Academic Excellence
in Mathematics and
Science through
Competition

T M S C A   M I D D L E   S C H O O L

N U M B E R   S E N S E

T E S T   # 7 ©

J A N U A R Y   1 3 ,   2 0 1 8

GENERAL DIRECTIONS

1. Write only the requested information on this coversheet. 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 <u>non-black</u> 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 <u>FIVE</u> points. <u>FOUR</u> points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

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2017-2018 TMSCA Middle School Number Sense Test 7

(1) $2018 \times 4 =$ _____

(2) $65 \times 0.4 =$ _____

(3) $0.56 =$ _____ (fraction)

(4) $924 \div 11 =$ _____

(5) $9 \times 4 \times 11 =$ _____

(6) $(1+2+3+4+5) \div 5$ has a remainder of _____

(7) The largest multiple of 99 less than 500 is _____

(8) $10^2 \div \left(3^2 + 4^2\right) =$ _____

(9) $\dfrac{5}{12} \times 72 =$ _____

*(10) $2018 + 2017 + 2016 + \ldots + 2001 =$ _____

(11) $7\dfrac{1}{4}\% =$ _____ (fraction)

(12) $103 \times 115 =$ _____

(13) $83 \times 23 =$ _____

(14) $96 \times 91 =$ _____

(15) $27 \times 24 + 27 \times 26 =$ _____

(16) $\dfrac{8}{3} + \dfrac{2}{3} =$ _____ (mixed number)

(17) Which if greater, $\dfrac{8}{13}$ or $\dfrac{11}{18}$? _____

(18) $78 \times 82 =$ _____

(19) What is the smallest number that 14
and 63 divide into without a remainder? _____

*(20) 7993×125

= _____

(21) $23^2 =$ _____

(22) $83 \times 1.2 =$ _____ (decimal)

(23) $11554 = 109 \times$ _____

(24) $438 \times 111 =$ _____

(25) The multiplicative inverse of $\dfrac{4}{13}$ is _____

(26) The sum of the distinct prime divisors of 75 is ___

(27) $18 \times 18\dfrac{5}{18} =$ _____

(28) How many 2-digit positive integers exist? _____

(29) $17^2 + 51^2 =$ _____

*(30) $55^2 + 155^2 =$ _____

(31) An angle in an isosceles trapezoid
has a measure of $95°$. The sum of the
two smallest angles in the trapezoid is _____ $°$

(32) $5\dfrac{1}{4} \times 4\dfrac{3}{4} =$ _____ (mixed number)

(33) 74 has how many positive integral divisors? _____

(34) The sum of the positive
integral divisors of 32 is _____

(35) If $8x - 20 = 428$, then $2x - 5 =$ _____

(36) The GCF of 48 and 84 is _____

(37) The area of a rectangle with length two
greater than its width is 143, the length is _____

(38) If $x^2 = 25$, and $x < 0$, then $x^3 =$ _____

(39) If $x^2 = 478$, then $(x - 5)(x + 5) =$ _____

*(40) $\sqrt{24173} =$ _____

(41) If $4x + 3 = 51$, then $x =$ _____

(42) A set with 8 elements has _____ subsets

(43) $1 + 2 + 3 + 4 + \ldots + 35 =$ _____

(44) $0.375 \times 32 =$ _____

(45) The sum of the
exterior angles of an octagon is_____°

(46) If $f(x) = x^3 + 7$, then $f(5) =$ _____

(47) If $2x - 5y = 17$ is
perpendicular to $Ax - 2y = 31$, then $A =$ _____

(48) $1 + 3 + 5 + ... + 31 =$ _____

(49) $124_{10} =$ _____ $_6$

*(50) $142857 \times 47 =$ _____

(51) A set with 9 elements has
how many 2-element subsets? _____

(52) $23 \times \dfrac{23}{27} =$ _____(mixed number)

(53) The perimeter of a regular
13-sided polygon with side length 17 is_____

(54) $83^2 + 22^2 =$ _____

(55) The height of an equilateral triangle
with side 10 is $k\sqrt{3}$, $k =$ _____

(56) The largest integer solution
of $x(x - 1) < 75$ is_____

(57) $643_8 - 27_8 =$ _____ $_8$

(58) $\left(5 + 4 - 3 \times 12 + 7^2\right) \div 5$ has a remainder of_____

(59) If $47 \times 54 = 50 \times 51 - n$, then $n =$ _____

*(60) $103 \times 105 \times 107 =$ _____

(61) $1_9 + 2_9 + 3_9 + ... + 13_9 =$ _____ $_9$

(62) The product of the roots
of $4x^2 - 17x + 14 = 0$ is _____

(63) If $f(x) = 4x^2 + 3$, then $f(13) - f(3) =$ _____

(64) $18.5^2 - 6.5^2 =$ _____

(65) Find the x-intercept of $y - 8 = \dfrac{2}{3}(x - 6)$. _____

(66) The sum of the infinite
geometric series, $4 + 3 + 2.25 + ... =$ _____

(67) $4^3 + 8^3 + 16^3 = 4^3 \times$ _____

(68) The probability of obtaining a
sum of 5 when rolling a pair of dice is_____

(69) $0.8484... =$ _____ (fraction)

*(70) Find the surface area
of a tetrahedron with edge 15._____

(71) $\dfrac{2 + 4 + 6 + ... + 40}{2 + 4 + 6 + ... + 14} =$ _____

(72) The sum of coefficients of $(4x + 3)(2x + 7)$ is _____

(73) $1^3 + 2^3 + 3^3 + 4^3 + 5^3 =$ _____

(74) $993^2 =$ _____

(75) $f(x) = 2(x - 3)^2 + 1$, find the y-coordinate
of the vertex of $g(x)$ if $g(x) = f(x + 4) - 7.$_____

(76) If $2 + 4 + 6 + ... + n = 47(48)$, then $n =$ _____

(77) $4x^2 - 7x + 3 = 0$ has how many real roots?_____

(78) P, Q, and R are roots of $8x^3 - 7x^2 + 15x - 11 = 0$.
The arithmetic mean of P, Q, and R is_____

(79) $81 \times 37 =$ _____

*(80) 149 square miles =_____acres

2017-2018 TMSCA Middle School Number Sense Key #7

(1) 8072

(2) 26

(3) $\frac{14}{25}$

(4) 84

(5) 396

(6) 0

(7) 495

(8) 4

(9) 30

*(10) 34363 – 37979

(11) $\frac{29}{400}$

(12) 11845

(13) 1909

(14) 8736

(15) 1350

(16) $3\frac{1}{3}$

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

(18) 6396

(19) 126

*(20) 949169 – 1049081

(21) 529

(22) 99.6

(23) 106

(24) 48618

(25) 3.25, $3\frac{1}{4}$, or $\frac{13}{4}$

(26) 8

(27) 329

(28) 90

(29) 2890

*(30) 25698 – 28402

(31) 170

(32) $24\frac{15}{16}$

(33) 4

(34) 63

(35) 107

(36) 12

(37) 13

(38) – 125

(39) 453

*(40) 148 – 163

(41) 12

(42) 256

(43) 630

(44) 12

(45) 360

(46) 132

(47) – 5

(48) 256

(49) 324

*(50) 6378566 – 7049992

(51) 36

(52) $19\frac{16}{27}$

(53) 221

(54) 7373

(55) 5

(56) 9

(57) 614

(58) 2

(59) 12

*(60) 1099345 – 1215065

(61) 86

(62) 3.5, $3\frac{1}{2}$, or $\frac{7}{2}$

(63) 640

(64) 300

(65) – 6

(66) 16

(67) 73

(68) $\frac{1}{9}$

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

*(70) 371 – 409

(71) 7.5, $7\frac{1}{2}$, or $\frac{15}{2}$

(72) 63

(73) 225

(74) 986049

(75) – 6

(76) 94

(77) 2

(78) $\frac{7}{24}$

(79) 2997

*(80) 90592 – 100128