# HMC ROUND 1 – MEMORANDUM

1) What is the value of $\frac{8}{5-1} \times (3+6) \times 3$ ?

$= \frac{8}{4} \times 9 \times 3$
$= 2 \times 9 \times 3$
$= 54$
CORRECT ANSWER: D) 54

2) Which number should replace ■ in the equation $3 \times 24 \times 10 = 5 \times ■ \times 18$ ?

$720 = 90 \times ■$
$8 = ■$
CORRECT ANSWER: A) 8

3) Product of two numbers is 360. What is the minimum difference?

$18 \times 20 = 360$
$20 - 18 = 2$
CORRECT ANSWER: B) 2

4) What is the percentage of $\frac{7}{20}$ ?

$\frac{7}{20} = \frac{35}{100} = 35\%$
CORRECT ANSWER: A) 35%

5) If 2021 = 43x47, then find the number of whole numbers which divide 2021 without leaving any remainder.

FACTOR OF 2021: 1, 43, 47, 2021
CORRECT ANSWER: D) 4

6) N is one of the numbers below. N is such that when multiplied by 0.75 gives 3. Which number is equal to N?

$0.75 = \frac{75}{100} = \frac{3}{4}$
$3 \times \frac{4}{3} = 4$
CORRECT ANSWER: B) 4

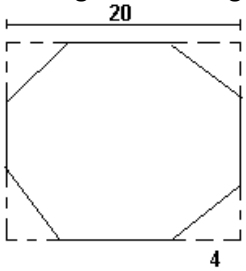
7) Martin knows that $111 \times 111 = 12321$. Which result does he get for $111 \times 222$ ?

$111 \times 2 = 222$
$12321 \times 2 = 24642$
CORRECT ANSWER: A) 24642

8) If the length of the side of a square is doubled, what is the ratio of the areas of the original square to the area of the new square?

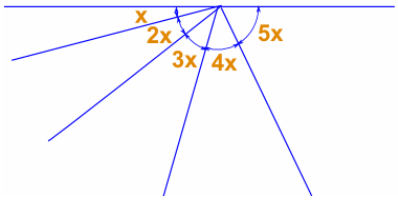
Let length = 10 cm
Area of original square = 100 $cm^2$
Doubled = 20 cm
Area of doubled square = 400 $cm^2$
Ratio$= \frac{100}{400} = \frac{1}{4}$
CORRECT ANSWER: C) $\frac{1}{4}$

9) Four congruent isosceles right triangles are cut from the 4 corners of a square with a side of 20 units. The length of one leg of the triangles is equal to 4 units. What is the area of the remaining octagon?




Area of Square: $20 \times 20 = 400$ $unit^2$
Area of Triangle: $\frac{1}{2} \times 4 \times 4 = 8$ $unit^2$
Area of Octagon: Area of Square – Area of 4 Triangles $= 400 - 4 \times 8 = 368$ $unit^2$
CORRECT ANSWER: B) 368

10) The angles on a straight line are x, 2x, 3x, 4x and 5x. What is the size of the greatest of the five angles?




$x + 2x + 3x + 4x + 5x = 180$
$15x = 180$
$x = 12$
Greatest angle is $5x = 5 \times 12 = 60$
CORRECT ANSWER: B) 60

11) A car is traveling 96 kilometres per hour. How many meters does the car travel in one minute?

$96 kilometres = 96000\ metres$
$1\ hour = 60\ minutes$
Car travels 96000 km in 60 minutes
$\frac{96000}{60} = 1600$ metres
CORRECT ANSWER: E) 1600

12) In a bag full of small balls, 1/4 of these balls are green, 1/8 are blue, 1/2 are yellow and the remaining 26 white. How many balls are blue?

$\frac{1}{4} + \frac{1}{8} + \frac{1}{2} = \frac{7}{8}$
Remain is $1 - \frac{7}{8} = \frac{1}{8}$
Blue balls are same as white balls.
CORRECT ANSWER: A) 26

13) Andile's father gives him a 440 pages book as a gift. On the first day Andile reads 20 pages of the book and he likes it. If Andile reads 10 more pages every day, in how many days he will be able to finish the book?

Day1: 20 pages
Day2: 30 pages
Day3: 40 pages
...
Day8: 90 pages
Total $= 20 + 30 + 40 + 50 + 60 + 70 + 80 + 90 = 440$
CORRECT ANSWER: C) 8

14) Bongi has a bucket full of water. The bucket has a hole in it and leaks water. He lets the bucket stand and measures the amount of water left in the bucket. The table shows the amount of water left in the bucket every 10 minute. How much water would you expect to be left in the bucket after 1.5 hours?

| Time(minutes) | 0 | 10 | 20 | 30 |
|---|---|---|---|---|
| Amount(milliliters) | 6000 | 5800 | 5600 | 5400 |

There are 9 times 10 minutes in 1.5 hours.
Water leaks 200ml every 10 minutes.
$9 \times 200 = 1800$
$6000 - 1800 = 4200$
CORRECT ANSWER: A) 4200

15) The petrol consumption of a car is 7 litres in 100 km. If one litre of petrol is R15, how much will a trip cost driving 4 hours with an average speed of 75 km per hour?

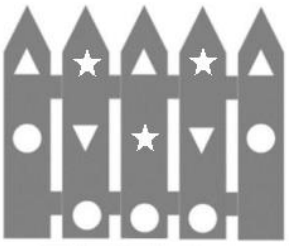
7 litres is $7 \times 15 = R105$
Therefore $R105$ in $100km$
Total Distance: $4 \times 75 = 300km$
Cost: $R105 \times 3 = R315$
CORRECT ANSWER: E) 315

16) Number 808 has a horizontal line of symmetry. Which of these words also have a horizontal line of symmetry?

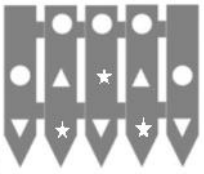
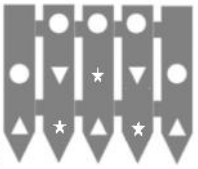
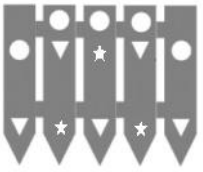
808

Only letters B, C, D, E, H, I, K, O, X are horizontally symmetrical.
Only word BOX has all symmetrical letters.
CORRECT ANSWER: D) BOX

17) The panels of Peter' fence are full of holes. One morning, one of the panels fell flat on the floor.
Which of the following could Peter see as he approaches his fence?



Option A) Triangles are different.
Option B) The middle line is located upper.
Option D) Position of triangles are incorrect.
Option E) The middle line and position of triangles are incorrect.
Option C) It is symmetrical.
CORRECT ANSWER: C)

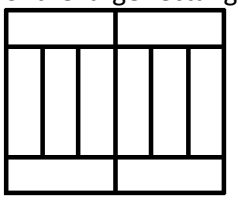
(A)  (B)  (C)  (D)  (E) 

18) Some of the digits in the following correct subtraction have been replaced by the letters A and B as shown.
How much is $A + B$?

$$\begin{array}{r} B\ A\ B \\ -\ A\ 5\ A \\ \hline 1\ 1\ 1 \end{array}$$

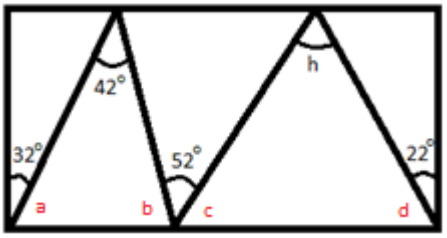
$A - 5 = 1$ therefore $A = 6$
$B - A = 1$ therefore $B = 7$
$A + B = 13$
CORRECT ANSWER: D) 13

19) A large rectangle is made up of ten identical rectangles whose longest sides are 30 cm long. What is the perimeter of the large rectangle?



Three short sides are equivalent to one long side.
Short side is 10 cm
Perimeter has six long sides and four short sides.
$Perimeter = 6 \times 30 + 4 \times 10 = 220$
CORRECT ANSWER: C) 220

20) Mike draws a zig-zag line inside a rectangle, creating angles of $22^o, 32^o, 42^o, 52^o$ as shown. What is the size of angle h?




Corner interior angles of rectangle are $90^o$.
$a = 90 - 32 = 58$
$d = 90 - 22 = 68$
Sum of interior angles in a triangle is $180^o$.
$b = 180 - 58 - 42 = 80$
Angles on a straight line equal to $180^o$.
$c = 180 - 80 - 52 = 48$
$h = 180 - 48 - 68 = 64$
CORRECT ANSWER: E) 64

A) 82 B) 76 C) 58 D) 72 **E) 64**

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