BYJU'S Tuition Center NMTC

15th October 2022	Primary Level	Screening test

Instructions:

1. Fill in the Response Sheet with your Name, Class and the Institution through which you appear, in the specified places.
2. Diagrams given are only Visual aids; they are not drawn to scale.
3. You may use separate sheets to do rough work.
4. Use of Electronic gadgets such as Calculator, Mobile Phone or Computer is not permitted.
5. Duration of the Test: 2 pm to 4 pm (2 hours).

Question 1.

In the year 2021, the ratio of A's income to B's income is 5:8. In the next year 2022, if A's income increases by 20% and B's income increases by 15%, what is the ratio of their incomes now?

a) 5:6 b) 7:23 c) 15:23 d) 9:11

Solution: (c)

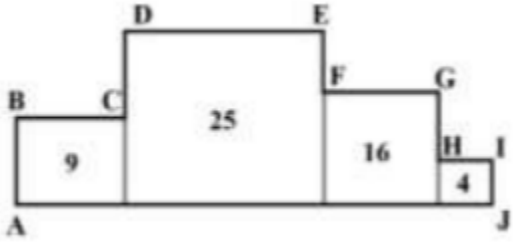
Given, A : B = 5 : 8
So, We can take A = 5n and B = 8n
As given in question,
A = 5n + 5n x (20/100)
A = 6n
and
B = 8n + 8n x (15/100)
B = 46n/5
So, A : B = 6n : 46n/5
A : B = 15 : 23

Question 2.

Four squares are placed as shown in the figure. The areas of the squares are marked in the respective squares. The perimeter ABCDEFGHIJA is ...

a) 34 b) 38 c) 36 d) 40

Solution: (b)



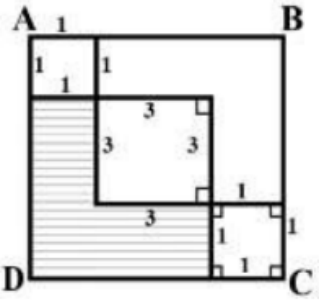
Let's take point K, L and M as shown in the figure
Given, Area of Square ABCM = 9
So, All side of square = 3
Similarly,
All side of square DELM = 5
All side of square FGKL = 4
All side of square HIJK = 2
So, CD = MD - MC = 5 - 3 = 2
Similarly, EF = EL - FL = 5 - 4 = 1
GH = 2
JA = JK + KL + LM + MA
= 2 + 4 + 5 + 3
= 14

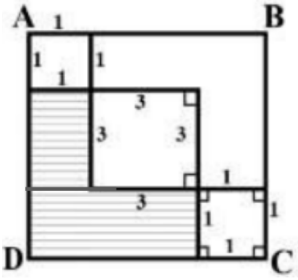
Perimeter of ABCDEFGHIJA = AB + BC + CD + DE + EF + FG + GH + HI + IJ + JA
= 3 + 3 + 2 + 5 + 1 + 4 + 2 + 2 + 2 + 14
= 38

Question 3.

In the adjoining figure ABCD is a square and there are two unit squares and a square of side 3 cm. The area of the shaded region (when
given in cm^2) is ...

a) 5 b) 6 c) 7 d) 8





Solution: (c)
Shaded Area is divided into 2 rectangles (as shown in figure)
So, Area of one rectangle = 3 x 1 = 3 cm^2
Area of second rectangle = (3 + 1) x 1
= 4 x 1 = 4 cm^2
Area of shaded region = 3 + 4 = 7 cm^2

Question 4.

The price of an article is reduced by 25%. In order to restore the original price, the new price must be increased by ...

a) 25 % b) 28 % c) 20 % d) 33 1⁄3 %

Solution: (d)

Let,
Old price = x
New price = y
According to question
y = x - (25% of x)
y = x - (25/100 × x)
y = x - x/4
y = 3x/4 ……(1)
Now, in order to restore the original price (x) the new price (y) should be increased by z
x = y + z
4y/3 = y + z ……[∵ from (1)]
z = 4y/3 - y
z = y/3
∴ New price should be increased by One-third means 33 ⅓ %.

Question 5.

The number of three-digit numbers that are multiples of 11 is ...

a) 80 b) 81 c) 79 d) 83

Solution: (b)

Lowest three digit number is 100.
Greatest three digit number is 999.
So the number of Three digit numbers which are divisible by 11= $\frac{999}{11}$ - $\frac{100}{11}$ (take quotient only)
= 90 - 9 = 81

Question 6.

For any natural number n, 2n[3n + {7n (n + 3) - (n + 1) - 2}] is divisible by

a) 7 b) 3 c) 11 d) 13

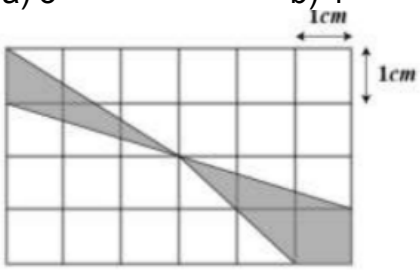
Solution: (b)

Given, 2n[3n + {7n (n + 3) - (n + 1) - 2}]
Let's take n = 1
⇒ 2 x 1 [3 x 1 + {7 x 1 (1 + 3) - (1 + 1) - 2}]
⇒ 2 [3 + {7 (4) - (2) - 2}]
⇒ 2 [3 + { 28 - 4}]
⇒ 2 [3 + 24]
⇒ 2 [27]
⇒ 54

Now, Let's take n = 3
⇒ 2 x 3 [3 x 3 + { 7 x 3 (3 + 3) - (3 + 1) - 2}]
⇒ 6 [9 + { 21 (6) - (4) - 2}]
⇒ 6 [9 + { 126 - 6}]
⇒ 6 [9 + 120]
⇒ 6 [129]
⇒ 774
54 and 774 Both are divisible by 3 only.

Question 7.

In the adjoining figure, the grid consists of Unit squares. The area of the shaded region (in cm^2) is ...
a) 3 b) 4 c) 3.5 d) 4.5



Solution: (b)

So, Area will be
⇒ $\frac{1}{2} \times 1 \times 3 + \frac{1}{2} \times 2 \times 1 + 1 + \frac{1}{2}$
⇒ 4 cm^2

Question 8.

Three digit numbers are formed using the digits 1, 3, 5, 9. The difference between the largest and the smallest numbers thus formed is?

a) 888 b) 798 c) 879 d) 789

Solution: (a)

Largest number = 999
Smallest number = 111
Difference = 999 – 111 = **888**

Question 9.

abc651 is exactly divisible by 5423. Then a + b + c is equal to?

a) 3 b) 6 c) 9 d) None of these

Solution: (d)

11 is a factor of 5423.
So, abc651 is also divisible by 11.
(a + c + 5) – (b + 6 + 1) should be divisible by 11.
So, a + c should be 6 and b should be 4.
Therefore, **a + b + c = 10**

Question 10.

If 12% of a number is 120, then 120% of that number is ?

a) 20 b) 480 c) 120 d) 720

Solution: 1200 (Not in options)

12% of x = 120
x = 120 (100/12)
x = 1000
120% of 1000
= (120/100) 1000
= **1200**

Question 11.

Three natural numbers which are co-prime to one another are such that the product of the first two is 779 and the product of the next two is 1107. The sum of three numbers is?

Solution: 87

Middle number = HCF of 779 and 1107
= 41
First number = 779/41
= 19
Third number= 1107/41
= 27
Sum of the numbers = 41 + 19 + 27 = **87**

Question 12.

The HCF of two natural numbers is 33. The sum of the numbers is 528. The number of such pairs of natural numbers is?

Solution: 4 pairs

Let the numbers be 33a and 33b.
The sum of the numbers is 528.
33a + 33b = 528
33(a+b) = 528
a + b = 528/33
a + b = 16
The combinations are,
a = 1, b = 15
a = 3, b = 13
a = 5, b = 11
a = 7, b = 9
So, there are **4 such pairs.**

Question 13.

If $\left(1\frac{1}{2}\right) \times \left(1\frac{1}{3}\right) \times \left(1\frac{1}{4}\right) \ldots \times \left(1\frac{1}{n}\right) = \frac{121}{2}$, $then\ the\ value\ of\ n\ is?$

Solution: 120

$\frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \ldots \times \frac{n+1}{n} = \frac{121}{2}$

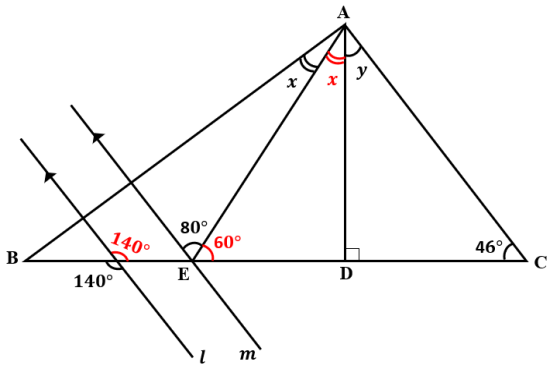
$n + 1 = 121$

$n = 120$

Question 14.

In the adjoining figure, AE is the bisector of angle BAD. The lines l, m are parallel. The degree measure of (x + y) is?

Solution: 74°



y + 90 + 46 = 180

y = 44

60 + x + 90 = 180

x = 30

Therefore, **x + y = 74°**

Question 15.

There are 8 boxes placed in a line. We have 1824 balls to be put in the boxes. Each box has to receive 2 balls more than the previous box. The largest number of balls put in a box is _____.

Solution: 235

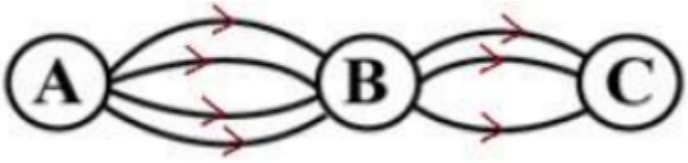
No. of boxes placed in line = 8

No. of balls to be put in boxes = 1824

According to question,
Each box has to receive 2 balls more than the previous box.
So the eq.
1824 = x + (x + 2) + (x + 4) …….. (x + 14)
So, 8x + 56 = 1824
x = 221
We have to find the largest number of balls put in a box = x+ 14
= 221 + 14 = 235

Question 16.

In the adjoining figure, A is your house, B is your friend's house and C is your School. There are 4 paths from A to B and 3 paths from B to C. You want to go to school, picking up your friend. The number of ways you can thus go by different routes is _____.



Solution: 12

As given,
No. of ways to go A to B = 4
No. of ways to go B to C = 3
So, total number of ways by different routes = 4 x 3 = 12

Question 17.

Mrs Sweety had money to buy just 6 Gulabjamoons and 7 Samosas. The sweetshop vendor told her that may also get 8 Gulabjamoons and 4 Samosas, for the same amount. Since Mrs Sweety is a diabetic patient, as per her doctor's advice, she decided not to buy any sweets; so with all the money she had, she bought only Samosas. Thus she got _____ Samosas.

Solution: 16

Let's take gulabjamoon as a and Samosa as b
As given in the question, we can write
6a + 7b = 8a + 4b
So, 2a = 3b

Accordingly we can replace the value of a in 6a + 7b
So, in terms of b, we get 9b + 7b = 16b
That means Sweety can buy 16 samosas in that amount.

Question 18.

In a playing Die, the dots represent values (numbers) from 1 to 6. The opposite 'faces' of a Die add up to 7. In the figure A is a sharing 'vertex' and is given a value 6 (=1×2×3, namely the product of the numbers on faces shared by it). Similar values are given to the other 7 vertices. Then the total value of all the vertices is _____.

Solution: 343

Vertex A = 1 x 2 x 3 = 6
Vertex B = 1 x 2 x 4 = 8
Vertex C = 1 x 5 x 4 = 20
Vertex D = 1 x 5 x 3 = 15
Vertex E = 6 x 2 x 4 = 48
Vertex F = 6 x 2 x 3 = 36
Vertex G = 6 x 5 x 3 = 90
Vertex H = 6 x 4 x 5 = 120

So, The total value of all the vertices = 6 + 8 + 20 + 15 + 48 + 36 + 90 + 120
= 343

Question 19.
A careless Secretary was asked to send 4 letters to 4 different persons. There are 4 envelopes on which separate addresses of the 4 persons were written. The number of ways the Secretary might put wrong letters in all the envelopes is _____.

Solution: 9

As given, Secretary was asked to send 4 letters to 4 different persons

We have to find the number of ways the Secretary might put wrong letters in all the envelopes.
So, Number of ways to distribute the n things to n persons = n!
The concept of de-arrangement
$D_n = n! (1/2! - 1/3! + 1/4!)$
Here n = 4
$D_4 = 4! (1/2! - 1/3! + 1/4!)$
= 12 - 4 + 1
= 9

Question 20.

The largest prime factor of the sum of the prime factors of 2022 is _____.

Solution: 19

Prime factors of 2022 = 2, 3, 337
Sum of prime factors = 2 + 3 + 337 = 342
We have to find the largest prime factor of the sum = 342
So, Prime factors of 342 = 2, 3, 19
So, largest prime factor = 19