CATEGORY 4 Sample Question

1. If $a * b = a + \frac{1}{b}$ for every pair of a, b positive numbers, then the value of $\frac{2}{3} * (\frac{1}{2} * 4)$ is

a) $\frac{7}{6}$ b) $\frac{6}{7}$ c) 1 d) 2

2. $\log 5 = x \Rightarrow \frac{\log_3 10}{\log_3 2} = ?$

a) $\frac{1}{1-x}$

b) $\frac{3}{1-x}$

c) $\frac{3}{x-1}$

d) $\frac{1}{x-1}$

3. $n! = n(n-1)(n-2)\cdots 3 \cdot 2 \cdot 1$, *and* $4! = 4 \cdot 3 \cdot 2 \cdot 1$ *are related to factorial notation.*

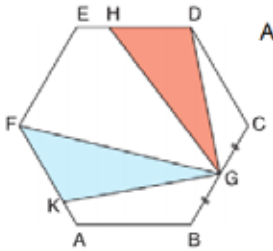
If $5! \cdot m! = n!$ *where* $m \geq 4$

Then what is the value of $m + n$?

a) 45 b) 98

c) 229 d) 239

4.



ABCDEF is a regular polygon.

IBGI = IGCI

IDHI = 2IEHI

IFKI = 3IAKI

If Area of red color shaded region is 24, find area of blue shaded region.

A) 27 B) 30 C) 32 D) 34

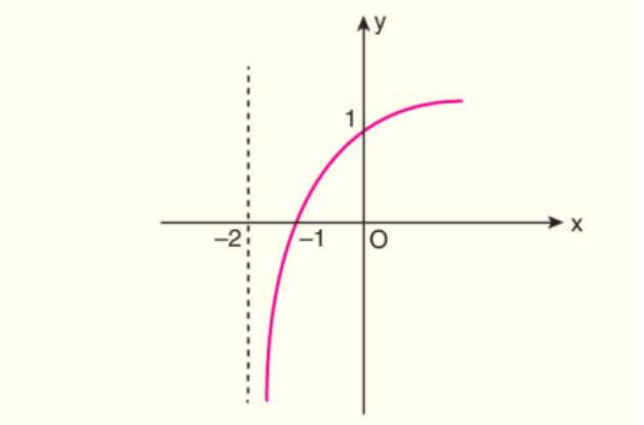
5.Find number of the 3 digit numbers which is divisible by 5, but not by 4.

A) 150 B) 135 C) 120 D) 115

6. The Domain of the function $y = \log log\,(x^2 - 5ax + 25)$is **the set of** all real numbers. Find sum of all integer values of variable a.

A) 0 B) -4 C) 5 D) 1

7.



The graph shown above is graph of function $f(x) = (x + b)$. Evaluate f(6)+ $f^{-1}(2)$.

A) 3 B) 2.5 C) 5 D) 8

8. Simplify the expression:

$$\frac{\sin^2\frac{5x}{3} - 2 + \cos^2\frac{5x}{3}}{\sin^2\frac{5\pi}{3}}$$

A) $\sin sin\ \frac{5x}{3}$ $B)\ \cos cos\ \frac{5x}{3}$ $C)\ 1$ $D)\ -\ \frac{4}{3}$

9.In a box, there are b blue marbles and g green marbles. If Sonya selects two marbles, what is the probability that both marbles are blue?

A) $\frac{b}{b+g}$ $B)\ \frac{b}{b+g+1}$ $C)\ \frac{b(b-1)}{(b+g)\cdot(b+g-1)}$ $D)\frac{b\cdot b}{(b+g)\cdot(b+g-1)}$

10.Find the domain of the function $f(x) = \sqrt{8\ -\ x} + \sqrt{x\ +\ 4} - \frac{3}{\sqrt[5]{x+11}}$

A) $[-\ 11; 8]$ $B)\ (-\ 4; 8]$ $C)\ [-\ 4; 8]$ $D)\ (-\ 11; -\ 4]$