## **Sarasota Math Immersion Monthly Tournament (SMIMT)**

## Grade 8 and under

	First	Name	Last Name	Grade
Instru	ction:	The examination has	6 pages and 20 questions.	You will be given <b>50</b>
		minutes to complete	the examination. All the qu	estions are single choice
		questions. Please cir	cle the correct answer or	ı the paper.
1.				be subtracted from 2022 to
	•	number exactly divisib	e by 11?	
	A)			
	B)			
	C)			
	D)			
	E)	9		
2	Which	of the following is exa	actly divisible by 99?	
		2002	iony divisible by co.	
	•	9090		
	•	12375		
	•	13579		
	E)	13589		
3.			ssible when you toss 6 fair	
			the coins come up heads of	or tails does not matter.
	A)			
	B)			
	C)	8		
	•	15		
	E)	None of the above		

4.	How many terms are in the expansion of (a+b+c+d) <sup>5</sup> ?
	<b>A)</b> 40
	<b>B)</b> 48
	<b>C)</b> 56
	<b>D)</b> 64
	<b>E)</b> 72
5.	Joy runs 800 meters at a speed of 160 meters per minute. How many additional
	meters will she have to run at a speed of 225 meters per minute to average 200
	meters per minute for the entire running training?
	<b>A)</b> 1000
	<b>B)</b> 1200
	<b>C)</b> 1600
	<b>D)</b> 1800
	<b>E)</b> 2000
6.	A car from Sarasota to Tallahassee departs at 8:00 am, driving at a constant rate
	of 60 miles per hour for the 300-mile trip. A second car departs from Tallahassee
	towards Sarasota at 8:20 am and drives at a rate of 80 miles per hour. At what
	time do they meet?
	<b>A)</b> 10:20 am
	<b>B)</b> 10:45 am
	<b>C)</b> 11:00 am
	<b>D)</b> 11:10 am
	<b>E)</b> 11:30 am
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7. Anna, Bob, and Carol all volunteer at the same animal shelter. Anna volunteers every two days. Bob volunteers every four days. Carol volunteers every five days. Suppose they all volunteer together on a Monday. On what day of the week do they all volunteer together next time?

A) Monday

**B)** Tuesday C) Wednesday **D)** Friday E) Saturday 8. Express the sum 623 8+164 8 in base 8. **A)** 787 **B)** 1007 **C)** 777 **D)** 1017 **E)** 1027 **9.** What is the sum of the roots of  $x^3-6x^2+2x+8$ ? **A)** 4 **B**) 5 **C)** 6 **D)** 7 **E)** 8 10. In how many ways can the letters in "deepfreeze" be arranged such that two e's do not appear together? **A)** 1200 **B)** 120 **C)** 240 **D)** 720 **E)** 10! **11.** If cos(2x) = 1/4, find  $cos^4(x) - sin^4(x)$ ? **A)** 1/32 **B)** 1/16 **C)** 1/8

- D) 1/4
- E) ½

**12.** If  $x + \frac{1}{x} = 4$ , what is the value of  $x^3 + \frac{1}{x^3}$ ?

- **A)** 44
- **B)** 48
- **C)** 52
- **D)** 56
- **E)** 60

**13.** James can paint a house in 8 hours and John can paint a house in 4.8 hours, but they're only ¾ as efficient when they work together. How many hours does it take them to paint a house together?

- **A)** 3
- **B)** 4
- **C)** 5
- **D)** 6
- **E)** 8

**14.** What is the remainder when (-29)<sup>76</sup> is divided by 6?

- **A)** 1
- **B)** 2
- **C)** 3
- **D)** 4
- **E)** 5

15. How many numbers less than or equal to 2000 are divisible by 3 or 4 but not 5?

- **A)** 200
- **B)** 400
- **C)** 600

<b>D)</b> 800			
<b>E)</b> 1000			
<b>16.</b> What is the value of A×B if 1B112A5 is divisible by 99?			
<b>A)</b> 15			
<b>B)</b> 20			
<b>C)</b> 25			
<b>D)</b> 30			
<b>E)</b> 35			
17. What is the median to the side of length 8 of a triangle with side lengths 7, 8, 9?			
A) 5			
B) 6			
C) 7			
D) 8			
E) 9			
18. What is the volume of the cone formed by aligning the straight sides of a circular			
sector with radius 30 and angle 288 degrees?			
A) 640π			
B) 1920π			
C) 3456π			
,			
D) 4032π			
Ε) 5760π			
19. How many 4-digit numbers are there such that at least 1 digit is repeated?			
<b>A)</b> 3464			
<b>B)</b> 4464			
<b>C)</b> 5464			
<b>D)</b> 6464			
E) 7464			

- **20.** A person has 30 apples. How many ways can he distribute the apples between himself and 3 other people if each person must get at least 3 apples?
  - **A)** 30
  - **B)** 210
  - **C)** 630
  - **D)** 1330
  - **E)** 4<sup>21</sup>

## SMIMT Nov 2022 Answer Keys Grades 8 & under

- 1. E) 9
- 2. C) 12375
- 3. B) 7
- 4. C) 56
- 5. D) 1800
- 6. A) 10:20 am
- 7. E) Saturday
- 8. B) 1007
- 9. C) 6
- 10.D) 720
- 11. D) 1/4
- 12.C) 52
- 13.B) 4
- 14.A) 1
- 15. D) 800
- 16.A) 15
- 17.C)7
- 18.C) 3456π
- 19.B) 4464
- 20.D) 1330