

01) If x is an odd integer, for which of the following equations must y be an even integer?

$$2x + 4 = 6$$

~~A) $xy = 5$~~

B) $x + y = 8$

C) $x + 2y = 7$

D) $2x + y = 6$

E) None of these

even + even = even
~~even + odd = odd~~

odd x even = even

$$3 \times 2 = 6$$

even + odd = odd
 $5 \times 9 = 20$

$$1 + 3 = 4$$

$$6 + 5 = 11$$

$y = 3$
 $x = \text{odd}$
 $y = 3$

even = 2
 odd = 3, 5, 7, 9
 $x = 3$
 $y = \text{even}$

$2x$
 $2 \times 3 = 6$

01) If x is an odd integer, for which of the following equations must y be an even integer?

A) $xy=5$ B) $x + y=8$ C) $x+2y=7$

D) $2x+y=6$ E) None of these

03) If x and y are positive integers, each greater than 1, and if $13(x-1) = 17(y-1)$, what is the least possible value of $(x+y)$.

$$13x - 13 = 17y - 17$$

$$13x = 17y - 4$$

$$x = \frac{17y - 4}{13}$$

- A) 32 B) 30 C) 26
 D) 25 E) None of these

$$13x = 17y - 4$$

Handwritten notes: 10 , 3 , 390 , 90 , 12

$$17y = 13x + 4$$

260
170
92

26
17
92
204

Handwritten notes: $x+y$, $18+14$, $x=17$, $y=13$

04) If the product of three consecutive integers is 120, then the sum of the integers is:

- A) 12 B) 14 ~~C) 15~~ D) 18 E) None of these

$$\begin{array}{r} 5 \times 6 \times 7 \times 8 \times 9 \\ \hline 20 \times 6 = 120 \end{array}$$

05) The sum of squares of 3 consecutive integers is less than 97. What is the greatest possible value of the smallest one?

- A) 4 B) 5 C) 6 D) 7 E) None of these

$25 + 36 + 49$

$9^2 + 5^2 + 6^2$
 $16 + 25 + 36$

$1^2 + 2^2 + 3^2 < 97$
 $1^2 + 3^2 + 4^2 < 97$

06) When the positive integer n is divided by 8, the remainder is 3. What is the remainder if $3n$ is divided by 8?

- A) 0 ~~B) 1~~ C) 2 D) 3 E) None of these

$$\begin{array}{r} 8 \overline{) 57} \\ \underline{56} \\ 1 \end{array}$$

$$\begin{array}{r} 8 \overline{) 33} \\ \underline{32} \\ 1 \end{array}$$

$n=11$
 $n=19$
 $n=27$
 $n=35$
 $n=43$
 $n=51$
 $n=59$
 $n=67$
 $n=75$
 $n=83$
 $n=91$
 $n=99$

$$\begin{array}{r} 8 \overline{) n} \\ \underline{8x} \\ 3 \end{array}$$

$n=7$
 $8 \times 3 = 24$
 $24 + 3 = 27$

$$\begin{array}{r} 8 \overline{) 3n} \\ \underline{8x} \\ 3 \end{array}$$

07) $2pq5$ is a four digit number divisible by 25. If the number formed from two digits pq is a multiple of 13. Then $pq = ?$

- A) 10 B) 25 C) 52 D) 65 E) None of these

Handwritten work for the first part of the problem:

- Handwritten notes: $2 \times 10 \times 15$ (above $2pq5$), 2525 , 2655 (circled).
- Options: A) 10, B) 25, C) 52 (circled), D) 65 (circled), E) None of these.
- Handwritten calculations:
 - $36 = 2 \times 18 = 3 \times 12 = 4 \times 9 = 6 \times 6$
 - $72 = 2 \times 36 = 3 \times 24 = 4 \times 18 = 6 \times 12 = 8 \times 9 = 9 \times 8 = 12 \times 6 = 18 \times 4 = 24 \times 3 = 36 \times 2 = 36 \times 2$
 - Division: $\frac{26}{13} = 2$, $\frac{39}{13} = 3$

Handwritten work for the second part of the problem:

- Handwritten notes: 2650 , 2675 (above the text).
- Handwritten calculations:
 - $3 \times 1 = 3$
 - $3 \times 2 = 6$
 - $3 \times 100 = 300$
- Handwritten numbers: 99 , 110 , 165 , 27 (circled), 55 (circled).

09) The greatest common factor of two positive integers is A . the least common multiple of the two integers is B . if one of the integers is C , what is the other number?

A) $\frac{AB}{C}$

B) $\frac{BC}{A}$

C) $\frac{A}{C} + B$

D) $A + \frac{B}{C}$

E) None of these

Handwritten notes in yellow:

- $GCF = A$
- $LCM = B$
- $\frac{AB}{C}$
- $\frac{AB}{C}$
- A
- $\frac{AB}{C}$
- $\frac{AB}{C}$
- $\frac{AB}{C}$
- $\frac{AB}{C}$

10) What is the minimum number of chocolates that must be added to the existing stock of 260 chocolates so that the total stock can equally be divided among 1, 4, or 6 persons?

- A) 4 B) 8 C) 12 D) 16 E) None these

11) The light of Shahbag signal flashes every 120 seconds and that of Green road and Bata singnal flash every 60 and 90 seconds. If they all flash at 8:30 am, when will they flash again simultaneously?

- A) 8:36 am B) 8:35 am C) 8:33 am
D) 8:40 am E) None of these

12) A number when divided by 195 leaves a remainder 47. If the same number is divided by 15, the remainder will be?

- A) 1 B) 2 C) 3 D) 4 E) None of these

13) The number of terms between 11 and 200 which are divisible by 7 but not by 3 are

- A) 18 B) 19 C) 27 D) 28 E) None of these

14) A number when divided by 3 leaves a remainder 1. When the quotient is divided by 2, it leaves a remainder 1. What will be the remainder when the number is divided by 6?

- A) 2 B) 3 C) 4 D) 5 E) None of these

15) When 24 is subtracted from a number, it reduces to its four-seventh. What is the sum of the digits of that number?

- A) 1 B) 9 C) 11 D) 13 E) None of these

16) In one classroom exactly two third of the seats are occupied. In another classroom with double the seating capacity of the first, exactly three quarters of the seats are occupied. If the students from both rooms are transferred into a third empty classroom that has a seating capacity exactly equal to the first two combined, what fraction of the seats in the third classroom is occupied?

- A) $\frac{3}{4}$ B) $\frac{2}{3}$ C) $\frac{6}{11}$ D) $\frac{13}{18}$ E) $\frac{12}{17}$

17) At room temperature, bacterium doubles in every 20 minutes, In two hours what will be the total number of bacteria from an initial number of 3?

A) 18

B) 192

C) 144

D) 96

E) 729

18) In a class, If 4 students sit in each bench, there are 3 empty benches, but 6 students have to stand if 3 students sit each bench. How many students are there in that class?

- A) 50 B) 60 C) 70 D) 80 E) None of these

19) What is the last (Unit) digit of 4^{218}

- A) 2 B) 4 C) 6 D) 8 E) None of these



$4^1 = 4$
 ~~$4^2 = 16$~~
 $4^3 = 64$
 ~~$4^4 = 256$~~
 $4^5 = 1024$

$3^1 = 3$
 $3^2 = 9$
 $3^3 = 27$
 $3^4 = 81$
 ~~$3^5 = 243$~~



$3 = 125$
 $4 = 25$
 $5 = 125$

4^{218}

3333

$4^4 \times 3^3$
 $5^5 \times 7^7$
 6

20) The units' digit of a two digit number is thrice its tens digit. If 36 is added to the number, the digits interchange their place. Find the number.

- A) 26 B) 45 C) 62 D) 54 E) None of these

21) In a two-digit number, the digit in the unit's place more than twice the digit in ten's place by 1. If the digits in the unit's place and the ten's place are interchanged, difference between the newly formed number and the original number by 1. What is the original number?

A) 25

B) 37

C) 49

D) 52

E) None of these

22) If the numerator of a fraction is increased by 2 and the denominator is increased by 3, the fraction becomes $\frac{7}{9}$ and if both the numerator as well as the denominator are decreased by 1, the fraction becomes $\frac{4}{5}$. What is the original fraction?

- A) $\frac{5}{6}$ B) $\frac{9}{11}$ C) $\frac{13}{16}$ D) $\frac{17}{21}$ E) None of these