The University Interscholastic League
Number Sense Test ⊛ HS State ⊛ 2006

Final _____ _____
2nd _____ _____
1st _____ _____
Score Initials

Contestant's Number _____

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) $6060 - 2020 =$ _____

(2) $2.6 \times 2.5 =$ _____ (decimal)

(3) $\frac{2}{3} + \frac{5}{8} =$ _____ (mixed number)

(4) $22066 \div 11 =$ _____

(5) $17^2 =$ _____

(6) $(1 + 1 \times 2) \div 3 - 5 =$ _____

(7) Which is larger, $\frac{7}{22}$ or .33 = _____

(8) $13^3 =$ _____

(9) $1\frac{1}{10}\% =$ _____ (proper fraction)

*(10) $2006 - 200.6 + 20.06 - 2.006 =$ _____

(11) $8\frac{9}{10} + 4\frac{17}{20} =$ _____ (mixed number)

(12) The GCF of 132 and 187 is _____

(13) $\frac{1}{7} + \frac{1}{14} + \frac{1}{28} =$ _____

(14) $142536 \div 11$ has a remainder of _____

(15) $53 \times 42 =$ _____

(16) $CDIV \div XL =$ _____ (Arabic Numeral)

(17) $6 + 12 + 18 + ... + 66 =$ _____

(18) 80% of $90 - 100 =$ _____

(19) $33 - 66 + 99 - 99 - 66 + 33 =$ _____

*(20) $\sqrt[3]{2006 \times 6002} =$ _____

(21) $69^2 - 67^2 =$ _____

(22) 3.21 liters = _____ mililiters

(23) $35 \times 1\frac{35}{38} =$ _____ (mixed number)

(24) 45% of 45 — 45 is _____

(25) $.25 + .125 - \frac{1}{12} =$ _____ (proper fraction)

(26) The number of positive integral divisors of $50 \times 5^4 \times 2^3$ is _____

(27) Set A has 8 distinct elements. How many proper subsets with at least one element does set A have? _____

(28) $93 \times 104 =$ _____

(29) $(2^4 \times 3^6 + 5^{10}) \div 4$ has a remainder of _____

*(30) $73 \times 86 + 77 \times 84 =$ _____

(31) 87.5% of a gallon is _____ fl. oz.

(32) 234_5 = _____ 4

(33) If x = 5 and y = − 7 then $x^3 - 3x^2y + 3xy^2 - y^3$ = _____

(34) If 44 pens cost $77.00, then 12 cost $ _____

(35) 686 + 98 + 14 = _____ base 7

(36) 7.6 × 8.4 = _____ (decimal)

(37) LCM(21,84) − GCF(21,84) = _____

(38) $\sqrt{676} \div \sqrt[3]{-2197}$ = _____

(39) 143 × 13 × 7 = _____

*(40) 875421 ÷ 369 = _____

(41) .875 ÷ 35 = _____

(42) If $x^5 = -32$ then 5^x = _____

(43) $1\frac{12}{13} + 1\frac{1}{12}$ = _____ (mixed number)

(44) A dodecahedron is a Platonic solid with 30 edges and _____ vertices

(45) If 6x − 5(4 − 3x) = 1, then 2 − x = _____

(46) 22 × 75 + 110 × 15 = _____

(47) In a 45°-45°-90° triangle the hypotenuse is $2\sqrt{2}$ ft. The area of the triangle is ____ sq. ft

(48) $92\frac{6}{7}\%$ = _____ (proper fraction)

(49) $\frac{4}{5} - \frac{67}{86}$ = _____

*(50) $\sqrt[4]{14643} \times \sqrt[3]{1329} \times \sqrt{120}$ = _____

(51) If 86k6 is divisible by 6 then the largest tens digit value for k is _____

(52) $\frac{11 \times 10! - 11! \times 10}{11!}$ = _____

(53) $55^2 - 50^2 + 5^2$ = _____

(54) $\sin\left(-\frac{7\pi}{6}\right) - \cos\left(-\frac{2\pi}{3}\right)$ = _____

(55) Two dice are tossed. What is the probability the sum is a multiple of 5? _____

(56) 77 × 73 + 4 = _____

(57) $6 - 1 - \frac{1}{6} - \frac{1}{36} - \frac{1}{216} - \ldots$ = _____

(58) 114 × 221 = _____

(59) 6! ÷ (3! × 2!) = _____

*(60) $14^3 \times 4^5$ = _____

(61) $4^2 \times 5^2 \times 6^2$ = _____

(62) $666 \times \frac{18}{37}$ = _____

(63) The slope of the line containing points (− 2 , 2) and (− 3 , 3) is _____

(64) 602 × 602 = _____

(65) 129 × 129 + 129 = _____

(66) $543_7 \div 6_7$ = _____ 7

(67) $89^2 - 86^2 + 83^2 - 80^2$ = _____

(68) $999 \times \frac{5}{27}$ = _____

(69) If h(x) = 5 − 3x, then $h^{-1}(-2)$ = _____

*(70) The area of $90x^2 + 150y^2 = 13500$ is _____

(71) If $\log_9 X = 2$ then $\sqrt{X}$ = _____

(72) $\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \ldots + \frac{1}{36}$ = _____

(73) The sum of the first nine terms of the Fibonacci sequence 1, 3, 4, 7, 11, ... is _____

(74) $22 \times \frac{22}{25} - 22$ = _____ (mixed number)

(75) If $f(x) = (3x^2 - 4)^2$, then $f'(1)$ = _____

(76) If sec θ = − 3 in QIII, then cos θ = _____

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

(78) The maximum value of 2cos 3x − 5 is ____

(79) $2^3 - 3^3 - 5^3$ = _____

*(80) $[(\pi)(e)]^4$ = _____

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*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) 4040

(2) 6.5

(3) $1\frac{7}{24}$

(4) 2006

(5) 289

(6) — 4

(7) .33 or $\frac{33}{100}$

(8) 2197

(9) $\frac{11}{1000}$

*(10) 1733 — 1914

(11) $13\frac{3}{4}$

(12) 11

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

(14) 9

(15) 2226

(16) 10.1, $10\frac{1}{10}$, $\frac{101}{10}$

(17) 396

(18) — 28

(19) — 66

*(20) 218 — 240

(21) 272

(22) 3210

(23) $67\frac{9}{38}$

(24) — 24.75, $-24\frac{3}{4}$, $-\frac{99}{4}$

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

(26) 35

(27) 254

(28) 9672

(29) 1

*(30) 12109 — 13383

(31) 112

(32) 1011

(33) 1728

(34) $ 21.00

(35) 2220

(36) 63.84

(37) 63

(38) — 2

(39) 13013

*(40) 2254 — 2491

(41) .025 or $\frac{1}{40}$

(42) .04 or $\frac{1}{25}$

(43) $3\frac{1}{156}$

(44) 20

(45) 1

(46) 3300

(47) 2

(48) $\frac{13}{14}$

(49) $\frac{9}{430}$

*(50) 1259 — 1391

(51) 7

(52) — 9

(53) 550

(54) 1

(55) $\frac{7}{36}$

(56) 5625

(57) 4.8, $4\frac{4}{5}$, $\frac{24}{5}$

(58) 25194

(59) 60

*(60) 2,669,364 — 2,950,348

(61) 14400

(62) 324

(63) — 1

(64) 362404

(65) 16770

(66) 64

(67) 1014

(68) 185

(69) $2\frac{1}{3}$ or $\frac{7}{3}$

*(70) 347 — 383

(71) 9

(72) $\frac{7}{9}$

(73) 196

(74) $-2\frac{16}{25}$

(75) — 12

(76) $-\frac{1}{3}$

(77) 6

(78) — 3

(79) — 144

*(80) 5053 — 5584