The University Interscholastic League
Number Sense Test ● HS SAC ● 2017

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.

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STOP -- WAIT FOR SIGNAL!

(1) $2018 + 1802 =$ _____

(2) $852 - 258 =$ _____

(3) $10 \times 22 \times 300 =$ _____

(4) $\frac{1}{5} + \frac{1}{6} =$ _____

(5) $45\% =$ _____ **(proper fraction)**

(6) $542 \div 9 =$ _____ **(mixed number)**

(7) $16^2 =$ _____

(8) **Which is larger,** $\frac{2}{5}$ **or .49 =** _____

(9) $3 \times 6 \div 9 - 12 =$ _____

***(10)** $394 + 868 + 2582 =$ _____

(11) $14 \times 13 + 14 \times 27 =$ _____

(12) **The GCD of 14 and 56 is** _____

(13) $3\frac{1}{4} - 1\frac{5}{8} =$ _____ **(mixed number)**

(14) **XLIX =** _____ **(Arabic Numeral)**

(15) $3 + 6 + 9 + 12 + 15 + 18 + 21 =$ _____

(16) **The arithmetic mean of 15 and 29 =** _____

(17) **The LCM of 12, 15, and 24 =** _____

(18) $2\frac{1}{4} \times 2\frac{2}{3} =$ _____

(19) **The largest prime number less than 89 is** _____

***(20)** $\sqrt{224} \times \sqrt{325} =$ _____

(21) $1998 \times 2 + 4 =$ _____

(22) **The number 36 has** _____ **positive prime divisors**

(23) **If 7 pens cost 84¢ then one dozen pens cost $** _____

(24) $312_4 =$ _____ **10**

(25) $F(x) = x^4 + 4x^2 + 4$. $F(4) =$ _____

(26) $\sqrt{5776} =$ _____

(27) **If** $x + y = 8$ **and** $x - y = 3$, **then** $2x =$ _____

(28) **0.151515... =** _____ **(fraction)**

(29) **Given the set {2,1,3,4,7,p,q,29,47,... }.** $p + q =$ ____

***(30)** $248 \times 598 =$ _____

(31) **A compact car needs 18 gallons of gas to travel 400 miles. The car gets** _____ **miles per gallon**

(32) **Let** $(3x + 2)^2 = ax^2 + bx + c$. **Find b.** _____

(33) **The sum of the positive integral divisors of 20 is** __

(34) $5423 \div 4$ **has a remainder of** _____

(35) $\sqrt[3]{2197} =$ _____

(36) A regular nonagon has how many sides? _____

(37) Find the simple interest on $300.00 at a rate of 4% for 2 years. $_____

(38) $2030 \div 5 =$ _____

(39) $4\frac{1}{5}$ is _____ % less than 7

***(40)** $9092330 \div 2018 =$ _____

(41) Let $(ab^2) \times (a^{-2}b) \div (a^3b^{-3}) = a^mb^n$. $mn =$ ____

(42) The legs of a right triangle are 7" and 24". The length of the hypotenuse is _____ "

(43) $991^2 =$ _____

(44) The sixth triangular number is _____

(45) $41^2 - 51^2 =$ _____

(46) The distance between the points (4,5) and (7,2) is k. Find k^2. _____

(47) If $2^{(x+y)} = 16$ then $(x+y)^2 =$ _____

(48) The sum of the reciprocals of all of the positive integral divisors of 8 is _____

(49) $4^{-2} =$ _____ (decimal)

***(50)** $\sqrt{64000} =$ _____

(51) The vertex of $y = x^2 - 2x - 3$ is (h, k). h = _____

(52) $i \times i \times i \times i \times i \times i =$ _____

(53) If 3, 8, and x are the sides of a triangle, then $x + 3 >$ _____

(54) $3! \times 4! =$ _____

(55) How many ways can 5 distinct books be placed on a bookshelf? _____

(56) $112_5 - 34_5 =$ _____ 5

(57) $\log_9(3) =$ _____

(58) $213 \times 232 =$ _____

(59) If $x^2 + y^2 = 29$, $x > y$ and both x and y are positive integers, then x = _____

***(60)** $12 \times 24 \times 36 \times 48 =$ _____

(61) Find the sum of all positive integers x such that $2x + 3 \leq 9$. _____

(62) $1 + \frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{5}{6} =$ _____

(63) 0.121212... base 4 = _____ base 10 (fraction)

(64) The volume of a cylinder is 27π dm^3. Find the height if the radius equals the height. _____ dm

(65) Let $f(x) = x^2 - 9$. Find $f(f(-3))$. _____

(66) $\cos(120°) =$ _____

(67) $\sec(\frac{2\pi}{3}) =$ _____

(68) $(x^3 + 2x^2 + x + 4) \div (x - 2)$ has a remainder of _____

(69) If $12^5 \div 4 = (3^x)(4^y)$, then $x + y =$ _____

***(70)** $\pi^5 =$ _____

(71) Find x, $0 \leq x \leq 6$, if $2x + 3 \equiv 2 \pmod 7$. x = _____

(72) The first four digits of the decimal for $\frac{21}{33}$ base 4 is 0._____ base 4

(73) Let $f(x) = x^3 - 2x^2 - 3x + 4$. Find $f'(1)$. _____

(74) $y = \log_2(x + 3)$ has a vertical asymptote at x = ____

(75) $\lim_{x \to 3} \frac{x^2 - 9}{x - 3} =$ _____

(76) $\int_1^2 (x)\, dx =$ _____

(77) If the probability of losing is 35%, then the odds of winning is _____ (fraction)

(78) $14^2 + 39^2 =$ _____

(79) The sum of the radii of the circumscribed circle and inscribed circle of a 5, 12, 13, right triangle is _____ units.

***(80)** $(1 + 2 + 3 + 4 + ... + 23 + 24)^2 =$ _____

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Number Sense Test • HS A • 2018

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(1) $118 + 811 - 181 =$ _____

(2) $40 \times 125 =$ _____

(3) $\frac{5}{8} + \frac{3}{16} =$ _____ **(proper fraction)**

(4) $123 \times 9 + 4 =$ _____

(5) $17^2 =$ _____

(6) $\frac{3}{40} =$ _____ **% (decimal)**

(7) $16 \times 28 + 16 \times 22 =$ _____

(8) $11 \div 2.5 =$ _____ **(decimal)**

(9) The largest prime divisor 76 is _____

***(10)** $158 \times 262 =$ _____

(11) $430 \div 9 =$ _____ **(mixed number)**

(12) 6 is _____ **% less than 25**

(13) 80% of 80 minus 80 = _____

(14) $1\frac{2}{5} + 1\frac{5}{7} =$ _____ **(mixed number)**

(15) MCXLVI = _____ **(Arabic Numeral)**

(16) If 1 gram = .04 oz, then 120 grams = _____ oz

(17) The GCD 24, 36, and 48 is _____

(18) $1994 \times 6 + 36 =$ _____

(19) The smallest prime number greater than 89 is ____

***(20)** $810210 \div 159 =$ _____

(21) 25 base 10 is written as _____base 7

(22) $(44 \times 19) - (36 \times 11) =$ _____

(23) 0.189189189... = _____ **(fraction)**

(24) $(37 \times 9 + 11) \div 5$ has a remainder of _____

(25) The sum of the roots $2x^2 - 4x - 3$ is _____

(26) $F(x) = 9x^2 - 6x + 1$, evaluate F(4). _____

(27) $64 \times 66 =$ _____

(28) $2500 = [2(15 + k)]^2$. Find $k \geq 0$. _____

(29) Given the set {1,3,6,10,15,p,28,36,q...}. q — p = ___

***(30)** 7 days = _____ minutes

(31) Let $x + y = 23$ and $xy = 76$, where x, y are integers and $y \geq x$. Find x. _____

(32) Let $(4x + 3)^2 = ax^2 + bx + c$. Find b — c. _____

(33) The LCM 24, 36, and 48 is _____

(34) How many positive integers between 4 and 28 are relatively prime to 28? _____

(35) $7^3 - 5^3 =$ _____

(36) A regular septagon has how many sides? _____

(37) Find the simple interest on $300.00 at a rate of 4% for 2 years. $_____

(38) $\frac{x-8}{x+9} + \frac{x+9}{x-8} = A\frac{B}{C}$, a simplified mixed number. Find B. _____

(39) $5\frac{1}{4}$ is _____ % less than 7

*(40) $(376 \times 49)^2 \div (51 \times 124)$ = _____

(41) The sum of the prime divisors of 30 is _____

(42) Find x if $4^x = 32$. x = _____

(43) 1,320 feet = _____ mile

(44) If $\sqrt{4k} = 6$ then k = _____

(45) $35^2 - 40^2$ = _____

(46) $5^6 \div 7$ has a remainder of _____

(47) If $2^{(2x+2y)} = 16$ then $(x+y)^2$ = _____

(48) The sum of the reciprocals of all of the positive integral divisors of 20 is _____

(49) The 6th hexagonal number is _____

*(50) $\sqrt{12018}$ = _____

(51) The vertex of the parabola, $y = 2x^2 - 4x - 5$ is at (h, k). h + k = _____

(52) $(3 - i)^2 + 6i$ = _____

(53) $(135_6)(4_6)$ = _____ 6

(54) $\log_3(9) + \log_3(27)$ = _____

(55) Two dice are rolled. What are the odds that a 4 was rolled? _____

(56) In Petville, 35 families have cats, 24 have dogs, and 12 have both. How many families are there? _____

(57) $2^{-1} + 2^{-2} + 2^{-3} + 2^{-4} + ...$ = _____

(58) The area of a 30° - 60° - 90° triangle with a hypotenuse length of 16 is $k\sqrt{3}$. k = _____

(59) If $x^2 + y^2 = 89$, $x > y$ and both x and y are positive integers, then y = _____

*(60) $14 \times 42 \times 70 \times 98$ = _____

(61) Find the sum of all positive integers x such that $3x - 6 < 9$. _____

(62) If $\begin{vmatrix} 2 & 5 \\ 3 & x \end{vmatrix} = 7$ then x = _____

(63) $\cos^{-1}(\sin \frac{\pi}{6})$ = _____°

(64) The volume of a right circular cylinder is 32π cm^3. Find the height if the radius is twice the the height. _____ cm

(65) $\sin^{-1}(\cos \frac{\pi}{3})$ = _____°

(66) 0.0202... base 5 = _____ base 10 (fraction)

(67) If $14^4 \div 4 = (2^x)(7^y)$, then x + y = _____

(68) $(2x^3 + x^2 + 3x + 4) \div (x + 1)$ has a remainder of _____

(69) Let $f(x) = 4x^2 - 1$. Find f(f(— 1)). _____

*(70) $\left(\frac{\sqrt{5}+1}{2}\right)^{10}$ = _____

(71) Change $\frac{3}{25}$ to a base 5 decimal. _____ 5

(72) Find x, $0 \le x \le 4$, if $16 + x \equiv 4 \pmod 5$. x = _____

(73) $f'(x) = 3$, $f(2) = 5$, find f(1). _____

(74) $y = \log_3(x)$ has a vertical asymptote at x = _____

(75) $\lim_{x \to 3} \frac{2x+2}{x^2+1}$ = _____

(76) $f(x) = \cos(x)$, $f''(60°)$ = _____

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

(78) $7^9 \div 11$ has a remainder of _____

(79) 1 gallon + 2 quarts + 3 pints = _____ cups

*(80) 1428.57×69 = _____

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Number Sense Test • HS B • 2018

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(1) $2018 - 201 - 20 =$ _____

(2) $8(10) + 8(12) + 8(2) =$ _____

(3) $37 \times 25 =$ _____

(4) $2018 \div 9$ has a remainder of _____

(5) $1234 \times 9 + 5 =$ _____

(6) 87.5% = _____ (proper fraction)

(7) $\frac{2}{7} - \frac{2}{5} =$ _____

(8) $27^2 =$ _____

(9) MCCXLI = _____ (Arabic Numeral)

***(10)** $20 + 81 \times 218 =$ _____

(11) If 1 gram = .04 oz, then 800 grams = _____ lbs

(12) The largest prime divisor of 253 is _____

(13) $4.8 \times 75 =$ _____

(14) The LCM of 63 and 28 is _____

(15) $48 \div 8 - 4 \times 12 =$ _____

(16) $1992 \times 8 + 64 =$ _____

(17) $\frac{18}{(5^3)(2)} =$ _____

(18) $5\frac{1}{4} - 2\frac{2}{3} =$ _____

(19) $11 \times 369 =$ _____

***(20)** $\sqrt{224} \times \sqrt{325} =$ _____

(21) Find the simple interest on $600.00 at a rate of 4% for 5 months. $_____

(22) The GCD of 21, 49, and 42 is _____

(23) $72 \times 78 =$ _____

(24) The sum of 3 consecutive integers is 84. The largest of these integers is _____

(25) $6\frac{1}{3} \times 9\frac{1}{3} =$ _____

(26) $1 + 3 + 5 + 7 + \ldots + 47 + 49 =$ _____

(27) $(4 \times 9 + 6) \div 7$ has a remainder of = _____

(28) The number of positive integer divisors of 24 is ___

(29) The largest root of $15x^2 + 2x - 1 = 0$ is _____

***(30)** $\sqrt{291} + \sqrt{359} + \sqrt{440} =$ _____

(31) A square has a perimeter of 48" and a diagonal length of $k\sqrt{2}$ ". Find k. _____

(32) Let $(5x - 1)^2 = ax^2 + bx + c$. Find $a + b + c$. ___

(33) 0.1373737... _____ (proper fraction)

(34) Change 37 base 8 to base 10. _____

(35) The smallest root of $(x - 1)^2 = \frac{1}{4}$ is _____

(36) The measure of a central angle of a regular septagon is _____ °

(37) Find x if $3x - y = 8$ and $x + y = 6$. x = _____

(38) Given: 547B6 is divisible by 6. Find B > 5. _____

(39) $(\sqrt{256} - \sqrt{484})^3$ = _____

*(40) $42 \times 37 + 1500$ = _____

(41) If $f(x) = 2x^2 - x - 4$ then $f(-3)$ = _____

(42) The sum of the prime divisors of 42 is _____

(43) 5.6 is _____ % less than 8

(44) $\frac{1}{4}$ mile = _____ yards

(45) If $3^{(x+y)} = 81$ then $(x + y)^3$ = _____

(46) $121_5 \div 4_5$ = _____

(47) $32^2 - 37^2$ = _____

(48) Given the sequence 2, 6, 14, 30, 62, k, 254, ... k = _____

(49) The sum of the reciprocals of all of the positive integral divisors of R is 1.444... . R = _____

*(50) $\sqrt[3]{531441}$ = _____

(51) If a triangle has integral sides of 6, 10, and x then $x + 3 >$ _____

(52) 11101_2 = _____ 4

(53) $60 + 30 + 15 + 7.5 + ...$ = _____

(54) The vertex of $y = 3x^2 + 6x + 1$ is (h, k). k = _____

(55) The 12th triangular number is _____

(56) (259)(39)(k) = 121,212. k = _____

(57) $\ln e^{10}$ = _____

(58) The probability of randomly selecting an ace from a standard deck of cards is _____ (fraction)

(59) If $x^2 + y^2 = 53$, $x > y$ and both x and y are positive integers, then y = _____

*(60) $11 \times 22 \times 33 \times 44$ = _____

(61) Find the sum of all positive integers x such that $3x - 1 \leq 8$. _____

(62) 241×246 = _____

(63) 0.1333... base 5 = _____ base 10 (fraction)

(64) Let $\frac{3 + i}{i} = a + bi$. Find a. _____

(65) $\begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix} + \begin{bmatrix} 1 & -1 \\ 1 & -1 \end{bmatrix} = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$. ab - cd = _____

(66) tan(135°) = _____

(67) $\cot(\frac{5\pi}{4})$ = _____

(68) $(x^2 + 5) \div (x + 2)$ has a remainder of _____

(69) The surface area of a cube is 96 cm^2. The perimeter of a single face of the cube is _____ cm

*(70) $\pi^2 \times e^3 \times \phi^4$ = _____

(71) Find x, $4 \leq x \leq 8$, if $3x - 4 \equiv 5 \pmod 9$. x = _____

(72) The first four digits of the decimal for $\frac{3}{10}$ base 5 is 0._____ base 5

(73) $f'(x) = 2$, $f(1) = 3$, find f(4). _____

(74) The minimum value of $y = 3x^2 - 2$ is _____

(75) $\lim_{x \to 2} \frac{2x^2 - 8}{x - 2}$ = _____

(76) The length of the tangent from (5, 0) to the circle $x^2 + y^2 = 9$ is _____

(77) $\int_0^2 (4 - x)\, dx$ = _____

(78) $8^7 \div 6$ has a remainder of _____

(79) 4 bushels + 3 pecks - 1 quart = _____ pints

*(80) $3\frac{1}{4} \times 13413 \div 26$ = _____

2017-18 TMSCA High School Number Sense Test 13

Final _____ _____

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(1) $2018 + 180 + 28 =$ _____

(2) $2.8 \times 7.5 =$ _____

(3) $7(8) + 7(18) - 7(20) =$ _____

(4) $11{,}111 = 1234 \times 9 + k$. $k =$ _____

(5) $0.45 =$ _____ (proper fraction)

(6) $\frac{3}{4} \div \frac{5}{6} =$ _____

(7) $19^2 =$ _____

(8) XCIX = _____

(9) 16 is _____% of 400

***(10)** $1865 + 651 - 518 + 8651 =$ _____

(11) The median of 12, 42, 30, and 24 = _____

(12) $(4 + 7)(22 + 33) =$ _____

(13) $2\frac{1}{8} + 8\frac{1}{2} =$ _____ (mixed number)

(14) $5 \times 10 - 15 \div 20 =$ _____

(15) 30 less 40% of 50 = _____

(16) $165 = 13 \times 13 +$ _____

(17) The LCM of 12, 15, and 24 = _____

(18) $1 + 7 + 13 + 19 + ... + 43 + 49 =$ _____

(19) The sum of the primes between 26 and 36 is _____

***(20)** $239 \times 798 + 397 =$ _____

(21) $1988 \times 12 + 144 =$ _____

(22) Find the simple interest on \$600.00 at a rate of 6% for 8 months. \$_____

(23) $(5 \times 13 - 3) \div 4$ has a remainder of _____

(24) If A = 6 = B and C = 9, then AC ÷ B = _____

(25) Find the smallest prime number p, where $p > 0$ and $4p + 7$ is a prime number. _____

(26) $8\frac{1}{4} \times 12\frac{3}{4} =$ _____ (mixed number)

(27) 0.515151... = _____ (proper fraction)

(28) A car travels 22 miles on a gallon of gas. How far can the car travel on 18 gallons of gas. _____ miles

(29) Given the set {1,5,12,22,p,51,q,... }. $p + q =$ _____

***(30)** $\left[\sqrt{963} - \sqrt{169}\right]^2 =$ _____

(31) 123 base 10 is written as _____base 6

(32) Let $(4x + 1)^2 = ax^2 + bx + c$. Find $a + c$. _____

(33) The diagonal of a square is $\sqrt{288}$ " long. The length of the side of the square is _____ "

(34) $352 \times 14 =$ _____

(35) Find x if $4x - y = 8$ and $2x + y = 4$. y = _____

(36) The measure of a central angle of a regular decagon is _____°

(37) $7\frac{1}{3} \times 7\frac{2}{3}$ = _____ (mixed number)

(38) The largest root of $(x + 1)^2 = \frac{1}{16}$ is _____

(39) $\frac{4}{5}$ is _____ % more than $\frac{3}{10}$

*(40) 3142018 ÷ 2018 = _____

(41) 997^2 = _____

(42) 72 is divisible by how many positive integers? ____

(43) Find k, given 1, 5, 6, 11, 17, ..., k, 118, ... _____

(44) $|2x - 3| = |x + 3|$ and $x > 0$. x = _____

(45) The harmonic mean of the roots of $3x^2 - x - 4 = 0$ is _____

(46) The distance between the points (— 4, 5) and (— 7, 2) is k. Find k^2. _____

(47) (777)(k)(16) = 161,616. k = _____

(48) The sum of the reciprocals of all of the positive integral divisors of 16 is _____

(49) $33^2 - 28^2$ = _____

*(50) $\sqrt{288} \times \sqrt[3]{3376}$ = _____

(51) The vertex of $y = x^2 + 2x + 3$ is (h, k). hk = _____

(52) The 4^{th} octagonal number is _____

(53) If 5, 10, and x are the sides of a triangle, then $x - 3 >$ _____

(54) 11011_2 = _____ 4

(55) If two dice are rolled the probability of rolling a 7 or an 11 is _____%

(56) 237×235 = _____

(57) ${}_6C_4$ = _____

(58) $(312_4 - 103_4)(3_4)$ = _____ 4

(59) If $x^2 + y^2 = 90$, $x > y$ and both x and y are positive integers, then $x + y$ = _____

*(60) $12 \times 24 \times 36 \times 48$ = _____

(61) Find the sum of all negative integers x such that $4x + 1 \geq -9$. _____

(62) The expansion of $(3x - y^2)^5$ has _____ terms

(63) 0.5777... base 8 = _____ base 10 (fraction)

(64) Y varies inversely as X. If X = 4 when Y = 12. find Y when X = 8. Y = _____

(65) If $\begin{vmatrix} 2 & 5 \\ 3 & 7 \end{vmatrix}$ = x then 4x — 1 = _____

(66) csc(210°) = _____

(67) sec(— $\frac{2\pi}{3}$) = _____

(68) How many 3-digit numbers end in a 2? _____

(69) If $18^6 \div 6 = (2^x)(3^y)$, then $x + y$ = _____

*(70) $2\pi \times 3e \times 5\phi$ = _____

(71) $\lim_{x \to \infty} \frac{3x + 1}{x^2 - 2}$ = _____

(72) Find x, $1 \leq x \leq 4$, if $3x - 4 \equiv 7 \pmod 5$. x = _____

(73) $f'(x) = 2x$, f(— 1) = 0, find f(3). _____

(74) The minimum value of $y = x^2 + 4x - 2$ is _____

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

(76) Change $\frac{11}{36}$ to a base 6 decimal. _____ 6

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

(78) 34×111 = _____

(79) 1 ton + 2 pounds + 3 ounces = _____ ounces

*(80) $(1 + 2 + 5 + 13 + ... + 89)^2$ = _____

2017-18 TMSCA High School State Meet

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(1) $2018 + 100 - 79 =$ _____

(2) $922 - 229 =$ _____

(3) $22 \times 85 =$ _____

(4) $357 \div 9 =$ _____ **(mixed number)**

(5) **Simplify:** $\frac{126}{621}$. _____

(6) $\frac{3}{4} - \frac{5}{6} =$ _____ **(proper fraction)**

(7) $15^3 =$ _____

(8) $48\% =$ _____ **(proper fraction)**

(9) $CXX =$ _____

***(10)** $78 - 159 + 1642 + 352 =$ _____

(11) **Which is larger,** $-\frac{5}{7}$ **or** $-\frac{2}{5}$**?** _____

(12) $(4 + 7)(34 + 17) =$ _____

(13) **The GCD of 70 and 84 =** _____

(14) $1\frac{3}{4} - 2\frac{7}{8} =$ _____ **(mixed number)**

(15) $5 + 7 + 9 + 11 + ... + 33 + 35 =$ _____

(16) **The arithmetic mean of 34, 45, and 56 is** _____

(17) **20% of 80 less 100 is** _____

(18) $2\frac{1}{4} \times 2\frac{2}{3} =$ _____

(19) **The smallest prime number greater than 89 is** ____

***(20)** $241 \times 801 + 298 =$ _____

(21) $(1993 \times 7 + 49) \div 2 =$ _____

(22) $24 + 6 \times 12 \div 6 =$ _____

(23) **The simple interest on $1200.00 at 3% for 9 months is $** _____

(24) $(7 \times 15 - 5) \div 6$ **has a remainder of** _____

(25) **The smaller root of** $2x^2 + 7x + 6 = 0$ **is** _____

(26) $15^2 =$ _____

(27) **Find the smallest prime number p, where** $p > 3$ **and** $4p + 7$ **is a prime number.** _____

(28) $0.727272... =$ _____ **(proper fraction)**

(29) **Given the set {2,3,5,7,11,p,17,19,q...}.** $q - p =$ ____

***(30)** **3 miles =** _____ **inches**

(31) $5\frac{1}{3} \times 5\frac{2}{3} =$ _____ **(mixed number)**

(32) **Let** $(4x + 5)^2 = ax^2 + bx + c$**. Find b.** _____

(33) $135_7 =$ _____ **10**

(34) **What number times 8 and added to 12, gives the same result?** _____

(35) $94 \times 97 =$ _____

(36) A regular octagon has how many vertices? _____

(37) If $|x - 12| = 3x$ and $x > 0$ then x = _____

(38) $\frac{5}{6}$ is _____ % more than $\frac{1}{2}$

(39) If A = 6, A = B, and A = 2C then AB ÷ C = _____

*(40) $\sqrt{81000}$ = _____

(41) Given: 2, 7, 9, 16, ..., k, 107, ... Find k. _____

(42) 33×73 = _____

(43) Let $4^{(2x+1)} = 256$. Find x. _____

(44) The vertex of $y = 3x^2 - 6x + 5$ is (h, k).
h — k = _____

(45) $36^2 - 41^2$ = _____

(46) ${}_6P_4$ = _____

(47) If $3^{(x+y)} = 6{,}561$ then $(x + y)^3$ = _____

(48) Two dice are tossed. What are the odds that the sum of the faces is 6? _____ (proper fraction)

(49) 994^2 = _____

*(50) $(27.18)^4$ = _____

(51) The number of positive divisors of 84 is _____

(52) (111)(91)(k) = 191,919. k = _____

(53) If a side of an equilateral triangles is $8\sqrt{3}$ " then its altitude is _____ inches

(54) Let $3x - 8 < 14$. The largest integer x is _____

(55) $\frac{2}{3} + \frac{4}{9} + \frac{8}{27} + ...$ = _____

(56) $42_5 - 113_5 + 444_5$ = _____ 5

(57) If $\log_x(8) = 1.5$ then x^3 = _____

(58) 514×213 = _____

(59) If $x^2 + y^2 = 61$, $x > y$ and both x and y are positive integers, then x = _____

*(60) $9 \times 18 \times 27 \times 36$ = _____

(61) Find the sum of all negative integers x such that $3x + 2 \geq -5$. _____

(62) ${}_5P_3 \times {}_5C_2$ = _____

(63) 0.4333... base 6 = _____ base 10 (fraction)

(64) The simplified coefficient of the x^2y^3 term in the expansion of $(x - 2y)^5$ is _____

(65) Let $f(x) = x^2 - 6x + 9$. Find f(f(2)). _____

(66) cos(240°) = _____

(67) $\sec(\frac{4\pi}{3})$ = _____

(68) Find x if $\begin{vmatrix} 4 & x \\ 7 & x \end{vmatrix} = 28$. x = _____

(69) If $20^5 \div 32 = (2^x)(5^y)$, then xy = _____

*(70) $(\pi \times e \times \phi)^3$ = _____

(71) Find x, $0 \leq x \leq 4$, if $3x - 4 \equiv 2 \pmod 5$. _____

(72) The length of the tangent from (10, 0) to the circle $x^2 + y^2 = 36$ is _____

(73) $f'(x) = 2$, f(3) = 4, find f(5). _____

(74) If $x < 0$ and $|3x + 6| = 9$ then x = _____

(75) The minimum value of $y = 2x^2 + 3x + 1$ is _____

(76) $\int_0^8 (8 - x)\,dx$ = _____

(77) $\lim_{x \to 0} \frac{\sin(x)}{x}$ = _____

(78) (0.857142857142857142...) ÷ (0.666...) = _____

(79) The eighth term in the arithmetic sequence 16, 13, 10, ... is _____

*(80) How many seconds are in 30 days? _____

2017-18 TMSCA UIL District Warm-Up

Final _____ _____

Contestant's Number _____ 2nd _____ _____

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Score **Initials**

Read directions carefully before beginning test

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STOP -- WAIT FOR SIGNAL!

(1) $1314 - 2018 =$ _____

(2) $1314 \times 4 =$ _____

(3) $8(13) + 8(14) - 8(18) =$ _____

(4) $8\frac{1}{3}\% =$ _____ **(proper faction)**

(5) $\frac{5}{8} + \frac{8}{13} =$ _____ **(mixed number)**

(6) $14^3 =$ _____

(7) $4 + 1 \times 3 \div 1 - 18 =$ _____

(8) 24 is _____% of 60

(9) The multiplicative inverse of -1.2 is _____

***(10)** $1418 + 1320 - 8131 + 8141 =$ _____

(11) $1896 \times 3 + 12 =$ _____

(12) $33^3 \div 6$ has a remainder of _____

(13) $6 + 10 + 14 + 18 + ... + 46 + 50 =$ _____

(14) 66 feet = _____ rods

(15) If 1 cm = 0.39" then 4 decameters = _____"

(16) The median of 1, 3, 1, 4, 2, 0, 1, and 8 is _____

(17) The LCM of 13, 14, and 26 = _____

(18) The sum of the positive prime divisors of 84 is ____

(19) 348 is 25% of _____

***(20)** $814 \times 131 + 597 =$ _____

(21) Let M = {m,e,d,i,a,n} and P = {p,r,i,m,e}. The number of distinct elements of $M \cap P$ is _____.

(22) How many positive prime numbers divide 84? ____

(23) $1 - |3 + 1| - 4 + |1 - 8| =$ _____

(24) If A = 2, B = 3 and C = 5, then $BC \div A =$ _____

(25) The additive inverse of -1.2 is _____

(26) $14^2 =$ _____

(27) $3\frac{4}{7} - 1\frac{3}{4} =$ _____ **(mixed number)**

(28) $22.5 \div 0.03 =$ _____

(29) 0.3252525... = _____ **(fraction)**

***(30)** $3141 \times 2018 =$ _____

(31) 314 base 10 is written as _____ base 8

(32) Given: {1,8,21,40,...,96,k,176,... }. Find k. _____

(33) $131_8 =$ _____ 10

(34) Let $x - y = 1$ and $x + y = 7$. Find xy. _____

(35) 22.5 miles per hour = _____ ft/sec

(36) The measure of an interior angle of a regular dodecagon is _____ degrees

(37) $(36)(24) - (18)(30) =$ _____

(38) The largest root of $(x - 1)^2 = \frac{9}{16}$ is _____

(39) If P is 10% of Q and Q is 40% of R, then R is what % of P. _____ %

***(40)** $\sqrt{111348} =$ _____

(41) Let $(a^2b^{-3}c) \times (a^{-4}bc^2) \div (a^3b^2c^{-1}) = a^pb^qc^r$. Find $p + q + r$. _____

(42) The sum of the roots plus the product of the roots of $3x^2 + 7x + 4 = 0$ is _____

(43) $202^2 =$ _____

(44) The number of real roots in $4x^2 + 2x + 1 = 0$ is ___

(45) $46^2 - 39^2 =$ _____

(46) ${}_7C_3 \div {}_7C_4 =$ _____

(47) The distance between the points (1, 3) and (4, 1) is k. Find k^2. _____

(48) The sum of the integral values of x such that $|x - 3| + 1 \leq 4$ is _____

(49) The vertex of $y = x^2 - 2x + 5$ is (h, k). k = _____

***(50)** $3\frac{1}{3} \times 2018 \div 4.25 =$ _____

(51) The third octagonal number is _____

(52) $(413_8)(6_8) =$ _____ 8

(53) $444 \times \frac{4}{37} =$ _____

(54) $101110_2 =$ _____ 4

(55) Truncate $4\sqrt{3}$ to the tenths place. _____

(56) Let $(1 + 3i) \times (1 - 4i) = a + bi$. Find $a + b$. _____

(57) $\cot(\frac{11\pi}{4}) =$ _____

(58) $131 \times 418 =$ _____

(59) If $x^2 + y^2 = 2601$, $x > y$ and both x and y are positive integers, then x = _____

***(60)** $43 \times 54 \times 65 =$ _____

(61) Find the sum of all negative integers x such that $2x + 3 \geq -5$. _____

(62) The Greatest Integer Function is written as $f(x) = [x]$. Find $\left[\pi^3\right]$. _____

(63) 0.525252... base 8 = _____ base 10 (fraction)

(64) Find k if $\begin{vmatrix} k & 6 \\ -3 & -10 \end{vmatrix} = 15$. _____

(65) $\csc(\frac{5\pi}{6}) =$ _____

(66) $\sec(\frac{4\pi}{3}) =$ _____

(67) If $24^5 \div 4 = (4^x)(6^y)$, then $x + y =$ _____

(68) The simplified coefficient of the x^3y^3 term in the expansion of $(x + 3y)^6$ is _____

(69) $31^2 - 41^2 + 51^2 - 61^2 =$ _____

***(70)** $12^4 \times 24^3 \div 48^2 =$ _____

(71) If $44 \pmod{13} \equiv x - 1$, where $3 \leq x \leq 12$, then x = _____

(72) The first four digits of the decimal for $\frac{123}{550}$ base 6 is 0._____ base 6

(73) $f'(x) = 4$, $f(1) = 3$, find $f(-1)$. _____

(74) The minimum value of $y = 4x^2 + 12x + 9$ is _____

(75) $16 \times \frac{17}{19} - 2 =$ _____ (mixed number)

(76) If $f(x) = 1 - \frac{3}{x-4}$, then $f^{-1}(8) =$ _____

(77) $\int_0^2 (3x + 1)\,dx =$ _____

(78) Let $f(x) = 2x^2 - 3x + 5$. Find $f'(-7)$. _____

(79) 4 gallons + 3 quarts + 2 pints = _____ cups

***(80)** How many square feet are in 5 acres? _____ ft^2

The University Interscholastic League
Number Sense Test • HS District • 2018

Final _____ _____

Contestant's Number _____ 2nd _____ _____

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Score **Initials**

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(1) $319 + 2420 + 18 =$ _____

(2) $2.8 - 7.5 =$ _____ **(decimal)**

(3) $24 \times 25 =$ _____

(4) $\frac{1}{9} \div \frac{1}{8} =$ _____

(5) $3 \times 1 \div 9 + 2 - 4 =$ _____

(6) $2418 \div 9 =$ _____ **(mixed number)**

(7) $15^2 =$ _____

(8) MDCXLVI = _____ **(Arabic Numeral)**

(9) The negative reciprocal of 1.1 is _____

***(10)** $293 \times 392 =$ _____

(11) The arithmetic mean of 19, 24, and 18 = _____

(12) The GCD of 45 and 36 is _____

(13) $3\frac{1}{4} + 4\frac{1}{3} =$ _____ **(mixed number)**

(14) The LCM of 36 and 45 is _____

(15) If 6 Qs cost $20.18, then 9 Qs cost $ _____

(16) If 1 gram = .04 oz, then 4.8 oz = _____ grams

(17) 30% of 50 less 70 is _____

(18) $2\frac{1}{4} \times 4\frac{1}{2} =$ _____ **(mixed number)**

(19) $11 \times 319 =$ _____

***(20)** $32418 \div 319 =$ _____

(21) The largest prime divisor of 187 is _____

(22) 48% = _____ **(proper fraction)**

(23) Given the set {4, 6, 8, 9, 10, p, 14, 15, q, 18,...}. Find $p + q$. _____

(24) $(3 \times 19 + 24) \div 9$ has a remainder of _____

(25) $4^{-1} - 4^{-2} =$ _____

(26) $15^3 =$ _____

(27) $324 \times 18 =$ _____

(28) 0.0181818... = _____ **(proper fraction)**

(29) $(1991 \times 9 + 81) \div 3 =$ _____

***(30)** $\sqrt{7} \times 498 =$ _____

(31) A septagon has how many vertices? _____

(32) Let $(5x - 2)^2 = ax^2 + bx + c$. Find b. _____

(33) The sum of the positive integral divisors of 24 is __

(34) If $x - 3y = 5$ and $x - 2y = 4$ then $y =$ _____

(35) 2 gallon jugs hold _____ cubic inches of water

(36) 130 base 10 is written as _____base 5

(37) Find the simple interest on $400.00 at a rate of 6% for 8 months. $ _____

(38) Given: 319B4 is divisible by 6. Find B $>$ 5. _____

(39) $3\frac{3}{4}$ is _____ % less than 5

*(40) $24^4 \div 24^2 \times 2^3$ = _____

(41) $31^2 - 26^2$ = _____

(42) $3 + 7 + 11 + 15 + ... + 31 + 35$ = _____

(43) ${}_8C_3$ = _____

(44) 75% of a gallon is _____ cups

(45) Let $(ab) \div (a^{-2}b^2) \times (a^3b^{-3}) = a^mb^n$. mn = ____

(46) The 5th pentagonal number is _____

(47) If $3^{(x+y)} = 243$ then $2^{(x+y)}$ = _____

(48) The vertex of $y = 3x^2 + 6x - 9$ is (h, k). h = ____

(49) The largest root of $(x - 2)^2 = \frac{1}{16}$ is _____

*(50) 31924×0.876 = _____

(51) 324×201 = _____

(52) $i \times i \times i \times i$ = _____

(53) $\log_4(8) - \log_4(2)$ = _____

(54) $324_5 \times 11_5$ = _____$_5$

(55) (k)(23)(91) = 232,323. k = _____

(56) $\frac{3}{5} + \frac{6}{25} + \frac{12}{125} + ...$ = _____

(57) If 1, 9, and x are the integral sides of a triangle, then the least value of x is _____

(58) The sum of the reciprocals of all of the positive integral divisors of 35 is _____

(59) If $x^2 + y^2 = 170$, $x > y > 1$ and both x and y are positive integers, then $x + y$ = _____

*(60) $15 \times 30 \times 45 \times 60$ = _____

(61) Find the sum of all positive integers x such that $3x - 1 \leq 9$. _____

(62) $\begin{bmatrix} 0 & 4 \\ 6 & 8 \end{bmatrix} + \begin{bmatrix} 1 & -3 \\ 6 & -10 \end{bmatrix} = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$. ac — bd = _____

(63) $(3x^2 + x - 9) \div (x - 2)$ has a remainder of _____

(64) 0.2444... base 8 = _____ base 10 (fraction)

(65) Let $f(x) = x^2 - 6x + 9$. Find f(f(3)). _____

(66) $\cos(240°)$ = _____

(67) $\sin(\frac{7\pi}{6})$ = _____

(68) The 5th triangular number plus the 3rd pentagonal number is _____

(69) If $20^5 \div 16 = (4^x)(5^y)$, then $x + y$ = _____

*(70) $[(\sqrt{5} + 1) \div 2] \times 100\pi$ = _____

(71) If $4.5^x = 50$ then $4.5^{(x+1)}$ = _____

(72) Find x, $0 \leq x \leq 8$, if $32 + x \equiv 4 \pmod 9$. x = _____

(73) $f'(x) = 3$, $f(2) = 1$, find f(9). _____

(74) The minimum value of $y = x^2 - 4x + 4$ is _____

(75) If $x < 0$ and $|3x + 2| = 4$ then x = _____

(76) $\int_{-1}^{1} (x - 1)\,dx$ = _____

(77) $9^{11} \div 13$ has a remainder of _____

(78) (0.428571428571428571...) ÷ (0.333...) = _____

(79) 24×1111 = _____

*(80) $3\frac{1}{9} \times 32420 \div 18$ = _____

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(1) $413 + 414 + 2018 =$ _____

(2) $4.8 \times 1.25 =$ _____

(3) $414 \div 5 =$ _____ **(mixed number)**

(4) $18.75\% =$ _____ **(proper fraction)**

(5) $34^2 =$ _____

(6) $413414 \div 9$ **has a remainder of** _____

(7) $4\frac{1}{3} - 2\frac{1}{8} =$ _____ **(mixed number)**

(8) Which is larger, $-\frac{3}{5}$ **or** $-.59 =$ _____

(9) $CCCXIV + CDXIV =$ _____ **(Arabic Numeral)**

***(10)** $247 \times 352 =$ _____

(11) Simplify to lowest terms: $\frac{314}{414}$. _____

(12) 20 plus 30% of 40 = _____

(13) $2\frac{3}{5} + 5\frac{2}{3} =$ _____ **(mixed number)**

(14) $6 \times 12 \div 18 - 24 + 30 =$ _____

(15) $1995 \times 6 + 30 =$ _____

(16) The arithmetic mean of 15, 22, 37 and 41 = _____

(17) The largest prime number less than 79 is _____

(18) $63 \times 36 =$ _____

(19) $413 \times 11 =$ _____

***(20)** $41314 - 4131 + 413 - 41 + 4 =$ _____

(21) The number 70 has _____ **positive prime divisors**

(22) The simple interest on $800.00 at 9% for 8 months is $ _____

(23) $0.2353535... =$ _____ **(proper fraction)**

(24) $(41 \times 34 - 14) \div 8$ **has a remainder of** _____

(25) $8\frac{3}{4} \times 4\frac{1}{2} =$ _____

(26) Find the slope of the line $2x - 3y = 1$. _____

(27) $2 + 5 + 8 + 11 + ... + 32 + 35 =$ _____

(28) $\sqrt[3]{2197} =$ _____

(29) If $(2x - 5)^2 = ax^2 + bx + c$ **then** $a + b - c$ **is** ____

***(30)** $8102414 \div 314 =$ _____

(31) $468_{10} =$ _____ $_8$

(32) $414 \times 13 =$ _____

(33) The LCM 28, 56, and 14 is _____

(34) The larger root of $(x - 1)^2 = \frac{4}{9}$ **is** _____

(35) Given the set {4,6,8,9,p,q,14,15,... }. $p + q =$ _____

(36) $5\frac{1}{3}$ is _____ % more than 4

(37) The measure of a central angle of a regular nonagon is _____°

(38) 2 miles = _____ yards

(39) Find y if $2x - y = -6$ and $3x + y = 1$. $y =$ _____

*(40) $21^4 \div 7^3 \times 3^2 =$ _____

(41) $991^2 =$ _____

(42) The sum of the prime divisors of 70 is _____

(43) The 4-digit number 41k8 is divisible by 9. k = ____

(44) $31^2 - 41^2 =$ _____

(45) ${}_7P_3 =$ _____

(46) $5^{(-2)} =$ _____ (decimal)

(47) $124_8 \div 6_8 =$ _____ 8

(48) The sum of the reciprocals of all of the positive integral divisors of 15 is _____

(49) The 9th pentagonal number is _____

*(50) $\sqrt[3]{413414} =$ _____

(51) The vertex of $y = 3x^2 - 2x - 5$ is (h, k). h = _____

(52) If (111)(65)(k) = 404,040 then k = _____

(53) If 4, 11, and x are the integral sides of a triangle, then the greatest value of x is _____

(54) Let $5x - 7 < 12$. The largest integer x is _____

(55) The probability of randomly selecting a composite number from the set of positive digits is _____%

(56) $127 \times 413 =$ _____

(57) $\log 10^2 =$ _____

(58) If $x^2 + y^2 = 169$, $x > y$ and both x and y are positive integers, then $x - y =$ _____

(59) $321_4 =$ _____ 2

*(60) $8 \times 16 \times 24 \times 32 =$ _____

(61) Find the sum of all positive integers x such that $2x - 4 \leq 6$. _____

(62) 0.3111... base 5 = _____ base 5 (fraction)

(63) The simplified coefficient of the x^3y^3 term in the expansion of $(2x + y)^6$ is _____

(64) Let $\frac{2-3i}{i} = a + bi$. Find a + b. _____

(65) $\sin(\frac{5\pi}{6}) =$ _____

(66) $\cos(300°) =$ _____

(67) If $21^4 \div 3 = (3^x)(7^y)$, then xy = _____

(68) $f(x) = 2x^2 - 1$. $g(x) = 2 + x^2$. $g(f(1)) =$ _____

(69) $9^8 \div 7$ has a remainder of _____

*(70) $\left((\sqrt{5} + 1) \div 2 + \pi + e\right)^3 =$ _____

(71) Let $f'(x) = 4$ and $f(2) = 3$. Find $f(-1)$. _____

(72) $\int_{-1}^{2} (3x^2 - 1)\, dx =$ _____

(73) The length of the tangent from (13, 0) to the circle $x^2 + y^2 = 25$ is _____

(74) If $\begin{vmatrix} -4 & 6 \\ 8 & x \end{vmatrix} = 9$ then x = _____ (decimal)

(75) $\lim_{x \to -2} \left(\frac{x+2}{x^2-4}\right) =$ _____

(76) $3^{-1} + 3^{-2} + 3^{-3} + 3^{-4} + ... =$ _____

(77) Find x, $1 \leq x \leq 6$, if $2x - 1 \equiv 4 \pmod 7$. _____

(78) Truncate $6\sqrt{6}$ to a whole number. _____

(79) 2 cups + 4 pints + 6 quarts = _____ gallons

*(80) How many seconds are in April, 2018? _____

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Final _____ _____

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(1) $5418 + 8145 =$ _____

(2) $504 \times 8 =$ _____

(3) $5042018 \div 9$ has a remainder of _____

(4) $5 \times 4 \div 2^0 + 1 - 8 =$ _____

(5) $29^2 =$ _____

(6) $5420 \div 18 =$ _____ (mixed number)

(7) $5\frac{1}{4} - 1\frac{4}{5} =$ _____ (mixed number)

(8) $5.4 \div 2.5 =$ _____ (decimal)

(9) The negative reciprocal of 3.5 is _____

***(10)** $20 + 18 \times 504 =$ _____

(11) $24 \times 38 - 24 \times 14 =$ _____

(12) The GCD of 85 and 102 is _____

(13) $4 \times 8 - 12 + 16 \div 20 =$ _____

(14) The LCM of 102 and 85 is _____

(15) Simplify to lowest terms: $\frac{144}{234}$. _____

(16) The arithmetic mean of 5, 4, 20, and 18 = _____

(17) 20% of 60 less 40 is _____

(18) The largest prime number less than 95 is _____

(19) $11 \times 504 =$ _____

***(20)** $81547 \div 347 =$ _____

(21) $1797 \times 3 + 9 =$ _____

(22) $39 \times 31 - 33 \times 13 =$ _____

(23) $83 \times 87 =$ _____

(24) $(50 \times 34 - 18) \div 7$ has a remainder of _____

(25) Find the slope of the line $5x + 4y = 18$. _____

(26) $\sqrt{8836} =$ _____

(27) $405 \times 16 =$ _____

(28) $3600 = [3(12 + k)]^2$. Find $k \geq 0$. _____

(29) The largest root of $15x^2 + 7x - 4 = 0$ is _____

***(30)** $\sqrt{6} \times 597 =$ _____

(31) A pickup gets 17 miles per gallon of gas. How far can it travel on 23 gallons of gas? _____ miles

(32) 504 base 10 is written as _____ in base 7

(33) 0.0545454... _____ (proper fraction)

(34) How many positive integers less than or equal to 27 are relatively prime to 27? _____

(35) 6.5 is _____ % more than 4

(36) A regular hendecagon has how many sides? _____

(37) Find the simple interest on $500.00 at a rate of 4% for 18 months. $ _____

(38) Given: 8145B is divisible by 6. Find $B > 0$. _____

(39) Find y if $5x - y = 1$ and $4x + y = 8$. y = _____

*(40) $(248 \times 53)^2 \div (47 \times 289)$ = _____

(41) $48^2 - 58^2$ = _____

(42) $504_7 + 305_7 + 534_7$ = _____ 7

(43) Find k, given 5, 4, 9, 13, 22, ..., 57, k, 149, ... _____

(44) $5^{(-3)}$ = _____ (decimal)

(45) The vertex of $y = 4x^2 - 5x - 3$ is (h, k). h = _____

(46) The midpoint between the points (— 5,4) and (3,— 5) is (h, k). Find h + k. _____

(47) The smallest root of $(x + 3)^2 = \frac{1}{4}$ is _____

(48) If 6 apps cost $12.24, then 9 apps cost $ _____

(49) 991^2 = _____

*(50) $\sqrt[3]{542018}$ = _____

(51) Let $(1 + 2i) \times (3 - 4i) = a + bi$. Find a + b. _____

(52) $i \times i \times i \times i \times i \times i$ = _____

(53) If 4, 18, and x are the sides of a triangle, then x + 5 > _____

(54) $4\log 10^5$ = _____

(55) $\frac{3}{4} + \frac{1}{2} + \frac{1}{3} + ... + \frac{8}{81} + ...$ = _____

(56) 1 + 3 + 6 + 10 + 15 + ... + 78 + 91. _____

(57) $74^2 + 33^2$ = _____

(58) $(504_6 - 405_6)(2_6)$ = _____ 6

(59) Find the sum of all positive integers x such that $3x - 6 \leq 10$. _____

*(60) $7 \times 14 \times 21 \times 28$ = _____

(61) 0.454545... base 8 = _____ base 10 (fraction)

(62) $(6x^2 + x - 7) \div (x + 1)$ has a remainder of _____

(63) X varies inversely as Y. If X = 16 when Y = 4. find Y when X = 12. Y = _____

(64) The simplified coefficient of the x^4y^2 term in the expansion of $(x + 3y)^6$ is _____

(65) $f(x) = 3 - 5\cos(\pi x + 1)$. The amplitude is _____

(66) $\cos^2(\frac{5\pi}{6})$ = _____

(67) $\sec^2(\frac{7\pi}{6})$ = _____

(68) $f(x) = 5x^2 - 4$. $g(x) = 5 + 4x + x^2$. f(g(—1)) = ____

(69) $10^{11} \div 12$ has a remainder of _____

*(70) $\pi^5 \times e^4$ = _____

(71) If $3.2^{(x+1)} = 64$ then $3.2^{(x)}$ = _____

(72) $\lim_{x \to \infty} \frac{3\cos(x)}{x}$ = _____

(73) Let $f(x) = x^3 - 3x^2 - 2x + 1$. Find $f'(1)$. _____

(74) If $x < 0$ and $|5x + 4| = 18$ then x = _____

(75) A pair of dice is rolled. The probability of rolling a four on one die but not on both is _____

(76) If $14^4 \div 4 = (4^x)(49^y)$, then x + y = _____

(77) If $f(x) = 5 - \frac{4x - 5}{4}$ then $f^{-1}(8)$ = _____

(78) (0.571428571428571428...) ÷ (0.222...) = _____

(79) 12.5% of a mile = _____ yards

*(80) $(504.2018)^3$ = _____

University Interscholastic League - Number Sense Answer Key HS ● SAC ● Fall 2017

***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) 3,820

(2) 594

(3) 66,000

(4) $\frac{11}{30}$

(5) $\frac{9}{20}$

(6) $60\frac{2}{9}$

(7) 256

(8) .49, $\frac{49}{100}$

(9) — 10

***(10) 3,652 — 4,036**

(11) 560

(12) 14

(13) $1\frac{5}{8}$

(14) 49

(15) 84

(16) 22

(17) 120

(18) 6

(19) 83

***(20) 257 — 283**

(21) 4,000

(22) 2

(23) $1.44

(24) 54

(25) 324

(26) 76

(27) 11

(28) $\frac{5}{33}$

(29) 29

***(30) 140,889 — 155,719**

(31) $\frac{200}{9}$, $22\frac{2}{9}$

(32) 12

(33) 42

(34) 3

(35) 13

(36) 9

(37) $24.00

(38) 406

(39) 40

***(40) 4,281 — 4,730**

(41) — 24

(42) 25

(43) 982,081

(44) 21

(45) — 920

(46) 18

(47) 16

(48) 1.875, $\frac{15}{8}$, $1\frac{7}{8}$

(49) .0625

***(50) 241 — 265**

(51) 1

(52) — 1

(53) 8

(54) 144

(55) 120

(56) 23

(57) .5, $\frac{1}{2}$

(58) 49,416

(59) 5

***(60) 472,781 — 522,547**

(61) 6

(62) 3.75, $\frac{15}{4}$, $3\frac{3}{4}$

(63) $\frac{2}{5}$

(64) 3

(65) — 9

(66) — .5, — $\frac{1}{2}$

(67) — 2

(68) 22

(69) 9

***(70) 291 — 321**

(71) 3

(72) 2121

(73) — 4

(74) — 3

(75) 6

(76) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(77) $\frac{13}{7}$, $1\frac{6}{7}$

(78) 1,717

(79) 8.5, $\frac{17}{2}$, $8\frac{1}{2}$

***(80) 85,500 — 94,500**

University Interscholastic League - Number Sense Answer Key HS ● Invitation A ● Fall 2018

***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) 748

(2) 5,000

(3) .8125, $\frac{13}{16}$

(4) 1,111

(5) 289

(6) 7.5

(7) 800

(8) 4.4

(9) 19

***(10) 39,327 — 43,465**

(11) $47\frac{7}{9}$

(12) 76

(13) — 16

(14) $3\frac{4}{35}$

(15) 1,146

(16) 4.8, $\frac{24}{5}$, $4\frac{4}{5}$

(17) 12

(18) 12,000

(19) 97

***(20) 4,841 — 5,350**

(21) 34

(22) 440

(23) $\frac{7}{37}$

(24) 4

(25) 2

(26) 121

(27) 4,224

(28) 10

(29) 24

***(30) 9,576 — 10,584**

(31) 4

(32) 15

(33) 144

(34) 10

(35) 218

(36) 7

(37) $24.00

(38) 289

(39) 25

***(40) 50,992 — 56,359**

(41) 10

(42) 2.5, $\frac{5}{2}$, $2\frac{1}{2}$

(43) .25, $\frac{1}{4}$

(44) 9

(45) — 375

(46) 1

(47) 4

(48) 2.1, $\frac{21}{10}$, $2\frac{1}{10}$

(49) 66

***(50) 105 — 115**

(51) — 6

(52) 8

(53) 1032

(54) 5

(55) $\frac{1}{11}$

(56) 47

(57) 1

(58) 32

(59) 5

***(60) 3,831,996 — 4,235,364**

(61) 10

(62) 11

(63) 60

(64) 2

(65) 30

(66) $\frac{1}{12}$

(67) 6

(68) 0

(69) 35

***(70) 117 — 129**

(71) .03

(72) 3

(73) 2

(74) 0

(75) .8, $\frac{4}{5}$

(76) — .5, $-\frac{1}{2}$

(77) 13.5, $\frac{27}{2}$, $13\frac{1}{2}$

(78) 8

(79) 30

***(80) 93,643 — 103,499**

University Interscholastic League - Number Sense Answer Key HS ● Invitation B ● Fall 2018

***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) 1,797

(2) 192

(3) 925

(4) 2

(5) 11,111

(6) $\frac{7}{8}$

(7) $-\frac{4}{35}$

(8) 729

(9) 1,241

***(10) 16,795 — 18,561**

(11) 2

(12) 23

(13) 360

(14) 252

(15) — 42

(16) 16,000

(17) .072, $\frac{9}{125}$

(18) $\frac{31}{12}$, $2\frac{7}{12}$

(19) 4,059

***(20) 257 — 283**

(21) $10.00

(22) 7

(23) 5,616

(24) 29

(25) $\frac{532}{9}$, $59\frac{1}{9}$

(26) 625

(27) 0

(28) 8

(29) .2, $\frac{1}{5}$

***(30) 55 — 59**

(31) 12

(32) 16

(33) $\frac{68}{495}$

(34) 31

(35) .5, $\frac{1}{2}$

(36) $\frac{360}{7}$, $51\frac{3}{7}$

(37) 3.5, $\frac{7}{2}$, $3\frac{1}{2}$

(38) 8

(39) — 216

***(40) 2,902 — 3,206**

(41) 17

(42) 12

(43) 30

(44) 440

(45) 64

(46) 14

(47) — 345

(48) 126

(49) 9

***(50) 77 — 85**

(51) 7

(52) 131

(53) 120

(54) — 2

(55) 78

(56) 12

(57) 10

(58) $\frac{1}{13}$

(59) 2

***(60) 333,815 — 368,953**

(61) 6

(62) 59,286

(63) $\frac{7}{20}$

(64) 1

(65) — 12

(66) — 1

(67) 1

(68) 9

(69) 16

***(70) 1,291 — 1,426**

(71) 6

(72) 2444

(73) 9

(74) — 2

(75) 8

(76) 4

(77) 6

(78) 2

(79) 302

***(80) 1,593 — 1,760**

2017-18 TMSCA High School Number Sense Test 13 - 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) 2,226

(2) 21

(3) 42

(4) 5

(5) $\frac{9}{20}$

(6) .9, $\frac{9}{10}$

(7) 361

(8) 99

(9) 4

***(10) 10,117 — 11,181**

(11) 27

(12) 605

(13) $10\frac{5}{8}$

(14) 49.25, $\frac{197}{4}$, $49\frac{1}{4}$

(15) 10

(16) — 4

(17) 120

(18) 225

(19) 60

***(20) 181,564 — 200,674**

(21) 24,000

(22) $24.00

(23) 2

(24) 9

(25) 3

(26) $105\frac{3}{16}$

(27) $\frac{17}{33}$

(28) 396

(29) 105

***(30) 309 — 341**

(31) 323

(32) 17

(33) 12

(34) 4,928

(35) 0

(36) 36

(37) $56\frac{2}{9}$

(38) — .75, $-\frac{3}{4}$

(39) $\frac{500}{3}$, $166\frac{2}{3}$

***(40) 1,480 — 1,634**

(41) 994,009

(42) 12

(43) 73

(44) 6

(45) — 8

(46) 18

(47) 13

(48) 1.9375, $\frac{31}{16}$, $1\frac{15}{16}$

(49) 305

***(50) 242 — 267**

(51) — 2

(52) 40

(53) 2

(54) 123

(55) $\frac{200}{9}$, $22\frac{2}{9}$

(56) 55,695

(57) 15

(58) 1221

(59) 12

***(60) 472,781 — 522,547**

(61) — 3

(62) 6

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

(64) 6

(65) — 5

(66) — 2

(67) — 2

(68) 90

(69) 16

***(70) 394 — 435**

(71) 0

(72) 2

(73) 8

(74) — 6

(75) 4.5, $\frac{9}{2}$, $4\frac{1}{2}$

(76) .15

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

(78) 3,774

(79) 32,035

***(80) 19,700 — 21,772**

2017-18 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) 2,039

(2) 693

(3) 1,870

(4) $39\frac{2}{3}$

(5) $\frac{14}{69}$

(6) $-\frac{1}{12}$

(7) 3,375

(8) $\frac{12}{25}$

(9) 120

***(10) 1,818 — 2,008**

(11) $-.4, -\frac{2}{5}$

(12) 561

(13) 14

(14) $-1\frac{1}{8}$

(15) 320

(16) 45

(17) — 84

(18) 6

(19) 97

***(20) 183,673 — 203,005**

(21) 7,000

(22) 36

(23) $27.00

(24) 4

(25) — 2

(26) 225

(27) 13

(28) $\frac{8}{11}$

(29) 10

***(30) 180,576 — 199,584**

(31) $30\frac{2}{9}$

(32) 40

(33) 75

(34) $\frac{12}{7}, 1\frac{5}{7}$

(35) 9,118

(36) 8

(37) 3

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

(39) 12

***(40) 271 — 298**

(41) 66

(42) 2,409

(43) $1.5, \frac{3}{2}, 1\frac{1}{2}$

(44) — 1

(45) — 385

(46) 360

(47) 512

(48) $\frac{5}{31}$

(49) 988,036

***(50) 518,468 — 573,042**

(51) 12

(52) 19

(53) 12

(54) 7

(55) 2

(56) 423

(57) 64

(58) 109,482

(59) 6

***(60) 149,591 — 165,337**

(61) — 3

(62) 600

(63) $\frac{23}{30}$

(64) — 80

(65) 4

(66) $-.5, -\frac{1}{2}$

(67) — 2

(68) $-\frac{28}{3}, -9\frac{1}{3}$

(69) 25

***(70) 2,507 — 2,770**

(71) 2

(72) 8

(73) 8

(74) — 5

(75) $-.125, -\frac{1}{8}$

(76) 32

(77) 1

(78) $\frac{9}{7}, 1\frac{2}{7}$

(79) — 5

***(80) 2,462,400 — 2,721,600**

2017-18 TMSCA UIL District Warm-Up 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) — 704

(2) 5,256

(3) 72

(4) $\frac{1}{12}$

(5) $1\frac{25}{104}$

(6) 2,744

(7) — 11

(8) 40

(9) $-\frac{5}{6}$

***(10) 2,611 — 2,885**

(11) 5,700

(12) 3

(13) 336

(14) 4

(15) 1,560

(16) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(17) 182

(18) 12

(19) 1,392

***(20) 101,870 — 112,592**

(21) 3

(22) 3

(23) 0

(24) 7.5, $\frac{15}{2}$, $7\frac{1}{2}$

(25) 1.2, $\frac{6}{5}$, $1\frac{1}{5}$

(26) 196

(27) $1\frac{23}{28}$

(28) 750

(29) $\frac{161}{495}$

***(30) 6,021,612 — 6,655,464**

(31) 472

(32) 133

(33) 89

(34) 12

(35) 33

(36) 150

(37) 324

(38) 1.75, $\frac{7}{4}$, $1\frac{3}{4}$

(39) 2,500

***(40) 318 — 350**

(41) — 5

(42) — 1

(43) 40,804

(44) 0

(45) 595

(46) 1

(47) 13

(48) 21

(49) 4

***(50) 1,504 — 1,661**

(51) 21

(52) 3102

(53) 48

(54) 232

(55) 6.9

(56) 12

(57) — 1

(58) 54,758

(59) 45

***(60) 143,384 — 158,476**

(61) — 10

(62) 31

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

(64) .3, $\frac{3}{10}$

(65) 2

(66) — 2

(67) 9

(68) 540

(69) — 1,840

***(70) 118,196 — 130,636**

(71) 6

(72) 1242

(73) — 5

(74) 0

(75) $12\frac{6}{19}$

(76) $\frac{25}{7}$, $3\frac{4}{7}$

(77) 8

(78) — 31

(79) 80

***(80) 206,910 — 228,690**

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST

University Interscholastic League - Number Sense Answer Key HS • District • 2018

***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) 2,757

(2) — 4.7

(3) 600

(4) $\frac{8}{9}$

(5) $-\frac{5}{3}, -1\frac{2}{3}$

(6) $268\frac{2}{3}$

(7) 225

(8) 1,646

(9) $-\frac{10}{11}$

***(10) 109,114 — 120,598**

(11) $\frac{61}{3}, 20\frac{1}{3}$

(12) 9

(13) $7\frac{7}{12}$

(14) 180

(15) $30.27

(16) 120

(17) — 55

(18) $10\frac{1}{8}$

(19) 3,509

***(20) 97 — 106**

(21) 17

(22) $\frac{12}{25}$

(23) 28

(24) 0

(25) .1875, $\frac{3}{16}$

(26) 3,375

(27) 5,832

(28) $\frac{1}{55}$

(29) 6,000

***(30) 1,252 — 1,383**

(31) 7

(32) — 20

(33) 60

(34) — 1

(35) 462

(36) 1010

(37) $16.00

(38) 7

(39) 25

***(40) 4,378 — 4,838**

(41) 285

(42) 171

(43) 56

(44) 12

(45) — 24

(46) 35

(47) 32

(48) — 1

(49) 2.25, $\frac{9}{4}, 2\frac{1}{4}$

***(50) 26,568 — 29,363**

(51) 65,124

(52) 1

(53) 1

(54) 4114

(55) 111

(56) 1

(57) 9

(58) $\frac{48}{35}, 1\frac{13}{35}$

(59) 18

***(60) 1,154,250 — 1,275,750**

(61) 6

(62) 25

(63) 5

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

(65) 9

(66) — .5, $-\frac{1}{2}$

(67) — .5, $-\frac{1}{2}$

(68) 27

(69) 8

***(70) 483 — 533**

(71) 225

(72) 8

(73) 22

(74) 0

(75) — 2

(76) — 2

(77) 3

(78) $\frac{9}{7}, 1\frac{2}{7}$

(79) 26,664

***(80) 5,324 — 5,883**

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST

University Interscholastic League - Number Sense Answer Key HS • Regional • 2018

***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) 2,845

(2) 6

(3) $82\frac{4}{5}$

(4) $\frac{3}{16}$

(5) 1,156

(6) 8

(7) $2\frac{5}{24}$

(8) $-.59, -\frac{59}{100}$

(9) 728

***(10) 82,597 — 91,291**

(11) $\frac{157}{207}$

(12) 32

(13) $8\frac{4}{15}$

(14) 10

(15) 12,000

(16) 28.75, $\frac{115}{4}$, $28\frac{3}{4}$

(17) 73

(18) 2,268

(19) 4,543

***(20) 35,682 — 39,436**

(21) 3

(22) $48.00

(23) $\frac{233}{990}$

(24) 4

(25) 39.375, $\frac{315}{8}$, $39\frac{3}{8}$

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

(27) 222

(28) 13

(29) — 41

***(30) 24,514 — 27,094**

(31) 724

(32) 5,382

(33) 56

(34) $\frac{5}{3}$, $1\frac{2}{3}$

(35) 22

(36) $\frac{100}{3}$, $33\frac{1}{3}$

(37) 40

(38) 3,520

(39) 4

***(40) 4,848 — 5,358**

(41) 982,081

(42) 14

(43) 5

(44) — 720

(45) 210

(46) .04

(47) 16

(48) 1.6, $\frac{8}{5}$, $1\frac{3}{5}$

(49) 117

***(50) 71 — 78**

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

(52) 56

(53) 14

(54) 3

(55) $\frac{400}{9}$, $44\frac{4}{9}$

(56) 52,451

(57) 2

(58) 7

(59) 111001

***(60) 93,389 — 103,219**

(61) 15

(62) $\frac{23}{40}$

(63) 160

(64) — 5

(65) .5, $\frac{1}{2}$

(66) .5, $\frac{1}{2}$

(67) 12

(68) 3

(69) 4

***(70) 398 — 439**

(71) — 9

(72) 6

(73) 12

(74) — 14.25

(75) $-.25, -\frac{1}{4}$

(76) .5, $\frac{1}{2}$

(77) 6

(78) 14

(79) 2.125, $\frac{17}{8}$, $2\frac{1}{8}$

***(80) 2,462,400 — 2,721,600**

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST

University Interscholastic League - Number Sense Answer Key HS • State • 2018

***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) 13,563

(2) 4,032

(3) 2

(4) 13

(5) 841

(6) $301\frac{1}{9}$

(7) $3\frac{9}{20}$

(8) 2.16

(9) $-\frac{2}{7}$

***(10) 8,638 — 9,546**

(11) 576

(12) 17

(13) 20.8, $\frac{104}{5}$, $20\frac{4}{5}$

(14) 510

(15) $\frac{8}{13}$

(16) 11.75, $\frac{47}{4}$, $11\frac{3}{4}$

(17) — 28

(18) 89

(19) 5,544

***(20) 224 — 246**

(21) 5,400

(22) 780

(23) 7,221

(24) 2

(25) $-1.25, -\frac{5}{4}, -1\frac{1}{4}$

(26) 94

(27) 6,480

(28) 8

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

***(30) 1,390 — 1,535**

(31) 391

(32) 1320

(33) $\frac{3}{55}$

(34) 18

(35) 62.5, $\frac{125}{2}$, $62\frac{1}{2}$

(36) 11

(37) $30.00

(38) 6

(39) 4

***(40) 12,084 — 13,355**

(41) — 1,060

(42) 1646

(43) 92

(44) .008

(45) .625, $\frac{5}{8}$

(46) $-1.5, -\frac{3}{2}, -1\frac{1}{2}$

(47) $-3.5, -\frac{7}{2}, -3\frac{1}{2}$

(48) $18.36

(49) 982,081

***(50) 78 — 85**

(51) 13

(52) — 1

(53) 19

(54) 20

(55) 2.25, $\frac{9}{4}$, $2\frac{1}{4}$

(56) 455

(57) 6,565

(58) 154

(59) 15

***(60) 54,743 — 60,505**

(61) $\frac{37}{63}$

(62) — 2

(63) $\frac{16}{3}$, $5\frac{1}{3}$

(64) 135

(65) 5

(66) .75, $\frac{3}{4}$

(67) $\frac{4}{3}$, $1\frac{1}{3}$

(68) 16

(69) 4

***(70) 15,873 — 17,543**

(71) 20

(72) 0

(73) — 5

(74) $-4.4, -\frac{22}{5}, -4\frac{2}{5}$

(75) $\frac{5}{18}$

(76) 3

(77) $-1.75, -\frac{7}{4}, -1\frac{3}{4}$

(78) $\frac{18}{7}$, $2\frac{4}{7}$

(79) 220

***(80) 121,769,012 — 134,586,802**