The University Interscholastic League
Number Sense Test, Series UU-3

Contestant's Number _____ Contestant's Score _____

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 only approximate answers; any answer to a starred problem that is within five per cent 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) $1988 + 8891 =$ _____.

(2) $2^3 \div 2^4 \times 4 =$ _____.

(3) $3(4) + 6(4) + 11(4) =$ _____.

(4) $22\frac{1}{2}\% =$ _____ (fraction).

(5) $50 \times 123 =$ _____.

(6) $611 \div 9 =$ _____ (mixed number).

(7) $39^2 =$ _____.

(8) $55 \times 75 =$ _____.

(9) $1\frac{1}{10} \div 2\frac{1}{5} =$ _____.

*(10) $51 \times 240 - 40 =$ _____ (Integer).

(11) Which is the largest $\frac{7}{8}$, $\frac{8}{9}$, or .8? _____.

(12) $12 \times 27 =$ _____.

(13) $(6.3 \times 10^5) \div (.21 \times 10^3) =$ _____ (numeral).

(14) $15 \times 36 =$ _____.

(15) If one centimeter equals 0.39 inches, 4 meters = _____ inches.

(16) $5 \times 12 \times 15 \times 12 =$ _____.

(17) How many minutes between 8:23 a.m. and 10:15 a.m.? _____ minutes.

(18) What is the largest value of x such that 120 is the least common multiple of 12, 10 and 5x? _____.

(19) My house is valued at $80,000. If the tax is $2.50 per $100, based on $\frac{3}{4}$ of the value, my yearly tax is $ _____.

*(20) $(31 \times 29)^2 =$ _____ (Integer).

(21) $.0032 \times 11.1 =$ _____.

(22) $(623 \times 62) \div 10$ has a remainder of _____.

(23) If $x = 3$, then $x^4 - 2x^2 + 1 =$ _____.

(24) Find x, if $\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$ _____.

(25) Determine k, so that the sum of the roots of $4kx^2 - 5x = 6$ is 2. _____.

(26) $47 \times 43 =$ _____.

(27) The product of the distinct prime divisors of 338 is _____.

(28) $.2\overline{9} =$ _____ (fraction).

(29) The remainders for $\frac{a}{7}$ and $\frac{b}{7}$ are 4 and 6, respectively. Find the remainder for $\frac{ab}{7}$, _____.

*(30) $59 \times 60 \times 61 =$ _____ (Integer).

(31) If $A = 3B$, $B \neq 0$ and $C = 4$, then $AC \div B =$ _____.

(32) If 84 is divided into three parts proportional to 3, 4 and 5, the smallest part is _____.

(33) $(25_7)(4_7) =$ _____$_7$.

(34) The sum of three consecutive even integers is 162. The largest of these is _____.

(35) A trapezoid has one base 9" and altitude 6" and area 60 sq. in. The other base is _____ inches.

(36) $101011_2 =$ _____ 4.

(37) $36 \times 31 =$ _____.

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

(39) Pipe A can fill a pool in 2 days and Pipe B can fill the pool in 3 days. How many days will it take to fill the pool if they work together? _____ days.

*(40) $29857 \div 111 =$ _____ (Integer).

(41) Find the next term: 1,4,5,9,14,23,.... _____.

(42) The area of a 30° - 60° right triangle with hypotenuse 4 is _____.

(43) If $x^{5/2} = 32$, then $x =$ _____.

(44) A regular n-gon has an exterior angle of measure 18°. $n =$ _____ sides.

(45) The ninth term of the sequence 2,6,10,14,... is _____.

(46) 1/4 mile = _____ feet.

(47) $111 \times 33 =$ _____.

(48) If $x^2 + 60^2 = 61^2$, then $x^2 =$ _____.

(49) The remainder when 4^6 is divided by 15 is _____.

*(50) $\sqrt{33699} =$ _____ (Integer).

(51) How many three-digit positive integers are multiples of 5? _____.

(52) The set [a,b,c,d] has _____ subsets that contain two elements.

(53) $2^{\log_2 4} =$ _____.

(54) $(2 + 3i)(1 + i) = a + bi$ and $b =$ _____.

(55) If $(2x + 3)^3 = ax^3 + bx^2 + cx + d$, then $c =$ _____.

(56) The smallest positive value of x such that $x^2 - 9 \geq 0$ is _____.

(57) Four men date four women. What is the total number of ways in which the men and women may be paired? _____.

(58) If x and y vary directly and $x = 7$ when $y = 4$, find x when $y = 3$. _____.

(59) If $\log 2 = .3$ and $\log 3 = .5$, then $\log 18 =$ _____.

*(60) $142857 \times 51 =$ _____ (Integer).

(61) $\sin(2 \operatorname{Arcsin} \frac{3}{5}) =$ _____.

(62) Find x, if $\log_4 6 = \log_{10} 6 \div \log_{10} x$. _____.

(63) $[\,4.7\,] =$ _____.

(64) $\det \begin{vmatrix} 1 & 3 \\ 4 & 2 \end{vmatrix} =$ _____.

(65) If $x\,2^x = x$, then $x =$ _____.

(66) If the volume of a sphere numerically equals to the surface area of the sphere then the radius is _____ units.

(67) $1 + \cos\Theta = 2\cos^2 20°$, $0° < \Theta < 90°$, $\Theta =$ _____ °.

(68) There are _____ Platonic solids.

(69) If a team's probability of winning a game is $\frac{3}{5}$, what is the expected ratio of the losses to the wins, with no ties? _____.

*(70) $(36)^4 =$ _____ (Integer).

(71) $(4, \frac{3\pi}{4})$ are polar coordinates for (x,y). $x =$ _____.

(72) 20° C = _____ ° F.

(73) The horizontal asymptote for $y = -3^x - 1$ is $y =$ _____.

(74) Change .22, base 4, to a base ten fraction. _____.

(75) The remainder when $f(x) = 1 + 2x - 2x^2 - x^3$ is divided by $(x + 2)$ is _____.

(76) Find x, $0 \leq x < 4$, such that $3x + 1 \equiv 11 \pmod 4$. _____.

(77) $\lim_{x \to 2} \frac{2x^2 + x - 10}{x - 2} =$ _____.

(78) What is the slope of $f(x) = x^2 + 4x + 1$ at $x = 4$? _____.

(79) $\int_1^3 x^{-2}\,dx =$ _____.

*(80) $121 \times 1111 + 37 \times 1111 =$ _____ (Integer).