

ISMTF Middle School Competition – Toulouse June 2021

ROUND 2

The following are the 20 multiple choice questions for round 1 of the competition with the correct answers.

- Each question has options A,B,C,D and E
- Option E is always 'No Answer' and should be awarded '1' point
- The correct answer should be awarded '4' points
- An incorrect answer should be awarded '0' points

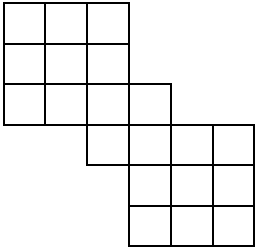
Question 1

Together Jake and Anna have 20 CDs. Anna has two more CDs than Jake. How many CDs does Jake have?

A	B	C	D	E
9	11	10	8	NO ANSWER

Question 2

How many squares are there in this diagram?



A	B	C	D	E
20	28	31	32	NO ANSWER

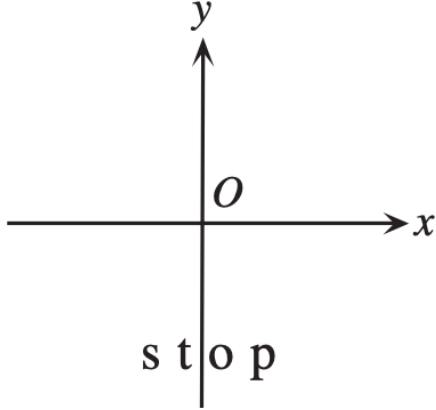
Question 3

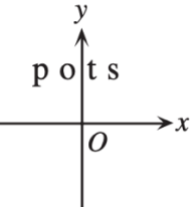
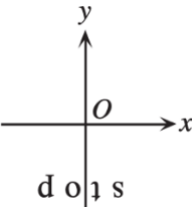
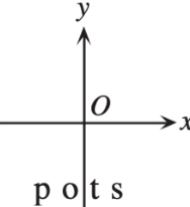
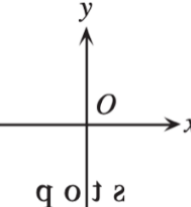
Anne, Ben and Chris have 10 chocolate bars to divide amongst themselves. Anne receives at least 3 bars, whilst Ben and Chris each get at least 2. If Chris gets at most 3, the number of bars that Ben could get is

A	B	C	D	E
2 or 3	3 or 4	2, 3 or 5	2, 3, 4 or 5	NO ANSWER

Question 4

The word “stop” starts in the position shown in the diagram below. It is then rotated 180° clockwise about the origin, O , and this result is then reflected in the x -axis. Which of the following represents the final image?



A	B	C	D	E
				NO ANSWER

Question 5

In the square shown, the numbers in each row, column and diagonal multiply to give the same result. The sum of the two missing number is

12	1	18
9	6	4
		3

A	B	C	D	E
15	30	38	72	NO ANSWER

Question 6

If the operation ' $\&$ ' was defined as $s\&p = s + sp$, find $(2\&3)\&(3\&2)$

A	B	C	D	E
80	73	81	72	NO ANSWER

Question 7

Eden had a 10:00 a.m. appointment 60 km from her home. She averaged 80 km/h for the trip and arrived 20 minutes late for the appointment. At what time did she leave his home?

A	B	C	D	E
8:40am	9:00am	9:15am	9:35am	NO ANSWER

Question 8

You have the following lines:

$$y = 2$$

$$y = -3x + 5$$

$$y = -3$$

The equation of a 4th line that would enclose a parallelogram whose area is 20 square units is to be found. If this line is expressed as $y = ax + b$. Which of the following is a possible value for b ?

A	B	C	D	E
-17	-7	$-\frac{7}{3}$	$\frac{17}{3}$	NO ANSWER

Question 9

If n and m are integers and $n^2 + m^2$ is even, which of the following is impossible?

A	B	C	D	E
n and m are even	n and m are odd	$n + m$ is even	$n + m$ is odd	NO ANSWER

Question 10

The racoons team lost 7 out of their first 9 games. By winning 75% of their remaining games, they ended with victories in exactly $\frac{2}{3}$ of all their games. In all, how many games did they win?

A	B	C	D	E
40	36	25	38	NO ANSWER

Question 11

The integer m is a perfect cube exactly when it is equal to n^3 for some integer n . For example, 1000 is a perfect cube since $1000 = 10^3$. What is the smallest positive integer k for which the integer $2^4 \times 3^2 \times 5^5 \times k$ is a perfect cube?

A	B	C	D	E
12	30	60	480	NO ANSWER

Question 12

A bag contains 100 marbles such that 28 are red, 20 are green, 12 are yellow, 20 are blue, 10 are white and 10 are black. What is the smallest number of marbles that needs to be drawn out of the bag in order to ensure that there are 15 of one color?

A	B	C	D	E
74	75	90	91	NO ANSWER

Question 13

If the square is completed with the letters A, B, C, D and E so that no row, column, or either of the two main diagonals contains the same letter more than once, which letters should replace the asterisk?

	*			A
		B		
D		C		
			E	

A	B	C	D	E
B	C	D	E	NO ANSWER

Question 14

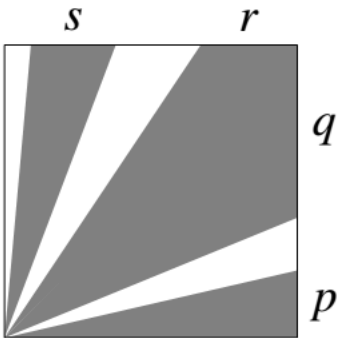
In their latest game, a basketball team scored 82 points. This raised their scoring average from 70 points per game to 71 points per game.

How many points must the team score in their next game to raise their scoring average to 72 points per game?

A	B	C	D	E
82	83	84	155	NO ANSWER

Question 15

Inside a square of area 36, there are shaded regions as shown in the figure. The total shaded area is 27. p , q , r and s are the lengths of the sides of the shaded areas where they meet the edge of the square. What is $p + q + r + s$?



A	B	C	D	E
6	8	9	10	NO ANSWER

Question 16

Janice puts a fence around her rectangular garden. The garden has a length that is 9 feet less than 3 times the width. What is the perimeter of Janice's fence if the area of her garden is 5 670 square feet

A	B	C	D	E
342	318	300	270	NO ANSWER

Question 17

Mrs. Sanders has three grandchildren, who call her regularly. One calls her every three days, one calls her every four days, and one calls her every five days. All three called her on December 31, 2020. On how many days during the next year did she not receive a phone call from any of her grandchildren? 2021 is not a leap year.

A	B	C	D	E
78	80	144	146	NO ANSWER

Question 18

Find the value of xy

$$6751x + 3249y = 26751$$

$$3249x + 6751y = 23249$$

A	B	C	D	E
2	3	5	6	NO ANSWER

Question 19

There are n students in the math club at ISCAT. When Ms. Erin tries to put the n students in groups of 4, there is one group with fewer than 4 students, but all of the other groups are complete. When she tries to put the n students in groups of 3, there are 3 more complete groups than there were with groups of 4, and there is again exactly one group that is not complete. When she tries to put the n students in groups of 2, there are 5 more complete groups than there were with groups of 3, and there is again exactly one group that is not complete. The sum of the digits of the integer equal to $n^2 - n$ is...

A	B	C	D	E
11	12	13	10	NO ANSWER

Question 20

A cube of side length 3 cm and a cylinder with a radius of 3 cm both have the same volume. What is the surface area of the cylinder?

A	B	C	D	E
Answer 1 $9\pi + 18$	Answer 2 $18\pi + 27$	Answer 3 $18\pi + 18$	Answer 4 $12\pi + 18$	NO ANSWER