1st Score: _____	2nd Score: _____	3rd Score: _____	**Final Score**
Grader: _____	Grader: _____	Grader: _____	

Name:_____ School:_____

SS/ID Number:_____ City:_____

Grade: 9 10 11 12 Classification: 1A 2A 3A 4A 5A 6A

TMSCA HIGH SCHOOL NUMBER SENSE STATE MEET TEST © MARCH 20, 2021

GENERAL DIRECTIONS

1. Write only the requested information on this cover sheet. Do not make any additional marks on this cover sheet.
2. You will be given 10 minutes to take this test.
3. There are 80 problems on the test.
4. Write in ink only! It would be advantageous to use non-black ink.
5. Solve as many problems as you can in the order that they appear.
6. Problems that are skipped are considered wrong.
7. Problems that appear after the last attempted problem do not count either for or against you.
8. ALL PROBLEMS ARE TO BE SOLVED MENTALLY! [No scratch work!]
9. Only the answer may be written in the answer blank.
10. Starred [*] problems require approximate INTEGRAL answers that are within 5% of the exact answers. All other problems require exact answers.
11. All problems answered correctly are worth FIVE points. FOUR points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

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2020-21 TMSCA High School State Meet

Final _____ _____

Contestant's Number _____ 2nd _____ _____

1st _____ _____

Score **Initials**

Read directions carefully before beginning test

DO NOT UNFOLD THIS SHEET UNTIL TOLD TO BEGIN

Directions: Do not turn this page until the person conducting this test gives the signal to begin. This is a ten-minute test. There are 80 problems. Solve accurately and quickly as many as you can in the order in which they appear. ALL PROBLEMS ARE TO BE SOLVED MENTALLY. Make no calculations with paper and pencil. Write only the answer in the space provided at the end of each problem. Problems marked with a (*) require approximate integral answers; any answer to a starred problem that is within five percent of the exact answer will be scored correct; all other problems require exact answers.

The person conducting this contest should explain these directions to the contestants.

STOP -- WAIT FOR SIGNAL!

(1) $320 + 2021 =$ _____

(2) $1202 - 320 =$ _____

(3) $3.2 \times 20 =$ _____

(4) $\frac{20}{21} \div \frac{3}{20} =$ _____

(5) The LCM of 81 and 18 is _____

(6) $\frac{3}{16} =$ _____ % (mixed number)

(7) $1.3 \div 2\frac{1}{2} =$ _____ (decimal)

(8) $42^2 =$ _____

(9) The mode of {3, 2, 0, 2, 0, 2, 1} is _____

***(10)** 320% of 2021 = _____

(11) If 7 pens cost \$4.83 then 4 pens cost \$ _____

(12) 6 pecks = _____ bushels

(13) MMXXI + CCCXX = _____ (Arabic Numeral)

(14) $4 - (8 + 12) \times 16 \div (20 - 24) =$ _____

(15) $3.92 - 4.17 =$ _____ (decimal)

(16) $38^2 - 37^2 =$ _____

(17) $3\frac{3}{5} \times 2\frac{1}{2} =$ _____

(18) A 15% tip on a \$20.21 meal is \$ _____

(19) $\frac{13}{15} \times 13 =$ _____ (mixed number)

***(20)** $\sqrt[3]{1730} \times 143 =$ _____

(21) $(14 + 15 \times 16 - 17) \div 6$ has a remainder of ____

(22) $13 \times 169 =$ _____

(23) The sum of the roots of $(6x - 7)(4x + 5)$ is _____

(24) $1A1_{13} =$ _____ 10

(25) $111 \times \frac{11}{37} =$ _____

(26) Let $\frac{4}{9} = \frac{3}{x}$. Find 8x. _____

(27) $1994 \times 6 + 36 =$ _____

(28) Two positive numbers differ by 12, have a product of 253, and a sum of _____

(29) How many days are there from the beginning of March 14 to the end of July 4? _____

***(30)** 57381 ÷ 128 = _____

(31) Let $(53x - 34)^2 = ax^2 + bx + c$. $a + b + c =$ ____

(32) If 4.333... × k = 1, then k = _____

(33) $\{p,l,u,s\} \cup [\{m,i,n,u,s\} \cap \{t,i,m,e,s\}]$ contains how many elements? _____

(34) 0.3777... = _____ (fraction)

(35) If $\sqrt{80} + \sqrt{k} = \sqrt{245}$, then k = _____

(36) 3.2 is _____% greater than $2\frac{1}{5}$

(37) 320 = _____ 5

(38) A dodecahedron has how many edges? _____

(39) The sides of a square decreases from 36 to 32. The area decreases by _____ sq. units.

*(40) $\sqrt{6123457}$ = _____

(41) $(105)^3$ = _____

(42) $18 \times 24 + 9$ = _____

(43) If $7x + 1 < 2$, then $2x - 7 <$ _____

(44) 993×998 = _____

(45) If $\sqrt[5]{a^4} \times \sqrt[3]{a^2} = \sqrt[n]{a^k}$, then $n + k$ = _____

(46) 120 feet per minute = _____ inches per second

(47) $(34_8 - 6_8) \times 5_8$ = _____ 8

(48) The sum of the product of the roots of $2x^3 - x^2 - 5x - 2 = 0$ taken two at a time is ____

(49) If $12^{(-1)} + x^{(-1)} = 3^{(-1)}$, then x = _____

*(50) 6388×3.76 = _____

(51) Given the sequence 3,6,11,17,26,k,45,... . k = _____

(52) $2 + 5 + 7 + 12 + 19 + ... + 81 + 131$ = _____

(53) Let $48^2 - 32^2 = 80k$. Find k. _____

(54) If 34 is in base 7, then its positive square root in base 10 is _____

(55) The maximum number of regions created by 6 intersecting lines is _____

(56) ${}_{10}P_2$ = _____

(57) $9 + 6 + 4 + 2\frac{2}{3} + ...$ = _____

(58) $\text{Log}_{27}9$ = _____

(59) The simplified coefficient of the 4th term in the expansion of $(x + y)^6$ is _____

*(60) $13 \times 26 \times 39 \times 52$ = _____

(61) 5152×17 = _____

(62) If $2^5 \div 4^3 \times 8^2 = 2^k$, then k = _____

(63) Find the sum of all negative integers x such that $3 - 6x \leq 36$. _____

(64) sin 210° = _____

(65) $(123_6 + 205_6) \div 5_6$ has a remainder of _____

(66) The focus point of $\frac{(x-1)^2}{9} - \frac{(y+3)^2}{16} = 1$ is (x, y), where $x > 0$. Find x. _____

(67) How many positive integers less than or equal to 50 are relatively prime to 50? _____

(68) $6^{13} \div 13$ has a remainder of _____

(69) Four coins are tossed. The probability of getting 2 heads and 2 tails is _____

*(70) $16667 \div 8333 \times 555$ = _____

(71) $\lim_{x \to -1} \left(\frac{x+1}{x^2-1}\right)$ = _____

(72) The first four digits of the decimal for $\frac{56}{77}$ base 8 is 0._____ base 8

(73) Change $\frac{25}{49}$ to a base 7 decimal. _____ 7

(74) $(2x^3 - x^2 + 2x + 1) \div (x - 2)$ has remainder ___

(75) The sum of the 3rd triangular number, the 3rd pentagonal number and the 3rd hexagonal number is _____

(76) The maximum value of $y = -5x^2 + 3$ is _____

(77) The sum of the critical values of $f(x) = x^3 - 15x^2 + 63x - \frac{1}{2}$ is _____

(78) $\int_{-2}^{3} (4x)\, dx$ = _____

(79) Given: 3, 6, 11, 18, 27, ..., k, 83, ... Find k. _____

*(80) Amount of interest on $5000 at a 7.25% simple annual rate for 25 months is _____ dollars

2020-21 TMSCA High School State Meet Number Sense - Answer Key

***number) x — y means an integer between x and y inclusive**

NOTE: If an answer is of the type like $\frac{2}{3}$ it cannot be written as a repeating decimal

(1) 2,341

(2) 882

(3) 64

(4) $\frac{400}{63}$, $6\frac{22}{63}$

(5) 162

(6) $18\frac{3}{4}$

(7) .52

(8) 1,764

(9) 2

***(10) 6,144 — 6,790**

(11) $2.76

(12) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(13) 2,341

(14) 84

(15) — .25

(16) 75

(17) 9

(18) $3.03

(19) $11\frac{4}{15}$

***(20) 1,631 — 1,802**

(21) 3

(22) 2,197

(23) — $\frac{1}{12}$

(24) 300

(25) 33

(26) 54

(27) 12,000

(28) 34

(29) 113

***(30) 426 — 470**

(31) 361

(32) $\frac{3}{13}$

(33) 6

(34) $\frac{17}{45}$

(35) 45

(36) $\frac{500}{11}$, $45\frac{5}{11}$

(37) 2240

(38) 30

(39) 272

***(40) 2,351 — 2,598**

(41) 1,157,625

(42) 441

(43) — $\frac{47}{7}$, $-6\frac{5}{7}$

(44) 991,014

(45) 37

(46) 24

(47) 156

(48) — 2.5, — $\frac{5}{2}$, $-2\frac{1}{2}$

(49) 4

***(50) 22,818 — 25,219**

(51) 34

(52) 338

(53) 16

(54) 5

(55) 22

(56) 90

(57) 27

(58) $\frac{2}{3}$

(59) 20

***(60) 651,191 — 719,737**

(61) 87,584

(62) 5

(63) — 15

(64) — .5, — $\frac{1}{2}$

(65) 3

(66) 6

(67) 20

(68) 6

(69) .375, $\frac{3}{8}$

***(70) 1,055 — 1,165**

(71) — .5, — $\frac{1}{2}$

(72) 5656

(73) .34

(74) 17

(75) 33

(76) 3

(77) 10

(78) 10

(79) 66

***(80) 718 — 792**