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

Name:_____ School:_____

SS/ID Number:_____ City:_____

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

TMSCA HIGH SCHOOL NUMBER SENSE DISD INVITATIONAL ©

2023

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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(45) $21 \times \frac{22}{23} =$ _____**(mixed number)**

(46) The units digit of 8^{16} **is** _____

(47) An interior angle of a regular octagon has a measure of _____ **degrees**

(48) $79^{17} \div 17$ **has a remainder of** _____

(49) $52 \div 1.08333\ldots =$ _____

***(50)** $142857 \times 53 =$ _____

(51) The geometric mean of 1, 4, and 16 is _____

(52) $34_5 \times 4_5 =$ _____ **(base 5)**

(53) 3 cubic feet = _____ **cubic inches**

(54) Find the radius of the circle $x^2 + y^2 + 8x + 10y = 8$. _____

(55) Let $4\frac{1}{m} \times n\frac{3}{13} = 27$**, where** m, n **are natural numbers. Find** $m \times n$. _____

(56) $(5 + i)(5 - i) = a + bi$**, then** $a =$ _____

(57) $111^2 =$ _____

(58) Find the geometric mean of the roots of $x^2 - 5x + 4 = 0$. _____

(59) $\log_4 2 - \log_4 16 =$ _____ **(decimal)**

***(60) 65 square miles =** _____ **acres**

(61) A 13-gon has how many distinct diagonals?

_____

(62) $32^2 + 96^2 =$ _____

(63) If sin x = 0.25 then csc x = _____

(64) $7^2 - 1 =$ _____ **(base 7)**

(65) $\cos(2\pi) - \cos(\pi) =$ _____

(66) If $xy = 1$ **and** $x + y = 5$ **then** $x^3 + y^3 =$

_____

(67) The sum of the product of the roots taken two at a time of $x^3 + 6x^2 + 8x + 9 = 0$ **is** _____

(68) $(3 \times 4! + 4 \times 3!) \div 3! =$ _____

(69) $429 \times 231 =$ _____

***(70)** $\sqrt[3]{32768000} =$ _____

(71) The area of the ellipse $3x^2 + 12y^2 = 36$ **is** $K\pi$ **and K =** _____

(72) $\int_0^2 (2x + 3)dx =$ _____

(73) If $\sqrt{24} + \sqrt{54} = \sqrt{x}$**, then** $x =$ _____

(74) If f(x) = 4x and g(x) = x + 4, then f(g(4)) =

_____

(75) $201^3 =$ _____

(76) $(\log_3 729)(\log_4 256) =$ _____

(77) $(6, \frac{\pi}{6})$ **are polar coordinates for (x, y), y =**

_____

(78) $444 \times \frac{2}{27} =$ _____ **(mixed number)**

(79) Four coins are tossed, what is the probability of not getting a head? _____

***(80)** $5.555\ldots \times 8100 =$ _____

2023 – 2024 TMSCA High School Number Sense Invitational Test

(1) $123 \times 11 =$ _____

(2) $\frac{7}{8} + \frac{9}{7} =$ _____ **(improper fraction)**

(3) $20.24 - 4.76 =$ _____ **(decimal)**

(4) $\frac{2}{5} - \frac{5}{6} =$ _____

(5) $0.0625 =$ _____ **(fraction)**

(6) $4\frac{4}{5} + 2\frac{1}{2} =$ _____ **(mixed number)**

(7) 15 is _____ **% of 35**

(8) $10 - 8 \times 12 \div 6 + 30 =$ _____

(9) $19^2 =$ _____

***(10)** $12311 + 33221 + 2821 =$ _____

(11) $41 \times 39 =$ _____

(12) $61 \times 25 - 25 \times 41 =$ _____

(13) $14 \times 15 =$ _____

(14) MCD + DLXVII = _____ **(Arabic Numeral)**

(15) The GCD of 24, 32, and 48 is _____

(16) The average of 3, 6, 9, 12, and 15 is _____

(17) The number of positive prime divisors of 70 is _____

(18) $\frac{19}{21} + \frac{21}{19} =$ _____ **(mixed number)**

(19) $701145 \div 8$ **has a remainder of** _____

***(20)** $95 \times 747 \div 24 =$ _____

(21) $1^3 + 2^3 + 3^3 + 4^3 =$ _____

(22) $16^2 + 42^2 =$ _____

(23) $\sqrt[3]{1331} + \sqrt{441} =$ _____

(24) The multiplicative inverse of 4.8 is _____

(25) $0.2333\ldots =$ _____ **(proper fraction)**

(26) The LCM of 14, 21, and 28 is _____

(27) $8\frac{1}{3}\%$ **of 7200 is** _____

(28) 89 in base 10 is _____ **(base 6)**

(29) Set A = {T, M, S, C, A}. How many 3-element subsets of set A exist? _____

***(30)** $425 \times 288 =$ _____

(31) If x + 4y = 11 and x – y = 6, then y = _____

(32) $35 \times 95 =$ _____

(33) Apples cost $4 per pound. A bag of apples that weighs 3 pounds and 4 oz costs $_____

(34) The product of the coefficients of $(3x + 1)^2$ **is** _____

(35) Let $9^{x+1} = \frac{18}{29}$ **then** $9^x =$ _____

(36) If $\frac{5}{8} = \frac{7}{x}$, **then** $x =$ _____ **(decimal)**

(37) $37 \times 77 =$ _____

(38) The product of the roots of $3x^2 = 9x + 6$ **is** _____

(39) $42^2 - 58^2 =$ _____

***(40)** $\sqrt{256324} =$ _____

(41) If $x = -9$, **then** $x^2 - 18x + 81 =$ _____

(42) The area of a rectangle with a width of 10 and a diagonal of 26 is _____

(43) $16\frac{1}{8} \times 8\frac{7}{8} =$ _____ **(mixed number)**

(44) If 5 – 3x < 17 then x > _____

23-24 TMSCA HSNS Invitational Test Answer Key

(1) 1353

(2) $\frac{121}{56}$

(3) 15.48

(4) $\frac{-13}{30}$

(5) $\frac{1}{16}$

(6) $7\frac{3}{10}$

(7) $42\frac{6}{7}$

(8) 24

(9) 361

***(10) 45936 - 50770**

(11) 1599

(12) 500

(13) 210

(14) 1967

(15) 8

(16) 9

(17) 3

(18) $2\frac{4}{399}$

(19) 1

***(20) 2810 – 3104**

(21) 100

(22) 2020

(23) 32

(24) $\frac{5}{24}$

(25) $\frac{7}{30}$

(26) 84

(27) 600

(28) 225

(29) 10

***(30) 116280 - 128520**

(31) 1

(32) 3325

(33) 13.00

(34) 54

(35) $\frac{2}{29}$

(36) 11.2

(37) 2849

(38) -2

(39) -1600

***(40) 481 - 531**

(41) 324

(42) 240

(43) $143\frac{7}{64}$

(44) -4

(45) $20\frac{2}{23}$

(46) 6

(47) 135

(48) 11

(49) 48

***(50) 7192850 – 7949992**

(51) 4

(52) 301

(53) 5184

(54) 7

(55) 18

(56) 26

(57) 12321

(58) 2

(59) -1.5

***(60) 3952 0 - 43680**

(61) 65

(62) 10240

(63) 4

(64) 66

(65) 2

(66) 110

(67) 8

(68) 16

(69) 99099

***(70) 304 - 336**

(71) 6

(72) 10

(73) 150

(74) 32

(75) 8120601

(76) 24

(77) 3

(78) $32\frac{8}{9}$

(79) $\frac{1}{16}$ **or .0625**

***(80) 42750 - 47250**