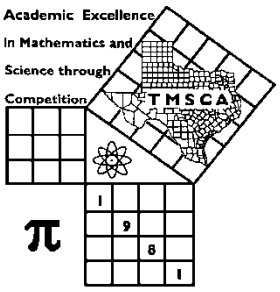
1st Score: _____ Grader: _____	2nd Score: _____ Grader: _____	3rd Score: _____ Grader: _____	**Final Score**

Name:_____ School:_____

SS/ID Number:_____ City:_____

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



TMSCA HIGH SCHOOL NUMBER SENSE TEST #6 (UIL C) ©

DECEMBER 7, 2019

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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2019-20 TMSCA High School Number Sense Test 6

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) $2019 + 2020 =$ _____

(2) $834 - 384 =$ _____

(3) $56 \times 1.1 =$ _____ **(decimal)**

(4) $6 \times 24 \div 18 - 12 =$ _____

(5) $\frac{3}{8} =$ _____ **(decimal)**

(6) $\frac{17}{200} =$ _____ **% (mixed number)**

(7) $0.0625 =$ _____ **(proper fraction)**

(8) DCVI = _____

(9) $3\frac{4}{5} \div 2 =$ _____

***(10)** $1919 - 191 + 119 - 1991 =$ _____

(11) $2\frac{1}{2} + 3\frac{1}{3} =$ _____ **(mixed number)**

(12) The arithmetic mean of 27, 22, and _____ is 26

(13) $18^2 =$ _____

(14) $7.5 \times 4.8 =$ _____

(15) 220 less 20% of 220 is _____

(16) $54^2 =$ _____

(17) The least common multiple of 8, 14, and 20 is _____

(18) $18 \times 81 - 63 \times 18 =$ _____

(19) 27% of $144\frac{4}{9} =$ _____

***(20)** $298 \times 302 + 406 =$ _____

(21) $45^2 + 15^2 =$ _____

(22) If 4 pens cost 98¢ then 6 pens cost $ _____

(23) $1594 \times 6 + 36 =$ _____

(24) $31 \times 35 =$ _____

(25) 4225 ÷ 9 has a remainder of _____

(26) $140 =$ _____ **6**

(27) $1.1222... =$ _____ **(mixed number)**

(28) $(111)(91)(k) = 121{,}212$. $k =$ _____

(29) How many subsets containing only 4 elements does the set {p,r,i,m,e,s} have? _____

***(30)** $3.25 \times 7507 \div 5 =$ _____

(31) Let $(31x - 24)^2 = ax^2 + bx + c$. $a + b + c =$ ____

(32) P = {p,o,i,n,t}, L = {l,i,n,e} and T = {t,r,i,a,n,g,l,e}. $(P \cap T) \cup L$ contains _____ distinct element(s).

(33) $(250 \times 44 - 9) \div 8$ has a remainder of _____

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

(35) The smallest root of $(2x - 1)^2 = \frac{1}{9}$ is _____

(36) $1\frac{1}{4}$ **is** _____ **% more than 0.75**

(37) $4^7 \div 5$ **has a remainder of** _____

(38) If $3x - 4 = 5$, **then** $2x - 1 =$ _____

(39) Find the smallest integer k, where $k > 1$, **such that** $5k - 4$ **is a perfect square.** _____

***(40)** $\sqrt{2345} \times \sqrt{5432} =$ _____

(41) $(102)^3 =$ _____

(42) The 4-digit number 235k is divisible by 6, where $k > 2$. **Find k.** _____

(43) Round $(\sqrt{3} + \sqrt{7})$ **to a whole number.** _____

(44) How many lines exist given four coplanar points such that no three points are collinear? _____

(45) $(24)^3 - (23)^3 =$ _____

(46) $2020_5 \div 4_5 =$ _____ $_5$

(47) If $A^k \times A^3 \div A^{-5} = A^7$ **and** $A > 1$, **then k =** ____

(48) (x, y) is the midpoint of the line segment whose endpoints are (2, 7) and (6, 3). $x + y =$ _____

(49) $(i)^{42} = a\sqrt{b}$, **where** $a,b \in \{-1, 1\}$. **Find** $a + b$. ___

***(50)** $12620 \div 19 =$ _____

(51) If $123_b = 66$, **then** $102_b =$ _____

(52) $\frac{1}{4}$ **mile =** _____ **feet**

(53) The coefficient of the xy term when $(4x + 5y)^2$ **is expanded is** _____

(54) Let $\frac{4!}{6!} = \frac{(x-1)!}{(x)!}$. **Find x.** _____

(55) $444 \times \frac{4}{37} =$ _____

(56) $3 + 8 + 11 + 19 + 30 + ... + 79 + 128 =$ _____

(57) If 9, 5, and x are the integral sides of a triangle, then the least value of x is _____

(58) The side lengths of a right triangle are 3 ft, 4 ft and 5 ft. The length of the altitude to the hypotenuse is _____ **ft**

(59) $1A3_{16} =$ _____ $_{10}$

***(60)** $32 \times 16 + 44 \times 15 =$ _____

(61) If $5P = 3Q$ **and** $2Q = 4R$, **then P =** _____**R**

(62) The Greatest Integer Function is written as $f(x) = [x]$. **Find** $\left[5\sqrt{7}\right]$. _____

(63) $15 \times \frac{17}{20} =$ _____ **(mixed number)**

(64) Let $f(x) = 2x^3 + 5$ **and** $g(x) = 5x - 3$. $g(f(2)) =$ ____

(65) $\sin\left(\frac{\pi}{6}\right) \times \cos\left(\frac{\pi}{6}\right) \times \tan\left(\frac{\pi}{6}\right) =$ _____

(66) The focus point of parabola $x^2 = 8y$ **is (0,** _____**)**

(67) Find the sum of all positive integers x such that $2x - 3 \leq 6$. _____

(68) The shortest distance between (1, 3) and $8x + 6y = 14$ **is** _____

(69) 0.242424... base 5 = _____ **base 5 (fraction)**

***(70) 123 sq. yards =** _____ **sq. inches**

(71) Find the sum of the reciprocals of the first eight triangular numbers. _____

(72) The sum of the reciprocals of all of the positive divisors of 18 is _____

(73) Let $f'(x) = 3$ **and** $f(5) = 2$. **Find** $f(-1)$. _____

(74) The probability of winning is 7 to 12. What are the odds of not winning _____**% (mixed number)**

(75) The critical value of $f(x) = \frac{1}{2}x + \cos x$, **where** $\frac{\pi}{2} < x < \pi$, **is** $k\pi$. **Find k.** _____

(76) $y = \frac{x^3 + 1}{x^2 - 1}$ **has a how many asymptotes?** _____

(77) $\int_0^3 (3 - x)\, dx =$ _____

(78) $231 \times 17 =$ _____

(79) Find the sum of the squares of the roots of $3x^2 + 11x - 4 = 0$. _____

***(80) An equilateral triangle with side length of 61 cm has an altitude length of** _____ **cm**

2019-20 TMSCA High School Number Sense Test 6 - 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) 4,039

(2) 450

(3) 61.6

(4) — 4

(5) .375

(6) $8\frac{1}{2}$

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

(8) 606

(9) 1.9, $\frac{19}{10}$, $1\frac{9}{10}$

***(10) — 151 – — 136**

(11) $5\frac{5}{6}$

(12) 29

(13) 324

(14) 36

(15) 176

(16) 2,916

(17) 280

(18) 324

(19) 39

***(20) 85,882 — 94,922**

(21) 2,250

(22) $1.47

(23) 9,600

(24) 1,085

(25) 4

(26) 352

(27) $1\frac{11}{90}$

(28) 12

(29) 15

***(30) 4,636 — 5,123**

(31) 49

(32) 5

(33) 7

(34) 12

(35) $\frac{1}{3}$

(36) $\frac{200}{3}$, $66\frac{2}{3}$

(37) 4

(38) 5

(39) 4

***(40) 3,391 — 3,747**

(41) 1,061,208

(42) 8

(43) 4

(44) 6

(45) 1,657

(46) 230

(47) — 1

(48) 9

(49) 0

***(50) 631 — 697**

(51) 51

(52) 1,320

(53) 40

(54) 30

(55) 48

(56) 327

(57) 5

(58) 2.4, $\frac{12}{5}$, $2\frac{2}{5}$

(59) 419

***(60) 1,114 — 1,230**

(61) 1.2, $\frac{6}{5}$, $1\frac{1}{5}$

(62) 13

(63) $12\frac{3}{4}$

(64) 102

(65) .25, $\frac{1}{4}$

(66) 2

(67) 10

(68) 1.2, $\frac{6}{5}$, $1\frac{1}{5}$

(69) $\frac{12}{22}$

***(70) 151,438 — 167,378**

(71) $\frac{16}{9}$, $1\frac{7}{9}$

(72) $\frac{13}{6}$, $2\frac{1}{6}$

(73) — 16

(74) $71\frac{3}{7}$

(75) $\frac{5}{6}$

(76) 2

(77) 4.5, $\frac{9}{2}$, $4\frac{1}{2}$

(78) 3,927

(79) $\frac{145}{9}$, $16\frac{1}{9}$

***(80) 51 — 55**