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 TEST (UIL E) ©

MARCH 19, 2022

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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2021-22 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) $1903 + 2022 =$ _____

(2) $319 - 2022 =$ _____

(3) $\frac{3}{20} \times \frac{22}{21} =$ _____

(4) $22.02 \div 0.3 =$ _____ **(decimal)**

(5) $1.375 =$ _____ **(mixed number)**

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

(7) $80\% =$ _____ **(proper fraction)**

(8) $3\frac{1}{4} + 2\frac{1}{3} =$ _____

(9) $2 + (4 - 6) \times 8 \div (10 - 12) =$ _____

***(10)** $31922 + 3192 + 319 + 31 + 3 =$ _____

(11) $64 \times 56 =$ _____

(12) $31922 \div 9$ **has a remainder of** _____

(13) $3^2 + 19^2 =$ _____

(14) $3\frac{1}{4} - 2\frac{1}{3} =$ _____

(15) **The number of prime numbers greater than 30 and less than 50 is** _____

(16) $15 \times 225 =$ _____

(17) $CCCXXI + MMXXII =$ _____ **(Arabic Numeral)**

(18) **15% of** $8\frac{2}{3}$ **is** _____

(19) $1.1 + \frac{10}{11} =$ _____ **(mixed number)**

***(20)** $3192 \times 202 =$ _____

(21) **Let P = 2, Q = — 3, and R = 5. Find** $P^QR =$ _____

(22) **If 8 pods cost $20.16, then 6 pods cost $** _____

(23) **Let** $\frac{3}{7} = \frac{22}{x}$**. Find x.** _____ **(mixed number)**

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

(25) $63 \times 67 =$ _____

(26) $12345 \times 9 + 6 =$ _____

(27) $\frac{7}{33} = 0.ababab...$ **and** $a + b =$ _____

(28) $52^2 + 15^2 =$ _____

(29) $7776 = 6^k$ **and k =** _____

***(30)** $3192022 \div 322 =$ _____

(31) $1AB_{12} =$ _____ **10**

(32) **If** $3.111... \times k = 1$**, then k =** _____

(33) $33^{30} \div 29$ **has a remainder of** _____

(34) $\sqrt[3]{1728} + \sqrt{441} =$ _____

(35) The product of the coefficients of $(x - y)^4$ is _____

(36) $7\frac{1}{7}\%$ = _____ (proper fraction)

(37) How long is it between the end of March 7, 2022 and the beginning of May 6, 2022? _____ days

(38) The smaller solution for $|3x + 2| = 5$ is _____

(39) Given: 1, 2, 3, 4, 6, 5, k, — 2, — 11... . Find k. _____

*(40) $\sqrt{3192022}$ = _____

(41) $63^2 - 64^2$ = _____

(42) 31922 ÷ 7 has a remainder of _____

(43) If $2x + y < 5$ and $y > -1$, then $x <$ _____

(44) $\ln e^3$ = _____

(45) $(\frac{5}{2})^{-3}$ = _____ (decimal)

(46) The sum of the coefficients of the x^4y term and the x^2y^3 term in the expansion of $(x + y)^5$ is _____

(47) $(8_9)^2 - 7_9 + 65_9$ = _____ 9

(48) Let $3\frac{3}{m} \times n\frac{1}{4} = 27$, where m, n are natural numbers. Find m + n. _____

(49) If y varies directly with x, and y = 8 when $x = \frac{1}{4}$, then y = _____ when $x = \frac{3}{8}$.

*(50) 358 × 41.667 = _____

(51) $79^2 + 79$ = _____

(52) Let $(5 - i)(4 - 2i) = a + bi$. Find a + b. _____

(53) $\sqrt[3]{35937}$ = _____

(54) The second octagonal number is _____

(55) The focus of $y = 0.125x^2$ is at (0, f) and f = _____

(56) ${}_{22}C_{20}$ = _____

(57) The sum of the roots of (2x — 3)(5x + 7) is _____

(58) $\frac{1}{5} + \frac{1}{3} + \frac{8}{15} + \frac{13}{15} + 1\frac{2}{5} + 2\frac{4}{15} + 3\frac{2}{3} + 5\frac{14}{15}$ = ____

(59) $(203)^3$ = _____

*(60) $\sqrt[3]{3192022}$ = _____

(61) 1 — 4 + 9 — 16 + 25 — ... — 400 + 441 = _____

(62) The volume of a 3" by 4" rectangular based pyramid with a 5" height is _____ cu. in

(63) The Greatest Integer Function is written as f(x) = [x]. Find $\left[\sqrt{7} - \sqrt{23}\right]$. _____

(64) $333 \times \frac{5}{27}$ = _____ (mixed number)

(65) The determinant of $\begin{bmatrix} 1 & 1 \\ 2 & k \end{bmatrix} = 5$. k = _____

(66) Let $v = (24, 45)$. Find $\|v\|$. _____

(67) 15 miles/hour = _____ feet/second

(68) 1 + 54 × 56 = _____

(69) The first four digits of the decimal for $\frac{11}{22}$ base 5 is 0._____ base 5

*(70) 76% of 77 pecks = _____ pints

(71) The range of $y^2 = 16 - x^2$ is $m \leq y \leq n$. m = ___

(72) $1^3 - 1^3 + 2^3 - 3^3 + 5^3 - 8^3$ = _____

(73) $\lim_{x \to 0} \sin(2x)$ = _____

(74) The slope of the line tangent to $y = 5x^2 - 3x - 2$ at x = — 1 is _____

(75) Let s(x) be the slant asymptote of $g(x) = \frac{2x^2 - 2x - 3}{x - 2}$. Find s(— 1). _____

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

(77) $\int_0^{\pi} \sin(x)\, dx$ = _____

(78) If $f(x) = \frac{2x - 3}{5} + \frac{3}{4}$, then $f^{-1}(0.25)$ = _____

(79) $(.875)^{-3}$ = _____ (improper fraction)

*(80) 16667 ÷ 8333 × 555 = _____

2021-22 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) 3,925

(2) — 1,703

(3) $\frac{11}{70}$

(4) 73.4

(5) $1\frac{3}{8}$

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

(7) $\frac{4}{5}$

(8) $\frac{67}{12}$, $5\frac{7}{12}$

(9) 10

***(10) 33,694 — 37,240**

(11) 3,584

(12) 8

(13) 370

(14) $\frac{11}{12}$

(15) 5

(16) 3,375

(17) 2,343

(18) 1.3, $\frac{13}{10}$, $1\frac{3}{10}$

(19) $2\frac{1}{110}$

***(20) 612,545 — 677,023**

(21) .625, $\frac{5}{8}$

(22) 15.12

(23) $51\frac{1}{3}$

(24) 3

(25) 4,221

(26) 111,111

(27) 3

(28) 2,929

(29) 5

***(30) 9,418 — 10,408**

(31) 275

(32) $\frac{9}{28}$

(33) 16

(34) 33

(35) 96

(36) $\frac{1}{14}$

(37) 59

(38) $-\frac{7}{3}$, $-2\frac{1}{3}$

(39) 4

***(40) 1,698 — 1,875**

(41) — 127

(42) 2

(43) 3

(44) 3

(45) .064

(46) 15

(47) 138

(48) 19

(49) 12

***(50) 14,171 — 15,662**

(51) 6,320

(52) 4

(53) 33

(54) 8

(55) 2

(56) 231

(57) .1, $\frac{1}{10}$

(58) 15.2, $\frac{76}{5}$, $15\frac{1}{5}$

(59) 8,365,427

***(60) 140 — 154**

(61) 231

(62) 20

(63) — 3

(64) $61\frac{2}{3}$

(65) 7

(66) 51

(67) 22

(68) 3,025

(69) 2222

***(70) 890 — 983**

(71) — 4

(72) — 406

(73) 0

(74) — 13

(75) 0

(76) 3

(77) 2

(78) .25, $\frac{1}{4}$

(79) $\frac{512}{343}$

***(80) 1,055 — 1,165**