>	
E. None of these		

Answer: Option C

Explanation:

 $45 = 5 \times 9$, where 5 and 9 are co-primes. Unit digit must be 0 or 5 and sum of digits must be

divisible by 9. Among given numbers, such number is 202860.

75. Which of the for $(3^{25} + 3^{26} + 3^{27})$	bllowing numbers will completely divide $+3^{28}$?
<u>A.</u> 11	<u>B.</u> 16 D.30
<u>C.</u> 25	<u>D.</u> 30

Answer: Option D

Explanation: $(3^{25} + 3^{26} + 3^{27} + 3^{28}) = 3^{25} \times (1 + 3 + 3^2 + 3^3) = 3^{25} \times 40$ $= 3^{24} \times 3 \times 4 \times 10$ $= (3^{24} \times 4 \times 30)$, which is divisible by 30.

76. A number when divide by 6 leaves a remainder 3. When the square of the number is divided by 6, the remainder is:

<u>A.</u> 0	<u>B.</u> 1
<u>C.</u> 2	<u>D.</u> 3

- Answer: Option D **Explanation:** Let x = 6q + 3. Then, $x^2 = (6q + 3)^2$ = $36q^2 + 36q + 9$ = $6(6q^2 + 6q + 1) + 3$ Thus, when x^2 is divided by 6, then remainder = 3.
- 77. The sum of the two numbers is 12 and their product is 35. What is the sum of the reciprocals of these numbers ?

 $\underline{\mathbf{B}}_{35}^{1}$ $\underline{\mathbf{D}}_{32}^{7}$

Answer: Option A

12

<u>A.</u>35

<u>C.</u>35

Explanation: Let the numbers be a and b. Then, a + b = 12 and ab =35.

$$\stackrel{\cdot}{\cdot} \stackrel{a+b}{}_{ab} \stackrel{12}{}_{35} \stackrel{}{\Rightarrow} \left(\begin{array}{c} 1 \\ b^+ a \end{array} \right) \stackrel{12}{}_{35} \stackrel{}{\Rightarrow}$$

•• Sum of reciprocals of given numbers $=_{35}^{12}$

78. What will be remainder when 17^{200} is divided by 18? <u>A.</u>17 <u>B.</u>16 **C**.1 **D**.2

Answer: Option C

Explanation:

When *n* is even. $(x^n - a^n)$ is completely divisibly by $(x + a^n)$ a)

 $(17^{200} - 1^{200})$ is completely divisible by (17 + 1), *i.e.*, 18. \Rightarrow (17²⁰⁰ - 1) is completely divisible by 18.

 \Rightarrow On dividing 17²⁰⁰ by 18, we get 1 as remainder.

79. If 1400 x <i>x</i> = 1050. 7	Then, $x = ?$
Δ 1	<mark>в</mark> 3
<u>^.</u> 4	<u>D.</u> 5
\mathbf{C}^2	D^3
<u></u> 3	<u></u> 4
<u>E.</u> None of these	

Answer: Option D

Explanation:

1400 x $x = 1050 \implies x = \frac{1050}{1400} = \frac{3}{4}$

80. $(1^2 + 2^2 + 3^2 + \dots + 10^2) = ?$	
<u>A.</u> 330	<u>B.</u> 345
<u>C.</u> 365	<u>D.</u> 385

Answer: Option D

Explanation:

We know that $(1^2 + 2^2 + 3^2 + ... + n^2) = \frac{1}{6}n(n+1)(2n+1)$ Putting n = 10, required sum = $\begin{pmatrix} 1 \\ 6^x & 10 \\ x & 11 \\ x & 21 \end{pmatrix} = 385$

81. The difference of the squares of two consecutive even integers is divisible by which of the following integers ? <u>A.</u>3 **B**.4

<u>C.</u> 6		<u>D.</u> 7

Answer: Option B **Explanation:**

Let the two consecutive even integers be 2n and (2n +2). Then, $(2n+2)^2 = (2n+2+2n)(2n+2-2n)$ = 2(4n + 2)

= 4(2n + 1), which is divisible by 4.

82. Which one of the fo	llowing is a prime number ?
<u>A.</u> 119	<u>B.</u> 187
<u>C.</u> 247	<u>D.</u> 551
E. None of these	

Answer: Option E **Explanation:** 551 > 22 All prime numbers less than 24 are : 2, 3, 5, 7, 11, 13, 17, 19, 23. 119 is divisible by 7; 187 is divisible by 11; 247 is divisible by 13 and 551 is divisible by 19. So, none of the given numbers is prime.

83. The sum all ev	en natural numbers between 1 and 31 is:
<u>A.</u> 16	<u>B.</u> 128
C.240	D .512

Answer: Option C

Explanation: Required sum = (2 + 4 + 6 + ... + 30)This is an A.P. in which a = 2, d = (4 - 2) = 2 and l = 30. Let the number of terms be *n*. Then, $t_n = 30 \implies a + (n-1)d = 30$ \Rightarrow 2 + (*n* - 1) x 2 = 30 $\Rightarrow n - 1 = 14$ $\Rightarrow n = 15$ \therefore S_n = ${n \choose 2}(a+l) = {15 \choose 2}x(2+30) = 240.$

84. The difference between the place value and the face value of 6 in the numeral 856973 is A.973 **B**.6973 <u>C.</u>5994 D.None of these

Answer: Option C **Explanation:** (Place value of 6) - (Face value of 6) = (6000 - 6) = 5994

85. If a and b are odd m	umbers, then which of the following
is even ?	
$\underline{\mathbf{A}}.a+b$	<u>B</u> . $a + b + 1$
<u>C.</u> ab	<u>D</u> . $ab + 2$
E. None of these	

Answer: Option A **Explanation:**

The sum of two odd number is even. So, a + b is even.

- 86. Which one of the following numbers is completely divisible by 99? <u>A.</u>3572404 **B**.135792 C.913464 D.114345
 - E. None of these

Answer: Option D **Explanation:** $99 = 11 \times 9$, where 11 and 9 are co-prime. By hit and trial, we find that 114345 is divisible y 11 as well as 9. So, it is divisible by 99.

87. The sum of how may tersm of the series 6 + 12 + 18 + 1824 + ... is 1800 ?

<u>A.</u> 16	<u>B.</u> 24
<u>C.</u> 20	<u>D.</u> 18
<u>E.</u> 22	

Answer: Option B **Explanation:** This is an A.P. in which a = 6, d = 6 and $S_n = 1800$ Then, ${}_{2}^{n}[2a + (n - 1)d] = 1800$ $\implies {n \choose 2} [2 \ge 6 + (n - 1) \ge 6] = 1800$ $\Rightarrow 3n(n+1) = 1800$ $\Rightarrow n(n+1) = 600$ $\Rightarrow n^2 + n - 600 = 0$ $\Longrightarrow n^2 + 25n - 24n - 600 = 0$ \Rightarrow n(n+25) - 24(n+25) = 0 \implies (n+25)(n-24) = 0 $\Rightarrow n = 24$ Number of terms = 24.

88. (51+52+53+...+100) = ?<u>A.</u>2525 **B**.2975 C.3225 **D**.3775

Answer: Option D **Explanation:** This is an A.P. in which a = 51, l = 100 and n = 50. •• Sum $n(a + 50x (51 + 100) = (25 \times 151) =$ 2l) 2 3775. =

89. 1904 x 1904 = ? A.3654316 <u>B.</u>3632646 <u>C.</u>3625216 D.3623436 E. None of these Answer: Option C **Explanation:** $1904 \times 1904 = (1904)^2$ $=(1900+4)^{2}$ $= (1900)^{2} + (4)^{2} + (2 \times 1900 \times 4)$ = 3610000 + 16 + 15200.= 3625216.

90. What is the unit digit $in(7^{95} - 3^{58})$? **A**.0 **B**.4 <u>C.</u>6 <u>D.</u>7

Answer: Option B

Unit digit in 7^{95} = Unit digit in $[(7^4)^{23} \times 7^3]$ = Unit digit in [(Unit digit in(2401))²³ x (343)] = Unit digit in (1²³ x 343) = Unit digit in (343) = 3 Unit digit in 3^{58} = Unit digit in $[(3^4)^{14} \times 3^2]$ = Unit digit in [Unit digit in $(81)^{14} \times 3^2$] = Unit digit in $[(1)^{14} \times 3^2]$ = Unit digit in (1×9) = Unit digit in (9) = 9 Unit digit in $(7^{95} - 3^{58}) =$ Unit digit in (343 - 9) = Unit digit in (334) = 4. So, Option B is the answer. 91. Which one of the following is a prime number ? <u>A.</u>161 <u>**B.**</u>221 <u>C.</u>373 **D**.437 E. None of these Answer: Option C **Explanation:**

437 > 22 All prime numbers less than 22 are : 2, 3, 5, 7, 11, 13, 17, 19. 161 is divisible by 7, and 221 is divisible by 13. 373 is not divisible by any of the above prime numbers. ·• 373 is prime.

92. The smallest 6 digit no	umber exactly divisible by 111 is:
<u>A.</u> 111111	<u>B.</u> 110011
<u>C.</u> 100011	<u>D.</u> 110101
E. None of these	

Answer: Option C **Explanation:** The smallest 6-digit number 100000.

111) 100000 (900 999 100

Required number = 100000 + (111 - 100)= 100011.

93. The largest 5 digit number exactly divisible by 91 is:		
<u>A.</u> 99921	<u>B.</u> 99918	
<u>C.</u> 99981	D.99971	
<u>E.</u> None of these		

Answer: Option B **Explanation:** Largest 5-digit number = 99999

Required number = (99999 - 81)= 99918.

	- ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
94.	$\begin{array}{c} 768 \text{ x } 768 \text{ x } 768 + 232 \text{ x } 232 \text{ x } 232 \\ 768 \text{ x } 768 \text{ - } 768 \text{ x } 232 + 232 \text{ x } 232 \\ \hline \textbf{A}.1000 \qquad \qquad \textbf{B}.536 \\ \hline \textbf{C}.500 \qquad \qquad \textbf{D}.268 \\ \hline \textbf{E}. \text{ None of these} \end{array}$
	Answer: Option A Explanation:
	Given Exp. $\begin{array}{l} (a^3 + b^3) \\ (a^2 - ab + b^2) \end{array} = (a + b) = (768 + 232) = \\ 1000 \end{array}$
95.	The smallest 5 digit number exactly divisible by 41 is:A.1004B.10004C.10045D.10025E. None of these
	Answer: Option B Explanation: The smallest 5-digit number = 10000.
	41) 10000 (243 82 180 164
	 160 123 37
	 Required number = 10000 + (41 - 37) = 10004.
96.	How many terms are there in the G.P. 3, 6, 12, 24,, 384 ? <u>A.8</u> <u>B.9</u>
	<u>C.10</u> <u>D.11</u> <u>E.</u> 7
	Answer: Option A Explanation:
	Here $a = 3$ and $r = \frac{6}{3} = 2$. Let the number of terms be n . Then, $t_n = 384 \implies ar^{n-1} = 384$ $\implies 3 \ge 2^{n-1} = 384$ $\implies 2^{n-1} = 128 = 2^7$ $\implies n - 1 = 7$ $\implies n = 8$
97.	•• Number of terms = 8. If x and y are positive integers such that $(3x + 7y)$ is a

9 multiple of 11, then which of the following will be divisible by 11?

<u>**B**</u>.x + y + 4A.4x + 6y<u>**C.**</u>9x + 4y<u>D.</u>4*x* - 9*y*

Answer: Option D

By hit and trial, we put x = 5 and y = 1 so that (3x + 7y) = (3 x 5 + 7 x 1) = 22, which is divisible by 11. $\therefore (4x + 6y) = (4 x 5 + 6 x 1) = 26$, which is not divisible by 11; (x + y + 4) = (5 + 1 + 4) = 10, which is not divisible by 11; (9x + 4y) = (9 x 5 + 4 x 1) = 49, which is not divisible by 11; (4x - 9y) = (4 x 5 - 9 x 1) = 11, which is divisible by 11.

98. 9548 + 7314 = 8362 + (?)<u>A.8230</u> <u>B.8410</u> <u>C.8500</u> <u>D.8600</u> <u>E. None of these</u>

Answer: Option CExplanation:954816862 = 8362 + x+7314x = 16862 - 8362----= 850016862

99. In a division sum, the remainder is 0. As student mistook the divisor by 12 instead of 21 and obtained 35 as quotient. What is the correct quotient ?

<u>A.0</u>
<u>B.12</u>
<u>C.13</u>
<u>D.20</u>

Answer: Option D Explanation: Number = (12×35) Correct Quotient = $420 \div 21 = 20$

 $100. 2 + 2^{2} + 2^{3} + ... + 2^{9} = ?$ <u>A.</u>2044 <u>B.</u>1022 <u>C.</u>1056 <u>D.</u>None of these

Answer: Option B Explanation:

This is a G.P. in which a = 2, $r = \frac{2^2}{2} = 2$ and n = 9. \therefore S_n $\begin{array}{c} a(r^n - 2x(2^9 - 2x(512 - 1))) = 2x(511 - 2x(512 - 1)) \\ = 0 \\ (r - 1) \\ (r - 1) \end{array} = \begin{array}{c} 2x(2^9 - 2x(512 - 1)) \\ = 0 \\ 1022. \end{array}$

101. The sum of even numbers between 1 and 31 is: $\underline{A.6}$ $\underline{B.28}$ $\underline{C.240}$ $\underline{D.512}$

Answer: Option C Explanation:

Explanation: Let $S_n = (2 + 4 + 6 + ... + 30)$. This is an A.P. in which a = 2, d = 2 and l = 30Let the number of terms be *n*. Then, a + (n - 1)d = 30 $\Rightarrow 2 + (n - 1) \ge 2 = 30$ $\Rightarrow n = 15$. $\therefore S_n = \frac{n}{2}(a + l) = \frac{15}{2} \ge (2 + 30) = (15 \ge 16) = 240$. then the smallest whole number in place of * will be: <u>A.1</u> <u>B.2</u> C.3 D.4

B.2029272

D.1926172

<u>E.</u>None of these

Answer: Option C Explanation:

Then number $6x^2$ must be divisible by 8. x = 3, as 632 is divisible 8.

103. 2056 x 987 = ?

<u>A.</u>1936372 <u>C.</u>1896172 <u>E.</u>None of these

> Answer: Option B Explanation: $2056 \ge 987 = 2056 \ge (1000 - 13)$ $= 2056 \ge 1000 - 2056 \ge 13$ = 2056000 - 26728= 2029272.

104. On multiplying a number by 7, the product is a number each of whose digits is 3. The smallest such number is: <u>A.</u>47619 <u>B.</u>47719 <u>C.</u>48619 <u>D.</u>47649

Answer: Option **A Explanation:** By hit and trial, we find that 47619 x 7 = 333333.

105. If 60% of ${}_{5}^{3}$ of a number is 36, then the number is:

<u>A.</u>80 <u>C.</u>75

<u>B.</u>100 <u>D.</u>90

Answer: Option B Explanation: Let the number be x. Then $60\% \text{ of}_5^3 \text{ of } x = 36$ $\Rightarrow \frac{60}{100} x_5^3 x x = 36$ $\Rightarrow x = \left(36 x_9^{25}\right) = 100$ \therefore Required number = 100

106. If x and y are the two digits of the number 653xy such that this number is divisible by 80, then x + y = ?<u>A.2</u> or 6 <u>B.4</u> <u>C.4</u> or 8 <u>D.8</u> <u>E.</u> None of these **Answer:** Option **A**

Explanation: $80 = 2 \times 5 \times 8$ Since 653xy is divisible by 2 and 5 both, so y = 0. Now, 653x0 is divisible by 8, so 3x0 should be divisible by 8. This happens when x = 2 or 6. $\therefore x + y = (2 + 0) = 2$ [or] x + y = (6 + 0) = 6. 107. The difference of the squares of two consecutive odd integers is divisible by which of the following integers ?

<u>A.</u> 3	<u>B.</u> 6
<u>C.</u> 7	<u>D.</u> 8

Answer: Option D Explanation:

Let the two consecutive odd integers be (2n + 1) and (2n + 3). Then, $(2n + 3)^2 - (2n + 1)^2 = (2n + 3 + 2n + 1)(2n + 3 - 2n - 1)$ = $(4n + 4) \ge 2$

- = 8(n + 1), which is divisible by 8.
- 108. What is the unit digit in $(4137)^{754}$? <u>A.1</u> <u>B.3</u> <u>C.7</u> <u>D.9</u> **Answer:** Option **D**

Explanation: Unit digit in $(4137)^{754}$ = Unit digit in $\{[(4137)^4]^{188}$ x $(4137)^2\}$ =Unit digit in $\{$ 292915317923361 x 17114769 $\}$ = $(1 \times 9) = 9$

<u>B.</u>587523

D.615173

109. 587 x 999 = ? <u>A.</u>586413 <u>C.</u>614823

> Answer: Option A Explanation: 587 x 999= 587 x (1000 - 1) = 587 x 1000 - 587 x 1 = 587000 - 587 = 586413.

110. A number was divided successively in order by 4, 5 and 6. The remainders were respectively 2, 3 and 4. The number is:
<u>A.</u>214 <u>B.</u>476

<u> </u>	2.10
<u>C.</u> 954	<u>D.</u> 1908

Answer: Option A **Explanation:** $4 \mid x$ $z = 6 \ge 1 + 4 = 10$ _____ 5 | y -2 y = 5 x z + 3 = 5 x 10 + 3 = 53_____ 6 | *z* - 3 $x = 4 \ge y + 2 = 4 \ge 53 + 2 = 214$ _____ | 1 - 4 Hence, required number = 214. 111. If $(64)^2 - (36)^2 = 20 \text{ x} x$, then x = ?<u>A.</u>70 **B**.120 <u>C.</u>180 **D**.140 E. None of these

Answer: Option D Explanation: 20 x $x = (64 + 36)(64 - 36) = 100 \times 28$ $\Rightarrow x = \frac{100 \times 28}{20} = 140$ 112. Which one of the following can't be the square of natural number ?A.32761 B.81225

D.20164

<u>C.</u>42437 <u>E.</u>None of these

Answer: Option C Explanation: The square of a natural number never ends in 7. ·· 42437 is not the square of a natural number.

113. $(2^2 + 4^2 + 6^2 + ... + 20^2) = ?$ <u>A.770</u> <u>C.1540</u> <u>B.1155</u> <u>D.385 x 385</u>

Answer: Option C
Explanation:

$$(2^2 + 4^2 + 6^2 + ... + 20^2) = (1 \ge 2)^2 + (2 \ge 2)^2 + (2 \ge 3)^2$$

 $+ ... + (2 \ge 10)^2$
 $= (2^2 \ge 1^2) + (2^2 \ge 2^2) + (2^2 \ge 3^2) + ... + (2^2 \ge 10^2)$
 $= 2^2 \ge [1^2 + 2^2 + 3^2 + ... + 10^2]$
[Ref: $(1^2 + 2^2 + 3^2 + ... + n^2) = \frac{1}{6}n(n+1)(2n+1)$]
 $= \left(4 \ge \frac{1}{6} \ge 10 \ge 11 \ge 21$)
 $= (4 \ge 5 \ge 77)$
 $= 1540.$

114. $854 \ge 854 \ge 854 = 276 \ge 276 \ge 276 = ?$ $854 \ge 854 = 854 \ge 276 = 276 \ge 276 = ?$ <u>A.1130</u> <u>B.578</u> <u>C.565</u> <u>D.1156</u> E. None of these

Answer: Option B

Explanation:

Given Exp. $= \frac{(a^3 - b^3)}{(a^2 + ab + b^2)} = (a - b) = (854 - 276) = 578$

115. $35 + 15 \ge 1.5 = ?$	
<u>A.</u> 85	<u>B.</u> 51.5
<u>C.</u> 57.5	<u>D.</u> 5.25
<u>E.</u> None of these	
Answer: Option C	

Explanation: Given Exp. = 35 + 15 3 = 35 45 = 35 + 22.5 = x 2+ 2 57.5

116. The sum of first 45 natural numbers is:		
<u>A.</u> 1035	<u>B.</u> 1280	
<u>C.</u> 2070	<u>D.</u> 2140	
Answer: Option <i>I</i> Explanation: Let $S_n = (1 + 2 + 1)$		

Let $S_n = (1 + 2 + 3 + ... + 45)$ This is an A.P. in which a = 1, d = 1, n = 45 and l = 45 $\therefore S_n = \frac{n}{2}(a + l) = \frac{45}{2}x(1 + 45) = (45 \times 23) = 1035$ Required sum = 1035. 117. $666 \div 6 \div 3 = ?$ <u>A.</u>37 <u>B.</u>333 <u>C.</u>111 <u>D.</u>84 <u>E.</u>None of these _**Answer:** Option **A Explanation:** Given Exp. = $666 x_6^1 x_3^1 = 37$

118. The sum of all two digit numbers divisible by 5 is:A.1035B.1245C.1230D.945E. None of these

Answer: Option D Explanation: Required numbers are 10, 15, 20, 25, ..., 95 This is an A.P. in which a = 10, d = 5 and l = 95. $t_n = 95 \implies a + (n - 1)d = 95$ $\implies 10 + (n - 1) \ge 5 = 95$ $\implies (n - 1) \ge 5 = 85$ $\implies (n - 1) = 17$ $\implies n = 18$ \therefore Required $n(a + \frac{18x (10 + 95)}{2 \ 105)} = (9 \ge 10)$

119. The difference between the place values of two sevens
in the numeral 69758472 isA.0B.6993C.699930D.None of these

Answer: Option C Explanation: Required difference = (700000 - 70) = 699930

120. On dividing a number by 68, we get 269 as quotient and 0 as remainder. On dividing the same number by 67, what will the remainder ?
<u>A.0</u> <u>B.1</u>
<u>C.2</u> <u>D.3</u>

Answer: Option **B** Explanation: Number = $269 \ge 68 + 0 = 18292$

67) 18292 (273 134 ----489 469 ----202 201 ----1 ----

Therefore, Required remainder = 1

121. What is the unit digit in the product $(3^{65} \times 6^{59} \times 7^{71})$? <u>A.1</u><u>B.2</u>

<u>C.</u> 4	<u>D.</u> 6

Answer: Option C

14

Explanation: Unit digit in $3^4 = 1 \implies$ Unit digit in $(3^4)^{16} = 1$ \therefore Unit digit in $3^{65} =$ Unit digit in $[(3^4)^{16} \ge 3] = (1 \ge 3)$ Unit digit in $6^{59} = 6$ Unit digit in $7^4 \implies$ Unit digit in $(7^4)^{17} \ge 1$. Unit digit in $7^{71} =$ Unit digit in $[(7^4)^{17} \ge 7^3] = (1 \ge 3) = 3$ \therefore Required digit = Unit digit in $(3 \ge 6 \ge 3) = 4$.

122.3251 + 587 + 369 - ? = 3007<u>A.</u>1250 <u>B.</u>1300 <u>C.</u>1375 **D**.1200 E. None of these Answer: Option D **Explanation:** Let 4207 - x = 30073251 +587Then, x = 4207 - 3007 = 1200+3694207 ----123.7589 - ? = 3434 <u>A.</u>4242 <u>**B.**</u>4155 <u>C.</u>1123 D.11023 E. None of these Answer: Option B **Explanation:** Let 7589 - x = 3434Then, x = 7589 - 3434 = 4155124. 217 x 217 + 183 x 183 = ? <u>A.</u>79698 **B**.80578 C.80698 **D**.81268 Answer: Option B **Explanation:** $(217)^2 +$ $=(200+17)^2+(200-17)^2$ $(183)^2$ $= 2 \text{ x} [(200)^2 + (17)^2]$ [**Ref:** $(a + b)^2$ + $(a - b)^2 = 2(a^2 + b^2)]$ = 2[40000 + 289]

125. The unit digit in the product (784 x 618 x 917 x 463) is: $\underline{A.2}$ $\underline{B.3}$ $\underline{C.4}$ $\underline{D.5}$

= 2 x 40289 = 80578.

Answer: Option A Explanation: Unit digit in the given product = Unit digit in (4 x 8 x 7 x 3) = (672) = 2

126. If the number 653 xy is divisible by 90, then (x + y) = ?<u>A.2</u> <u>B.3</u> <u>C.4</u> <u>D.6</u>

Answer: Option C

 $90 = 10 \times 9$ Clearly, 653*xy* is divisible by 10, so y = 0Now, 653*x*0 is divisible by 9. So, (6 + 5 + 3 + x + 0) = (14 + x) is divisible by 9. So, x = 4. Hence, (x + y) = (4 + 0) = 4.

27. 3897 x 999 = ?	
<u>A.</u> 3883203	<u>B.</u> 3893103
<u>C.</u> 3639403	<u>D.</u> 3791203
<u>E.</u> None of these	

Answer: Option B

1

Explanation: 3897 x 999= 3897 x (1000 - 1) = 3897 x 1000 - 3897 x 1 = 3897000 - 3897 = 3893103.

128. What is the unit digit in 7^{105} ?		
<u>A.</u> 1	<u>B.</u> 5	
<u>C.</u> 7	<u>D.</u> 9	

Answer: Option C Explanation: Unit digit in 7^{105} = Unit digit in [$(7^4)^{26} \ge 7$] But, unit digit in $(7^4)^{26} = 1$ \therefore Unit digit in $7^{105} = (1 \ge 7) = 7$

	lowing numbers will completely divide
$(4^{61} + 4^{62} + 4^{63} +$	(4^{64}) ?
<u>A.</u> 3	<u>B.</u> 10
<u>C.</u> 11	<u>D.</u> 13

Answer: Option B

Explanation: $(4^{61} + 4^{62} + 4^{63} + 4^{64}) = 4^{61} \times (1 + 4 + 4^2 + 4^3) = 4^{61} \times 85$ $= 4^{60} \times (4 \times 85)$ $= (4^{60} \times 340)$, which is divisible by 10.

130. 106 x 106 - 94 x 94 = ? A 2400

<u>A.</u> 2400	<u>B.</u> 2000
<u>C.</u> 1904	<u>D.</u> 1906
E. None of these	

Answer: Option A Explanation:

 $\begin{array}{rcl}
106 & x & 106 & - \\
94 & x & 94 & \\
& = (106)^2 - (94)^2 \\
& = (106 + 94)(106 - 94) \quad [\text{Ref:} (a^2 - b^2) = \\
& (a + b)(a - b)] \\
& = (200 & x & 12) \\
& = 2400.
\end{array}$

131. A number when divided successively by 4 and 5 leaves remainders 1 and 4 respectively. When it is successively divided by 5 and 4, then the respective remainders will be

<u>A.1,2</u>
<u>B.2,3</u>
<u>C.3,2</u>
<u>D.4,1</u>

Explanation:

 $\begin{array}{l} 4 \mid x & y = (5 \ x \ 1 + 4) = 9 \\ \hline 5 \mid y \ -1 & x = (4 \ x \ y + 1) = (4 \ x \ 9 + 1) = 37 \\ \hline 1 \ -4 & \end{array}$

Now, 37 when divided successively by 5 and 4, we get

Respective remainders are 2 and 3.

132. $8796 \ge 223 + 8796 \ge 77 = ?$ A.2736900C.2658560D.2716740E. None of these

Answer: Option B

Explanation:

8796 x 223 +	= 8796 x (223 + 77)	[Ref: <i>By</i>
8796 x 77	Distributive Law]	
	= (8796 x 300)	
	= 2638800	

133. $8988 \div 8 \div 4 = ?$ <u>A.4494</u> <u>C.2247</u> E. None of these

<u>B.</u>561.75 <u>D.</u>280.875

Answer: Option D

Explanation:

Given Exp. = 8988 $x_8^1 x_4^1 = \frac{2247}{8} = 280.875$

134. 287 x 287 + 269 x 269 - 2 x 287 x 269 = ? <u>A.534</u> <u>B.446</u> <u>D.324</u> <u>E.</u>None of these

Answer: Option D

Explanation: Given Exp.= $a^2 + b^2 - 2ab$, where a = 287 and b = 269 $= (a - b)^2 = (287 - 269)^2$ $= (18^2)$ = 324 135. 3 + 33 + 333 + 3.33 = ? <u>A.362.3</u> <u>C.</u>702.33 <u>E.</u>None of these

<u>B.</u>372.33 <u>D.</u>702

Answer: Option B

Explanation:

3 + 33 + 333 + 3.33 -----372.33

136. Which one of the following can't be the square of natural number ?
<u>A.30976</u>
<u>B.75625</u>
<u>C.28561</u>
<u>D.</u>143642
<u>E.</u>None of these

Answer: Option D

Explanation:

The square of a natural number nerver ends in 2.

•• 143642 is not the square of natural number.

 137. $(1000)^9 \div 10^{24} = ?$

 <u>A.10000</u>

 <u>C.100</u>

 <u>E.</u> None of these

Answer: Option B

Explanation:

Given Exp. $(1000)^9 = (10^3)^9 = (10)^{27} = 10^{(27-24)} = 10^3 = 10^{24} = 10^{24} = 10^{24} = 10^{27}$

138. $\{(476 + 424)^2 - 4 \times 476 \times 424\} = ?$ <u>A.2906</u> <u>B.3116</u> <u>C.2704</u> <u>D.2904</u> <u>E.None of these</u>

Answer: Option C

Explanation:

Given = $[(a + b)^2 - 4ab]$, where a = 476 and b = Exp.= $[(476 + 424)^2 - 4 \ge 476 \ge 424]$ = $[(900)^2 - 807296]$ = 810000 - 807296= 2704. If one-third of one-fourth of a number is 15, then threetenth of that number is:
 A.35
 B.36

<u>C.45</u> <u>D.54</u> Answer: Option D Explanation: Let the number be x. Then, ${}_{3}^{1}$ of ${}_{4}^{1}$ of x = 15 $\Leftrightarrow x = 15 \text{ x } 12 = 180$. So, required number $= \begin{pmatrix} 3 \\ 10^{1} \text{ x } 180 \end{pmatrix} = 54$.

2. Three times the first of three consecutive odd integers is 3 more than twice the third. The third integer is:<u>A.9</u><u>B.11</u>

<u>D.</u>15

<u>C.</u>13

Answer: Option **D** Explanation: Let the three integers be x, x + 2 and x + 4. Then, $3x = 2(x + 4) + 3 \iff x = 11$.

•• Third integer = x + 4 = 15.

- 3. The difference between a two-digit number and the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?
 - <u>A.</u>3 <u>C.</u>9 <u>E.</u>None of these

<u>B.</u>4 <u>D.</u>Cannot be determined

Answer: Option B Explanation: Let the ten's digit be x and unit's digit be y. Then, (10x + y) - (10y + x) = 36 $\Rightarrow 9(x - y) = 36$ $\Rightarrow x - y = 4$.

4. The difference between a two-digit number and the number obtained by interchanging the digits is 36. What is the difference between the sum and the difference of the digits of the number if the ratio between the digits of the number is 1 : 2 ?

<u>A.4</u> <u>B.8</u> <u>C.16</u> <u>D.</u>None of these

Answer: Option B Explanation:

Since the number is greater than the number obtained on reversing the digits, so the ten's digit is greater than the unit's digit.

Let ten's and unit's digits be 2x and x respectively.

Then, $(10 \ge 2x + x) - (10x + 2x) = 36$

 $\Rightarrow 9x = 36$ $\Rightarrow x = 4.$

 $\therefore \text{ Required difference} = (2x + x) - (2x - x) = 2x = 8.$

5. 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:

<u>A.</u> 18	<u>B.</u> 24
<u>C.</u> 42	<u>D.</u> 81

Answer: Option B Explanation:

Let the ten's and unit digit be x and respectively.

Then, $\begin{pmatrix} 8\\ 10x + \\ x \end{pmatrix} + 18 = 10 \frac{8}{x} + x$ $\Rightarrow 10x^2 + 8 + 18x = 80 + x^2$ $\Rightarrow 9x^2 + 18x - 72 = 0$ $\Rightarrow x^2 + 2x - 8 = 0$ $\Rightarrow (x + 4)(x - 2) = 0$ $\Rightarrow x = 2.$

6. The sum of the digits of a two-digit number is 15 and the difference between the digits is 3. What is the two-digit number?

A.69B.78C.96D.Cannot be determinedE. None of theseAnswer: Option DExplanation:Let the ten's digit be x and unit's digit be y.Then, x + y = 15 and x - y = 3 or y - x = 3.Solving x + y = 15 and x - y = 3, we get: x = 9, y = 6.Solving x + y = 15 and y - x = 3, we get: x = 6, y = 9.So, the number is either 96 or 69.Hence, the number cannot be determined.

Thenee, the number cannot be determined.

7. The sum of the squares of three numbers is 138, while the sum of their products taken two at a time is 131. Their sum is: <u>A.20</u> <u>B.30</u> <u>C.40</u> <u>D.None of these</u> <u>Answer: Option A</u> Explanation: Let the numbers be *a*, *b* and *c*. Then $a^2 + b^2 + c^2 = 128$ and (ab + ba + ac) = 121

Then, $a^2 + b^2 + c^2 = 138$ and (ab + bc + ca) = 131. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca) = 138 + 2 x$ 131 = 400. $\Rightarrow (a + b + c) = 400 = 20$.

- 8. A number consists of two digits. If the digits interchange places and the new number is added to the original number, then the resulting number will be divisible by: <u>A.3</u> <u>B.5</u> <u>C.9</u> <u>D.11</u> **_Answer:** Option **D Explanation:** Let the ten's digit be *x* and unit's digit be *y*. Then, number = 10x + y. Number obtained by interchanging the digits = 10y + x. $\therefore (10x + y) + (10y + x) = 11(x + y)$, which is divisible by 11.
- 9. 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:

<u>A.</u> 24	<u>B.</u> 26
<u>C.</u> 42	<u>D.</u> 46

Answer: Option A

Explanation:

Let the ten's digit be x. Then, unit's digit = x + 2. Number = 10x + (x + 2) = 11x + 2. Sum of digits = x + (x + 2) = 2x + 2. $\therefore (11x + 2)(2x + 2) = 144$ $\Rightarrow 22x^2 + 26x - 140 = 0$ $\Rightarrow 11x^2 + 13x - 70 = 0$ $\Rightarrow (x - 2)(11x + 35) = 0$ $\Rightarrow x = 2$. Hence, required number = 11x + 2 = 24.

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

Answer: Option A Explanation: Let the number be x. Then, $x + 17 = {60 \atop x}$ $\Rightarrow x^2 + 17x - 60 = 0$ $\Rightarrow (x + 20)(x - 3) = 0$ $\Rightarrow x = 3$.

1. The product of two numbers is 9375 and the quotient, when the larger one is divided by the smaller, is 15. The sum of the numbers is:

<u>A.</u> 380	<u>B.</u> 395
<u>C.</u> 400	<u>D.</u> 425

Answer: Option C Explanation: Let the numbers be x and y. Then, xy = 9375 and x = 15. xy = 9375 (x/y) = 15 $\Rightarrow y^2 = 625$. $\Rightarrow y = 25$. $\Rightarrow x = 15y = (15 \times 25) = 375$. \therefore Sum of the numbers = x + y = 375 + 25 = 400.

12. The product of two numbers is 120 and the sum of their squares is 289. The sum of the number is:
<u>A.20</u>
<u>B.23</u>
<u>C.169</u>
<u>D.</u>None of these

Answer: Option B Explanation: Let the numbers be *x* and *y*. Then, xy = 120 and $x^2 + y^2 = 289$. $\therefore (x + y)^2 = x^2 + y^2 + 2xy = 289 + (2 \times 120) = 529$ $\therefore x + y = 529 = 23$.

13. A number consists of 3 digits whose sum is 10. The middle digit is equal to the sum of the other two and the number will be increased by 99 if its digits are reversed. The number is:
<u>A.</u>145
<u>B.</u>253

<u>A.</u> 145	<u>B.</u> 253
<u>C.</u> 370	<u>D.</u> 352

Answer: Option B

Let the middle digit be *x*. Then, 2x = 10 or x = 5. So, the number is either 253 or 352. Since the number increases on reversing the digits, so

the hundred's digits is smaller than the unit's digit. Hence, required number = 253.

14. The sum of two number is 25 and their difference is 13. Find their product.A.104B.114

D.325

•••			
15			

Answer: Option B Explanation:

<u>C.</u>3

Let the numbers be x and y. Then, x + y = 25 and x - y = 13. $4xy = (x + y)^2 - (x - y)^2$ $= (25)^2 - (13)^2$ = (625 - 169) = 456 $\therefore xy = 114$.

15. What is the sum of two consecutive even numbers, the difference of whose squares is 84?

<u>A.</u> 34	<u>B.</u> 38
<u>C.</u> 42	<u>D.</u> 46

Answer: Option C Explanation: Let the numbers be x and x + 2. Then, $(x + 2)^2 - x^2 = 84$ $\Rightarrow 4x + 4 = 84$ $\Rightarrow 4x = 80$ $\Rightarrow x = 20$. \therefore The required sum = x + (x + 2) = 2x + 2 = 42.

SIMPLIFICATION

1. 'BODMAS' Rule:

This rule depicts the correct sequence in which the operations are to be executed, so as to find out the value of given expression.

- Here B Bracket,
- 0 of,
- D Division,
- M Multiplication,
- A Addition and
- S Subtraction

Thus, in simplifying an expression, first of all the brackets must be removed, strictly in the order (), $\{\}$ and $\|$. After removing the brackets, we must use the following operations strictly in the order:

(i) of (ii) Division (iii) Multiplication (iv) Addition (v) Subtraction.

2. *Modulus of a Real Number:* Modulus of a real number *a* is defined as

$$|a| = \begin{cases} a, \text{ if } a > 0 \\ -a, \text{ if } a < 0 \end{cases}$$

Thus, |5| = 5 and |-5| = -(-5) = 5. 3. *Virnaculum (or Bar):* When an expression contains Virnaculum, before applying the 'BODMAS' rule, we simplify the expression under the Virnaculum.

1. A man has Rs. 480 in the denominations of one-rupee notes, five-rupee notes and ten-rupee notes. The number of notes of each denomination is equal. What is the total number of notes that he has ?

<u>A.</u> 45	<u>B.</u> 60
<u>C.</u> 75	<u>D.</u> 90

Answer: Option D

Explanation: Let number of notes of each denomination be *x*. Then x + 5x + 10x = 480 $\Rightarrow 16x = 480$ $\therefore x = 30$. Hence, total number of notes = 3x = 90.

2. There are two examinations rooms A and B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:

<u>A.20</u> <u>B.80</u> <u>C.100</u> <u>D.200</u>

Answer: Option C

Explanation:

Let the number of students in rooms A and B be *x* and *y* respectively.

Then, $x - 10 = y + 10 \implies x - y = 20 \dots$ (i) and $x + 20 = 2(y - 20) \implies x - 2y = -60 \dots$ (ii) Solving (i) and (ii) we get: x = 100, y = 80. \therefore The required answer A = 100.

3. The price of 10 chairs is equal to that of 4 tables. The price of 15 chairs and 2 tables together is Rs. 4000. The total price of 12 chairs and 3 tables is:
A Pr. 3500
P Rs. 3750

Answer: Option D

Explanation:

Let the cost of a chair and that of a table be Rs. *x* and Rs. *y* respectively.

Then,
$$10x = 4y$$
 or $y = \frac{5}{2}x$.
 $\therefore 15x + 2y = 4000$
 $\Rightarrow 15x + 2x\frac{5}{2}x = 4000$
 $\Rightarrow 20x = 4000$
 $\therefore x = 200$.
So, $y = \begin{pmatrix} 5\\2x & 200 \end{pmatrix} = 500$.
Hence, the cost of 12 chairs and 3 tables = $12x + 3y$
 $= \text{Rs.} (2400 + 1500)$
 $= \text{Rs.} 3900$.

4. If a - b = 3 and $a^2 + b^2 = 29$, find the value of ab.

<u>A.</u>10 C.15

Answer: Option A

Explanation: $2ab = (a^2 + b^2) - (a - b)^2$ = 29 - 9 = 20 $\Rightarrow ab = 10.$

5. The price of 2 sarees and 4 shirts is Rs. 1600. With the same money one can buy 1 saree and 6 shirts. If one wants to buy 12 shirts, how much shall he have to pay ? <u>A.Rs. 1200</u> <u>B.Rs. 2400</u> <u>C.Rs. 4800</u> <u>D.Cannot be determined</u> <u>E.None of these</u>

Answer: Option B Explanation:

Let the price of a saree and a shirt be Rs. x and Rs. y respectively. Then, $2x + 4y = 1600 \dots$ (i) and $x + 6y = 1600 \dots$ (ii)

Divide equation (i) by 2, we get the below equation.

=> x + 2y = 800. --- (iii)

Now subtract (iii) from (ii)

 $\begin{array}{r} x + 6y = 1600 \quad (-) \\ x + 2y = 800 \\ \hline \\ 4y = 800 \\ \hline \end{array}$

Therefore, y = 200.

Now apply value of y in (iii)

 $\Rightarrow x + 2 x 200 = 800$

 $\Rightarrow x + 400 = 800$

Therefore x = 400

Solving (i) and (ii) we get x = 400, y = 200. \therefore Cost of 12 shirts = Rs. (12 x 200) = Rs. 2400. 6. A sum of Rs. 1360 has been divided among A, B and C such that A gets $\frac{2}{3}$ of what B gets and B gets $\frac{1}{4}$ of what C gets. B's share is: <u>A.Rs. 120</u> <u>B.Rs. 160</u> <u>C.Rs. 240</u> <u>D.Rs. 300</u>

Answer: Option C Explanation:

Let C's share = Rs. x Then, B's share = Rs. $\stackrel{x}{_4}$, A's share = Rs. $\begin{pmatrix} 2 & x \\ 3^x & 4 \end{pmatrix}$ = Rs. $\stackrel{x}{_6}$ $\therefore \stackrel{x}{_6} \stackrel{+x}{_4} + x = 1360$ $\Rightarrow \stackrel{17x}{_{12}} = 1360$ $\Rightarrow x = \stackrel{1360}{_{17}} x \stackrel{12}{_{=}}$ Rs. 960 Hence, B's share = Rs. $\begin{pmatrix} 960 \\ 4 \end{pmatrix}$ = Rs. 240. 7. 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 ?
 <u>A.Rs. 30,000</u>
 <u>B.Rs. 50,000</u>
 <u>C.Rs. 60,000</u>

Answer: Option C Explanation:

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

$$\Rightarrow_{3}^{x} = \frac{1}{2}(150000 - x)$$
$$\Rightarrow_{3}^{x} + \frac{x}{2} = 75000$$
$$\Rightarrow_{6}^{5x} = 75000$$
$$\Rightarrow x = \frac{75000 \times 6}{5} = 90000$$

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

8. 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:
<u>A.</u>30 birds <u>B.</u>60 birds <u>D.</u>90 birds

Answer: Option A Explanation:

Let the total number of shots be *x*. Then,

Shots fired by $A = {}_{8}^{5}x$ Shots fired by $B = {}_{8}^{3}x$ Killing shots by $A = {}_{3}^{1}of_{8}^{5}x = {}_{24}^{5}x$ Shots missed by $B = {}_{2}^{1}of_{8}^{3}x = {}_{16}^{3}x$ $\therefore {}_{16}^{3x} = 27 \text{ or } x = {}_{24}^{27 \text{ x 16}} = 144.$ Birds killed by $A = {}_{24}^{5x} = {}_{24}^{5}x = {}_{24}^{5}x = 30.$

9. Eight people are planning to share equally the cost of a rental car. If one person withdraws from the arrangement and the others share equally the entire cost of the car, then the share of each of the remaining persons increased by:

A.¹
A.¹
7
B.¹
8
C.¹
9
D.⁷
D.⁷
8
Answer: Option A
Explanation:
Original share of 1 person =
$$\frac{1}{8}$$

New share of 1 person = $\frac{1}{7}$
Increase = $\begin{pmatrix} 1 & 1 \\ 7^{-}8 \end{pmatrix} = \frac{1}{56}$
 \therefore Required fraction = $\begin{pmatrix} 1/56 \\ 1/8 \end{pmatrix} = \begin{pmatrix} 1 & 8 \\ 56^{x}1 \end{pmatrix} = \frac{1}{7}$

10. To fill a tank, 25 buckets of water is required. How many buckets of water will be required to fill the same tank if the capacity of the bucket is reduced to two-fifth of its present?

<u>A.</u>10 **B**.35 <u>C.</u>62.5 D.Cannot be determined E. None of these

Answer: Option C

Explanation: Let the capacity of 1 bucket = x. Then, the capacity of tank = 25x.

New capacity of bucket $=\frac{2}{5}x$

 \therefore Required number of buckets = $\frac{25x}{(2x/5)}$

$$= \begin{pmatrix} 5\\25x \\ 25x \\ 2 \\ 2 \\ = 62.5 \end{pmatrix}$$

11. 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 ?

<u>A.</u> 160	<u>B.</u> 175
<u>C.</u> 180	<u>D.</u> 195

Answer: Option B **Explanation:**

Suppose the man works overtime for *x* hours. Now, working hours in 4 weeks = $(5 \times 8 \times 4) = 160$. $160 \ge 2.40 + x \ge 3.20 = 432$ \Rightarrow 3.20*x* = 432 - 384 = 48 $\Rightarrow x = 15.$ Hence, total hours of work = (160 + 15) = 175.

12. Free notebooks were distributed equally among children of a class. The number of notebooks each child got was one-eighth of the number of children. Had the number of children been half, each child would have got 16 notebooks. Total how many notebooks were distributed ?

B.432

D.640

<u>A.</u>256 <u>C.</u>512 E. None of these

Answer: Option C **Explanation:**

Let total number of children be *x*.

Then, $x x_8^1 x = x_2^x x 16 \iff x = 64.$ $\therefore \text{ Number of notebooks} = \frac{1}{8}x^2 = \left(\frac{1}{8}x \ 64 \ x \ 64\right) = 512.$

13. A man has some hens and cows. If the number of heads be 48 and the number of feet equals 140, then the number of hens will be: <u>A.</u>22 <u>**B.</u>23</u></u>** <u>C.</u>

24	<u>D.</u> 26

Answer: Option D

Explanation:

Let the number of hens be *x* and the number of cows be

Then, $x + y = 48 \dots (i)$ and $2x + 4y = 140 \implies x + 2y = 70 \dots$ (ii) Solving (i) and (ii) we get: x = 26, y = 22. •• The required answer = 26.

14. $(469 + 174)^2 - (469 - 174)^2 - 2$ (469 x 174) <u>A.</u>2 **B**.4 <u>C.</u>295 D.643 Answer: Option B **Explanation:** Given exp. $=_{ab}^{(a+b)^2 - (a-b)^2}$ 4ab=ab= 4 (where a = 469, b = 174.)

15. 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?

<u>A.</u> 19	<u>B.</u> 28
C .30	D .37

Answer: Option C

Explanation:

Suppose their paths cross after x minutes. Then, $11 + 57x = 51 - 63x \iff 120x = 40$

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

 $\begin{pmatrix} 1_{\mathbf{X}} \\ 357 \end{pmatrix} = 19.$ Number of floors covered by David in (1/3) min. =

So, their paths cross at (11 + 19) *i.e.*, 30^{th} floor.