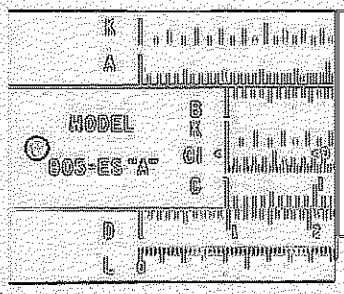

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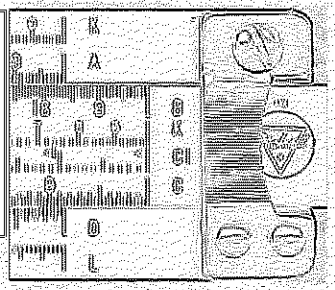
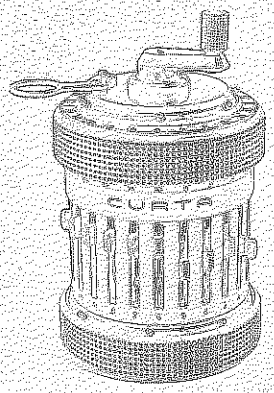
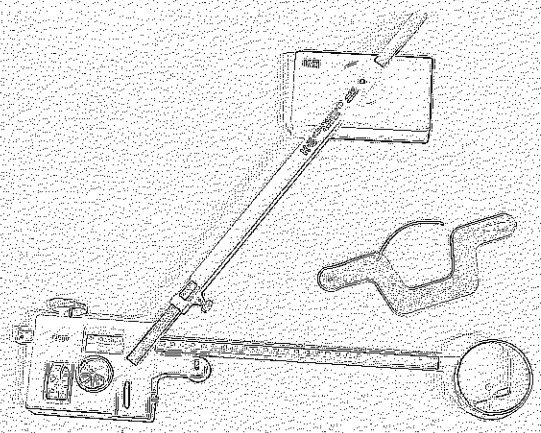
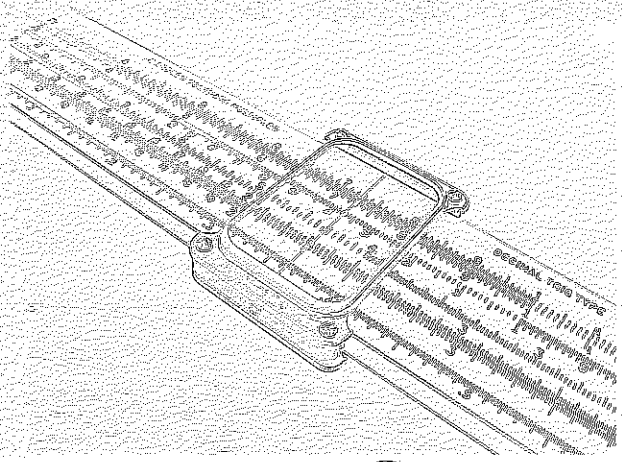
Web - http://www.texasmath.org
Fax - (206) 666-MATH/(206) 666-6284
E-Mail - webmaster@texasmath.org

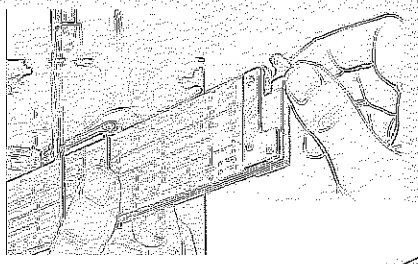


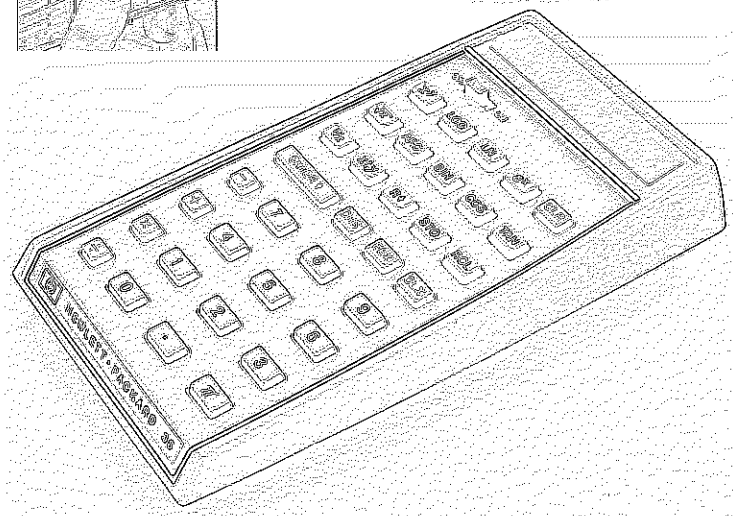
1974-75 UIL Number Sense
(14 pages)

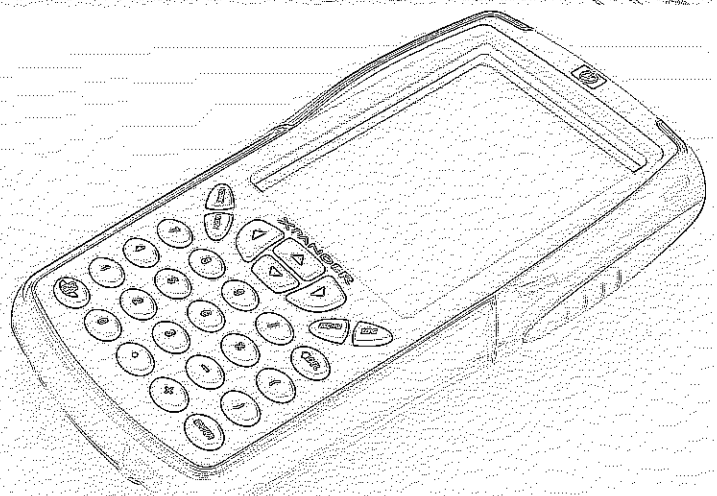


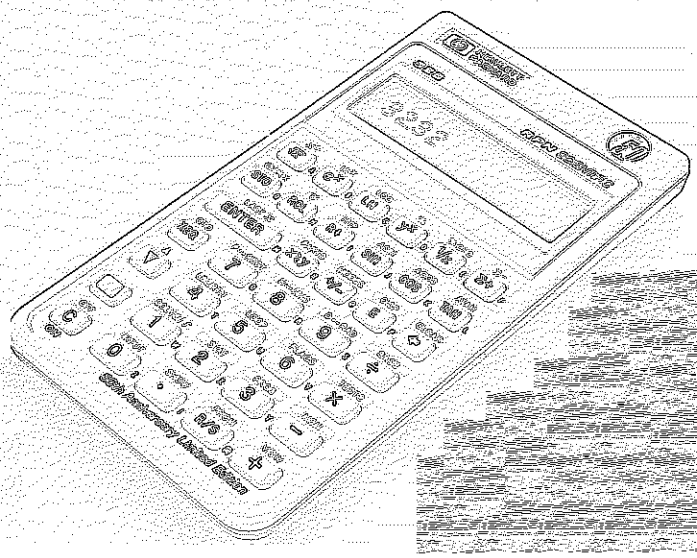


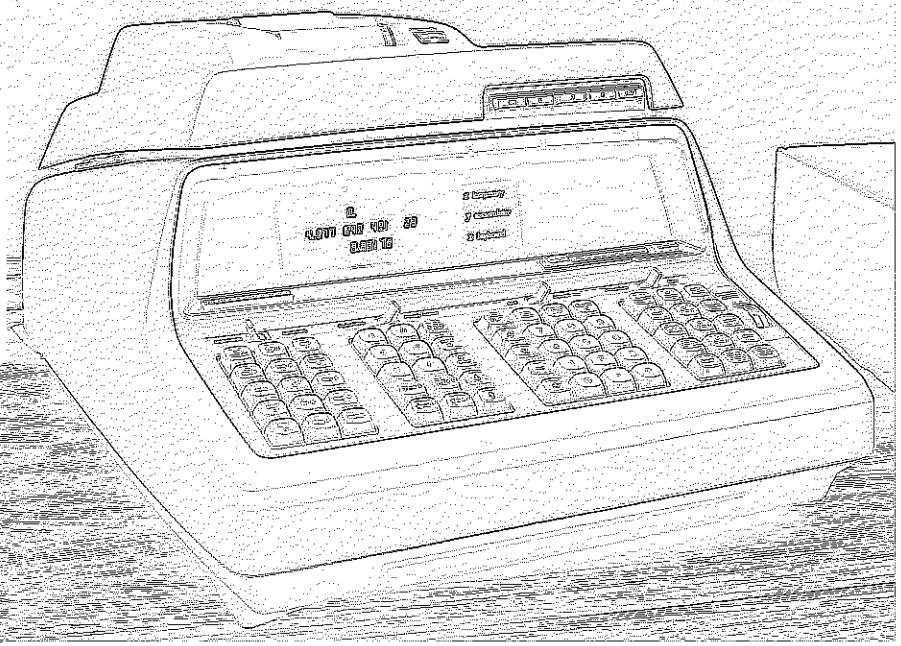












The University of Texas Interscholastic League

Number Sense Test, Series HH-1

Contestant's Number..... Contestant's Score.....

Read Directions Carefully Before Beginning Test

Do not Unfold This Sheet Until Told to Begin

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Stop—Wait for Signal

(1) $4801 - 763 =$ .....

(2) $9217 + 584 =$ .....

(3) $2^7 =$ .....

(4) $130 - 48 + 372 =$ .....

(5) $12(16) - 12(9) =$ .....

(6) $37 \times 47 =$ .....

(7) $\sqrt{529} =$ .....

(8) $27^2 =$ .....

(9) $456 \times 11 =$ .....

*(10) $(380)^2 =$ .....

(11) $3204 \div 18 =$ .....

(12) $1/6 \times 5/7 \times 12/13 =$ .....

(13) $7/20 + 5/6 =$ .....

(14) $51.42 + 6.59 - 0.33 =$ .....

(15) The greatest common divisor of 98 and 138 is .....

(16) $(815)^2 =$ .....

(17) Five more than twice a certain number is 23. The number is .....

(18) The interest on $175 for 2 months at 12% is $.....

(19) Change 178, base ten, to base seven; .....seven.

*(20) $3846 + 2981 + 178042 + 63411 =$ .....

(21) Candy sticks are 8 for 26 cents. One dozen will cost .....cents.

(22) $2 + 3 + 5 + 6 + 8 + 9 + 11 + 12 =$ .....

(23) 12.5 meters = ...millimeters.

(24) Five students in a class of 25 are absent. What percent of the students are present? .....%.

(25) $9^4 =$ .....

(26) The average (or mean) of 56, 41, 38 is .....

(27) The smaller of $\frac{2}{3}$ and .7 is .....

(28) The negative reciprocal of $-2\frac{2}{3}$ is .....

(29) If coal sells for $14 a ton, 2300 pounds would cost $.....

*(30) $(804960 \div 78) \times 4 =$ .....

(31) $1 - (\frac{1}{2})^3 =$ .....

(32) Write the value of the repeating decimal $1.\overline{82}$ as a fraction; .....

(33) When 7383 is divided by 9, the remainder is .....

(34) $(43_{five}) \times (4_{five}) =$ .....five.

(35) The smaller prime factor of 341 is .....

(36) If $12\frac{1}{2}$ pesos equals one dollar, $18 = ...pesos.

(37) What is the circumference of a circle with radius 5? (Use pi = 22/7) .....

(38) If a pair of dice is tossed once, what is the probability that the sum is 6? .....

(39) $\frac{5}{6}$ of 6 feet 8 inches is .....inches.

*(40) $\sqrt{980714} =$ .....

(41) The distance between the points (4, —1) and (1, 2) is a $\sqrt{b}$, b = ...

(42) If $f(x) = 3x^2 - 2x + 4$, $f(-1) =$ .....

(43) If $3x/4 - 2 \leq 3$, the largest value of x is .....

(44) $(0.5)^2 + (0.2)^3 =$ .....

(45) Solve for y: $x - 2y = 3$
$2x + y = 2$; $y =$ .....

(46) If $62.8 \div n = n \div 62.8$, $n > 0$, $n =$ .....

(47) If a/7 has a remainder of 5, and b/7 has a remainder of 4, ab/7 has a remainder of .....

(48) The larger of $0.3\overline{4}$, $0.\overline{34}$, $0.3\overline{43}$ is .....

(49) $(63_{seven}) \div (5_{seven}) =$ .....seven.

*(50) $28100 \times 76 =$ .....

(51) If $\log_3 1/9 = x$, $x =$ .....

(52) If you deposited $400 and received $22 in interest at the end of the year, what was the rate of interest? .....%.

(53) If $2^x = 8^{x-1}$, $x =$ .....

(54) If $2x^2 - 2x = 4$ and $x > 0$, $x =$ .....

(55) The conjugate of $5 + 5i$ is .....

(56) In how many different ways can the letters a,c,d, e be written exactly once in a line? .....

(57) The product of the roots of $3x^2 - 2x = 4$ is .....

(58) The coefficient of the x^2y^2 term in the expansion of $(3x - 2y)^4$ is .....

(59) If 1 inch equals 2.54 centimeters, 1 foot = ...cm.

*(60) $25(290 + 22) + 30 \times 48 =$ .....

(61) $(6 - 5i)^2 =$ .....

(62) Find the center of the circle with equation $x^2 - 2x + y^2 + 6y = 15$. .....(.....,.....).....

(63) If $\cos A = .6$, sec. A = ...

(64) $4/3\ \pi$ radians = ...degrees.

(65) If a club elects a president and secretary, how many different ways can the two offices be filled if there are 6 members and any member can hold exactly one office? .....

(66) Change .011, base two, to a decimal in base ten. .....

(67) The slope of a line perpendicular to the line $3y + 4x = 7$ is .....

(68) The sum of the coefficients in the binomial expansion of $(2x - 5y)^4$ is .....

(69) The range of the relation $\{(-1,2), (3,4), (7,8), (9,4)\}$ is .....{.....}.....

*(70) $30 \times 31 \times 32 \times 33 =$ .....

(71) Evaluate the determinant $B = \begin{vmatrix} 4 & -3 \\ 2 & 5 \end{vmatrix}$; .....

(72) The slope of the line tangent to $y = 5x^2 + 3x$ at the point (0,0) is .....

(73) $\lim_{x \to 3} \frac{x^2 - 3x}{x - 3} =$ .....

(74) $\int_1^3 3x^3 dx =$ .....

(75) Change 46, base eight, to base five. ..... five

(76) The remainder when $f(x) = 3x^5 - 2x^2 + 4$ is divided by $x - 2$ is .....

(77) If $f(x) = 2x - 3$, the inverse function $(f^{-1}(x) = ax + b$ and $b =$ .....

(78) In the system of integers modulo five, the least non-negative value for 4×3 is .....

(79) If $G(x) = 2x^2 - 3$ and $F(x) = 2$. Find $G(F(x))$. .....

*(80) $\sum_{n=1}^{7} 3n^2 =$ .....

The University of Texas Interscholastic League

Number Sense Test, Series HH-2

Contestant's Number..... Contestant's Score.....

Read Directions Carefully Before Beginning Test

Do not Unfold This Sheet Until Told to Begin

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Stop—Wait for Signal

(1) $2087 + 6954 =$ .....

(2) $3104 - 748 =$ .....

(3) $56 - 38 + 17 =$ .....

(4) $18^2 =$ .....

(5) $28 \times 32 =$ .....

(6) $1 + 3 + 5 + 7 + 9 + 11 + 13 =$ .....

(7) $7(8) + 7(15) + 7(17) =$ .....

(8) $86 \times 97 =$ .....

(9) $\sqrt{324} =$ .....

*(10) $762 \times 419 =$ .....

(11) $7/9 \times 2/5 \times 3/14 =$ .....

(12) $4\frac{3}{4} \div 12\frac{2}{3} =$ .....

(13) $17.64 - 8.7 =$ .....

(14) Change 45, base six to base ten; .....

(15) $\frac{5}{8}$ of 3% = ... (as a simple fraction).

(16) $12\frac{1}{3} - 7\frac{1}{4} =$ .....

(17) $3892 \times 11 =$ .....

(18) The least common multiple of 42 and 60 is .....

(19) A grocer sells 15 pounds of seed for $1.00, at the some rate, 40 cents will buy ..... pounds.

*(20) $\sqrt{48203} =$ .....

(21) $825^2 =$ .....

(22) If 1 inch equals 2.54 centimeters, 635 centimeters = ... inches.

(23) The larger of 7/28 and 8/27 is .....

(24) The mean (average) of 36, 17 and 64 is .....

(25) The reciprocal of $3\frac{1}{8}$ is .....

(26) What percent of 640 is 480? .....%.

(27) What is the probability of getting exactly two heads when tossing three coins? .....

(28) If $12\frac{1}{2}$ pesos equals one dollar, \$28 = ... pesos.

(29) The median of 7, 4, 8, 9, 14, 5, 4, 10, 2 is .....

*(30) $2784 + 19215 + 782 + 9381 =$ .....

(31) $(32_{seven}) \times (5_{seven}) =$ ..... seven.

(32) If $3^n \times 3^3 = 3^6$, n = ...

(33) $78 \times 24 \div 36 =$ .....

(34) The distance between the points (—2,—1) and (0,2) is .....

(35) Three times a certain number decreased by 2 is 43. The number is .....

(36) $(8.2 + 7.6) \div 0.2 =$ .....

(37) The largest number of .755, $0.7\overline{5}$, $0.7\overline{57}$, $0.75\overline{7}$ is .....

(38) $3 - (\frac{3}{4})^2 =$ .....

(39) If $x + 2 \geq 2x + 1$, the largest value of x is .....

*(40) $(3807)^2 =$ .....

(41) The next number in the sequence $\frac{3}{4}$, $-\frac{3}{8}$, 3/16, —3/32, 3/64 is .....

(42) Write the repeating decimal $.\overline{723}$ as a fraction .....

(43) If $f(b) = |2b| - 5$, $f(-3) =$ .....

(44) The perimeter of an equilateral triangle with altitude 10 is .....

(45) If $2^x = 2^{-x}$, x = ...

(46) Joe bought a coat on sale for $20. He saved 20% of the regular price. What did the coat cost before the sale? .....

(47) $(8.2 - 2.8) \div 0.6 =$ .....

(48) Solve for y: $2x - 3y = 4$
$x + y = 1$;
y = ...

(49) Assuming boys and girls are born with equal frequency what are the odds for having two boys in a two child family? .....

*(50) The number of feet in 120 miles is .....ft.

(51) If $\log_2 x = 3$, x = ...

(52) If $\sin A = .4$, $\csc A =$ .....

(53) The slope of the line $4x - 2y = 3$ is .....

(54) How many ways can 5 people be seated 3 at a time in 3 chairs in a row? .....

(55) The diameter of a circle whose area is 27π is a $\sqrt{b}$; $b =$ .....

(56) $49\frac{1}{8} - 12\,2/7 =$ .....

(57) How many 3 element subsets are there in the power set for {1, 2, 3, 4, 5, 6, 7}? .....

(58) If $x - 8x = -16$, $x =$ .....

(59) If $x > 0$ and $\log_5 (x^2 - 3) = 0$, $x =$ .....

*(60) $40 \times 41 \times 42 \times 43 =$ .....

(61) The radius of the circle with equation $x^2 + y^2 - 4y = 5$ is .....

(62) The range of the relation {(1, 3), (2, —2), (4, 3)} is .....{.....}.....

(63) The slope of the line containing the points (1, —1) and (—2, 2) is .....

(64) $(4 - i)(4 + i) =$ .....

(65) If $220° = a\pi$ radians, $a =$ .....

(66) The number of prime divisors of 480 is .....

(67) Change 0.7, base eight, to a decimal in base ten; .....

(68) The sum of the coefficients in the expansion of $(3a - b)^4$ is .....

(69) The coefficient of the x^4y^3 term in the expansion of $(x^2 + 3y)^5$ is .....

*(70) $\sum_{k=0}^{5} (4K^2 - 3k) =$ .....

(71) Change 25, base six, to base three. .....three.

(72) The slope of the line tangent to $y = 3x^{-2} + 4$ at the point (1, 7) is .....

(73) $\lim_{x \to 1} \frac{x^2 - 1}{1 - x} =$ .....

(74) $\int_0^3 x^4 dx =$ .....

(75) The remainder when $f(x) = 2x^4 - 3x + 7$ is divided by $x - 2$ is .....

(76) If $f(x) = 3x - 5$, the inverse function $f^{-1}(x) = ax + b$, then $a =$ .....

(77) If $G(x) = 3x^2 - 4$ and $F(x) = -2$, $G(F(x)) =$ .....

(78) The additive inverse of the vector (2, —1) is (a, b), and $a =$ .....

(79) If the matrix $A = [1, 2, 7]$ and the matrix $B = \begin{bmatrix} -1 \\ 0 \\ 2 \end{bmatrix}$ then $AB =$ .....

*(80) How many 9″ × 9″ tiles will it take to cover a 12′ × 12′ floor? .....

The University of Texas Interscholastic League

Number Sense Test, Series HH-3

Contestant's Number..... Contestant's Score.....

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Stop—Wait for Signal

(1) $497 - 289 =$ .....

(2) $1074 + 578 =$ .....

(3) $52 - 14\ 7/9 =$ .....

(4) $19^2 =$ .....

(5) $18(25) + 5(18) =$ .....

(6) $43 \times 37 =$ .....

(7) $7^3 =$ .....

(8) $83 \times 45 =$ .....

(9) $2 + 4 + 6 + 8 + 10 + 12 + 14 =$ .....

*(10) $571 \times 842 =$ .....

(11) $\sqrt{961} =$ .....

(12) $14/17 \div 7/8 =$ .....

(13) $6/11 \times 121/4 \times 2/9 =$ .....

(14) $50126 \div 71 =$ .....

(15) Change 304, base ten to base five; .....five

(16) If $2x - 4 = 7 - 2x/3$, $x =$ .....

(17) The greatest common divisor of 54 and 60 is .....

(18) ½% of 80 is .....

(19) 1700 pounds of hay at $7.00 per ton will cost $ .....

*(20) $(7894)^2 =$ .....

(21) $4273 \times 11 =$ .....

(22) $3.54 \div .6 =$ .....

(23) If 1 inch equals 2.54 centimeters, 9 inches = ...cm.

(24) $150 at 6½% for 3 years is $ .....

(25) When 34167 is divided by 9 the remainder is .....

(26) The area of a trapezoid with altitude 3 and sides 6 and 9 is .....

(27) If $f(m) = 3m^2 - 7$, $f(2) =$ .....

(28) The largest of 17/9, 25/13 and 13/7 is .....

(29) A car gets 14 miles to 1 gallon of fuel. How many gallons of fuel are needed to drive 162 miles? .....gals.

*(30) $\sqrt{50716} =$ .....

(31) $8\frac{3}{4} \times 8\frac{1}{3} =$ .....

(32) The mean (average) of 28, 49, and 37 is .....

(33) If $f(x) = |x| - 2$ then $f(-3) =$ .....

(34) $2^3 + 3^4 =$ .....

(35) Write the value of the repeating decimal $.\overline{726}$ as a fraction .....

(36) 123 is what percent of 615? .....%.

(37) What is the probability that in one draw a king is drawn from a deck of 52 cards? .....

(38) If $-3X + 1 \leq -2$, the smallest value of x is .....

(39) The distance between the points (—2, 1) and (2, —2) is .....

*(40) $2^{18} =$ .....

(41) Given {2, 3, 4, 5, 6, 7, 8}, what are the odds in favor of picking an even number from it? .....

(42) The reciprocal of 4 1/7 is .....

(43) $382 + (75 \div 5) - 29 =$ .....

(44) If $f(b) = 2b^2$, $f(b) = 32$, $b > o$, $b =$ .....

(45) A rectangular prism measures 12″ × 5″ × 5″. Its volume is ..... cu. in.

(46) Its surface area is .....sq. in.

(47) If $x^{-2/3} = 4$, $x =$ .....

(48) The slope of the line containing the points (0, —3) and (2, 1) is .....

(49) The product of the roots of $-3x^2 + 5x - 2 =$ .....

*(50) $47182 + 4096 + 1286 + 596 =$ .....

(51) If $\tan A = 2$ and $\sec A > 0$, $\sec A =$ .....

(52) How many integers greater than one and less than 20 are relatively prime to 20? .....

(53) If a/11 has a remainder of 6 and b/11 has a remainder of 7, what is the remainder for ab/11? .....

(54) What is the probability that the sum of the dots is 7 if a pair of dice is tossed? .....

(55) How many two-digit integers can be written using the set {2, 3, 4} if no digit is repeated in a number? .....

(56) The median of 4, 5, 8, 2, 7, 1, 8 is .....

(57) If $\log_4 x = -\frac{1}{2}$, x = ...

(58) The domain of the relation {(1,0), (—3,2), (7,—4)} is .....{.....}.....

(59) If (—2 + i) + (4 — 7i) = a + bi, b = ...

*(60) The number of feet in 98 miles is .....ft.

(61) Solve for y: $\begin{matrix} 3x - y = 2 \\ x - 2y = -1 \end{matrix}$, y = ...

(62) The slope of a line parallel to 2x + 5y = 6 is .....

(63) The sum of the coefficients in the binomial expansion of $(2a + b)^4$ is .....

(64) If $2x^2 + 5x - 3 = 0$ and $x > 0$, x = ...

(65) If 75° = a π radians, a = ...

(66) How many elements are in the power set for {2, 8, 9, 10, 12}? .....

(67) The coefficient of the ab^3 term in the expansion of $(2a - 3b)^4$ is .....

(68) Change .41, base five, to a decimal in base ten. .....

(69) Find the center of the circle with equation $x^2 + 2x + y^2 - 4y = 16$; .....(.....,.....).....

*(70) 34078232 ÷ 69.2 = ...

(71) Evaluate the determinant $A = \begin{vmatrix} 3 & 4 \\ -2 & -1 \end{vmatrix}$ .....

(72) The slope of the line tangent to $y = 5x^3 - 3x$ at the point (1, + 2) is .....

(73) $\lim_{x \to o} \frac{3x^2 + 4x}{x} =$ .....

(74) The remainder when $f(x) = 5x^4 - 2x^3 + 3$ is divided by x + 1 is .....

(75) $\int_1^4 x^2 dx =$ .....

(76) If the vector r = (1, —2) and the vector s = (3, 5) then r + s = (a, b), b = ...

(77) If f(x) = 2x — 3, the inverse function $f^{-1}(x) = ax + b$ and a = ...

(78) If $F(x) = 3x^2 - 1$ and G(x) = 2, F(G(x)) = ...

(79) $\sum_{x=1}^{3} 4x^2 =$ .....

*(80) 180% of 56200 = ...

The University of Texas Interscholastic League

Number Sense Test, Series HH-4

Contestant's Number..... Contestant's Score.....

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Stop—Wait for Signal

(1) $9827 + 546 =$ .....

(2) $1304 - 285 - 96 =$ .....

(3) $283 \times 11 =$ .....

(4) $28^2 =$ .....

(5) $9 \times 72 + 9 \times 21 =$ .....

(6) $67 \times 73 =$ .....

(7) $725^2 =$ .....

(8) $7\,2/5 \times 3\,2/5 =$ .....

(9) 27% of 350 = ...

*(10) $45620 \times 58 =$ .....

(11) Change 310, base four, to base ten. .....

(12) The least common multiple of 87 and 54 is .....

(13) $12\frac{1}{2} + 31\,5/7 =$ .....

(14) $38.02 - 9.57 =$ .....

(15) $15\frac{3}{4} - 3\frac{1}{2} =$ .....

(16) The smallest prime factor of 377 is .....

(17) $\sqrt{841} =$ .....

(18) $832 \div 8 =$ .....

(19) $790 - n = 428$, $n =$ .....

*(20) $3074140 \div 547 =$ .....

(21) If 1 centimeter equals 0.39 inches, 13 inches = ...centimeters

(22) Oranges are 5 for 30 cents, at the same rate, one dozen will cost ..... cents.

(23) 4/7 of 4 feet 8 inches is .....inches.

(24) 1/40 is .....%.

(25) $(7 \times 28) + (3 \times 36) =$ .....

(26) What is the total cost of 3 cans at 68 cents each and 4 cans at 93 cents each? $.....

(27) The larger of .9 and 6/7 is .....

(28) $4^4 =$ .....

(29) When 2741 is divided by 11 the remainder is .....

*(30) $(10074)^2 =$ .....

(31) The ratio of 10 inches to 3 feet 4 inches is .....

(32) The next number in the sequence 4, 8, 13, 19, 26, 34, . . . is .....

(33) Write the value of the repeating decimal $.\overline{407}$ as a fraction. .....

(34) $(63_{seven}) \times (5_{seven}) =$ .....seven

(35) If $12\frac{1}{2}$ pesos equals one dollar, 70 pesos = ...dollars.

(36) $4164 \div 12 =$ .....

(37) What is the area of a circle with diameter of 5 inches? (use pi = 22/7) .....sq. in.

(38) If $\frac{3}{4} = \frac{x-1}{2}$, $x =$ .....

(39) The median for 98, 96, 100, 101, 90, 97 is .....

*(40) $\sqrt{780423} =$ .....

(41) The distance between the points (3, —1) and (3, 0) is .....

(42) If $f(x) = 6 + |x|$, $f(-4) =$ .....

(43) The smallest number of $0.4\overline{5}$, $0.\overline{45}$, $0.\overline{454}$ is .....

(44) $(0.5)^3 =$ .....

(45) If a/7 and b/7 each give a remainder of 4, what is the remainder for ab/7? .....

(46) $(342_{six}) - (53_{six}) =$ .....six

(47) If $x^2 - 3x = 4$ and $x > 0$, $x =$ .....

(48) If the sum of three consecutive integers is 93, the largest is .....

(49) $(-12) \times (6 + -12) =$ .....

*(50) $314 + 2782 + 8147 + 32797 =$ .....

(51) The surface area of a cube with edge 4 inches is .....sq. in.

(52) If $2x/3 - 2 \leq 4$, the largest value of x is .....

(53) The coefficient of the y^6x term in the binomial expansion of $(y^2 - 2x)^4$ is .....

(54) What is the probability of obtaining two sevens if two cards are drawn from a deck of 52 and the first card is not replaced?

.....

(55) If the sales tax (5%) on an item is \$3.75, the total cost of the the item is \$.....

(56) If $-4x^2 + 2x + 3 = 0$, the sum of the roots is .....

(57) The slope of the line $-3y + x = 4$ is .....

(58) Solve for x: $\begin{matrix} x - 3y = 2 \\ 2x - y = 1 \end{matrix}$, x = ...

(59) $9^{\frac{1}{2}} - 9^{-\frac{1}{2}} =$ .....

*(60) $(12.8 \times 314.80) \div .02 =$ .....

(61) The sum of the coefficients in the binomial expansion of $(x + 3y)^3$ is .....

(62) If the cos A = ⅓ and sin A > o, sin A = $a\sqrt{b}$, b = ...

(63) If $2^x = 4^{2x-1}$, x = ...

(64) The slope of the line containing the points (0, —2) and (4, 3) is .....

(65) How many two member committees can be formed from a group of 5 people? .....

(66) If $\log_3 x = -2$, x = ...

(67) The domain of the relation {(—4,4), (2,—2), (0,1)} is .....{.....}.....

(68) $(3 - 2i)(3 + 2i) =$ .....

(69) In how many ways can all three of the integers 2, 4, 6 be written exactly once in a line? .....

*(70) $20 \times 21 \times 22 \times 23 =$ .....

(71) The slope of a line perpendicular to $2y - 6x = 3$ is .....

(72) $681 - (74 \times 8) + 92 =$ .....

(73) The slope of the line tangent to $y = x^2 - 4$ at the point (3, 5) is .....

(74) The remainder when $f(x) = 3x^3 - 2x + 4$ is divided by $x - 1$ is .....

(75) If $f(x) = x + 3$, the inverse function $f^{-1}(x) = ax + b$ and b = ...

(76) $\int_0^2 x^3 dx =$ .....

(77) $\lim_{x \to 1} \frac{x^2 - 1}{x - 1} =$ .....

(78) The additive inverse of the vector (3, —7) is ....(.....,.....)..

(79) If the matrix A = [2, 3, 4] and the matrix $B = \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}$, AB =

.....

*(80) How many 8″ × 8″ tiles will it take to cover a 12′ × 12′ room? .....

The University of Texas Interscholastic League

Number Sense Test, Series HH-5

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 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 star (*) 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.

Person conducting contest should explain these directions carefully to the contestants.

Stop—Wait for Signal

(1) $8107 + 275 =$ .....

(2) $90286 - 79248 =$ .....

(3) $393 \times 81 =$ .....

(4) $8127 \div 27 =$ .....

(5) $32 + 183 + 54 - 38 =$ .....

(6) $(12 \times 45) - 9 =$ .....

(7) Change 350, base seven, to base ten; .....

(8) $11 \times 4983 =$ .....

(9) $\sqrt{729} =$ .....

*(10) $34562 + 10479 + 83793 + 21706 =$ .....

(11) $1\frac{1}{6} \div 2\ 7/9 =$ .....

(12) $11^3 =$ .....

(13) The average of 51, 46, and 74 is .....

(14) $9\frac{2}{3} \times 5\frac{2}{3} =$ .....

(15) 32 is what percent of 40? .....%.

(16) $4^2 + 3^3 =$ .....

(17) If a 12 oz. package of salami sells for 69¢, at the same rate, one pound will cost $ .....

(18) The greatest common divisor of 272 and 96 is .....

(19) If $\frac{2}{3}x - 3 = x + 2$, x = ...

*(20) $2^{15} - 2^3 =$ .....

(21) If $12\frac{1}{2}$ pesos equals one dollar, 80 pesos = ...dollars.

(22) $(.5)^3 - (.3)^2 =$ .....

(23) The sum of the distinct prime divisors of 198 is .....

(24) If 1 inch equals 2.54 centimeters, 127 centimeters = ... inches.

(25) The area of a trapezoid with altitude 5 and sides 7 and 9 is .....

(26) When 3412 is divided by 11 the remainder is .....

(27) $2.16 \div .9 =$ .....

(28) The reciprocal of 4 3/7 is .....

(29) The larger of .11 and 3/25 is .....

*(30) $643210 \times 974 =$ .....

(31) The median of 31, 29, 37, 36, 39, 28 is .....

(32) The distance between (3, 2) and (4, 6) is $\sqrt{a}$, a = ...

(33) $(32_{six}) \div (5_{six}) =$ .....six

(34) 125% of 128 is .....

(35) If $\frac{3}{4}x + 2 \leq 14$, the largest value of x is .....

(36) If $f(x) = 4x^2 - 3x + 2$, $f(-3) =$ .....

(37) What is the probability of drawing a black eight if one card is drawn from a deck of 52 cards? .....

(38) $4^2 \times 4^n = 2^8$, n = ...

(39) Six times a certain number decreased by 9 is 57. The number is .....

*(40) $\sqrt{410298} =$ .....

(41) Solve for x $\begin{matrix} x - 3y = 4 \\ x + 2y = 3 \end{matrix}$ x = ...

(42) If the odds that it will rain are 4 to 3, what is the probability that it will rain? .....

(43) Write the value of the repeating decimal $.6\overline{24}$ as a fraction; .....

(44) If $f(x) = 4|x| - 5$, $f(-3) =$ .....

(45) The sum of the roots of $\frac{2}{3}x^2 - \frac{4}{5}x + 1/7 = 0$ is ....

(46) The slope of the line containing the points (5, 4) and (1, —3) is .....

(47) $-8 \times (47 - 91) =$ .....

(48) 4/7 of 9 feet 4 inches is .....inches.

(49) If a/17 has a remainder of 13 and b/17 has a remainder of 5, the remainder of ab/17 is .....

*(50) $27 \times 28 \times 29 \times 30 =$ .....

(51) How many integers greater than one and less than 18 are relatively prime to 18? .....

(52) If csc A = 7 and cot A > o, cot A = $a\sqrt{b}$, a = ...

(53) What are the adds of obtaining exactly one head when two coins are tossed? .....

(54) If $\log_3 x^2 = 4$ and x > o, x = ...

(55) The range of the relation {(—1, 2), (1, —3), (4, 5), (6, 3)} is .....{.....}.....

(56) If $3x^2 + 3x + k = 0$, find k so that the solution set for the equation will contain only one number. .....

(57) The slope of the line containing the points (—2, 3) and (2, —3) is .....

(58) In how many ways can three children be seated in six seats in a row? .....

(59) The radius of a circle whose area is 12π is $a\sqrt{b}$, and b = ...

*(60) 4118400 feet = ...miles

(61) The surface area of a cube with edge 7 inches is .....sq. in.

(62) The volume of the cube is ..... cu. in.

(63) $(5 - i)^2 = a + bi$, b = ...

(64) The sum of the coefficients in the expansion of $(6x - 4y)^5$ is .....

(65) The slope of the line perpendicular to $\frac{4}{5}y - \frac{2}{3}x + 4 = 0$ is .....

(66) 5/6 π radians = ...degrees.

(67) Change 0.32, base five, to a decimal in base ten; .....

(68) The coefficient of the $x^3 y^6$ term in the expansion of $(x - 3y^2)^6$ is .....

(69) Find the center of the circle with equation $x^2 - 4x + y^2 + y = 14$; .....(.....,.....).....

*(70) $29^3 - 89$ = ...

(71) Change 37, base eight to base three. .....three.

(72) Evaluate the determinant $A = \begin{vmatrix} -2 & -3 \\ 4 & 5 \end{vmatrix}$; .....

(73) $\lim_{x \to 3} \frac{2x^2 - 18}{3 - x}$ = ...

(74) The slope of the line tangent to $y = 3x^4 - 2x$ at the point (2, 44) is .....

(75) $\int_1^3 2x^2 dx$ = ...

(76) If $G(x) = 2x^3 - 1$, $F(x) = 3$, $G(F(x))$ = ...

(77) If $f(x) = 2 - 3x$, the inverse function $f^{-1}(x) = ax + b$ and a = ...

(78) The remainder when $f(x) = 3x^5 - 4x^2 + 3x$ is divided by $x + 1$ is .....

(79) If the matrix A = [—1, 0, 3] and the matrix $B = \begin{bmatrix} 2 \\ 1 \\ 4 \end{bmatrix}$, AB = ...

*(80) $19(23^3 + 23^2 + 4)$ = ...

The University of Texas Interscholastic League

Number Sense Test, Series HH-6

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 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 star (*) 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.

Person conducting contest should explain these directions carefully to the contestants.

Stop—Wait for Signal

(1) $478 + 23 + 309 =$.....

(2) $747 \times 9 =$.....

(3) $407 - 376 - 438 =$.....

(4) $(7 \times 18) + (8 \times 26) =$.....

(5) $6\frac{5}{8} + 7\frac{3}{8} =$.....

(6) $1574 \div 12 =$.....

(7) $23 \times 65 =$.....

(8) $\sqrt{32400} =$.....

(9) $1\frac{7}{8} \times 9\frac{3}{4} =$.....

*(10) $478 + 219 + 34628 + 458915 =$.....

(11) $11 \times 493 =$.....

(12) $6^3 =$.....

(13) $5\frac{3}{8} \div 2\frac{1}{6} =$.....

(14) Change 450, base ten, to base nine; .....nine

(15) If $x - 5 = 3 - 2x$, $x =$.....

(16) The mean (average) of 29, 18 and 43 is .....

(17) $5^3 - 4^3 =$.....

(18) Seven jars containing $1\frac{1}{2}$ pints each = ...qts.

(19) $(7.2 + 6.4) \div 0.04 =$.....

*(20) $48 \times 49 \times 50 \times 51 =$.....

(21) Four times a certain number decreased by seven is 29. The number is .....

(22) 16% of 220 is .....

(23) If a 12 oz. package of cheese sells for 93¢, at the same rate, one pound will cost $.....

(24) $(925)^2 =$.....

(25) $(45_{eight}) - (27_{eight}) =$.....eight

(26) The least common multiple of 182 and 18 is .....

(27) If $12\frac{1}{2}$ pesos equals one dollar, \$14 = ...pesos.

(28) $(.07)^3 =$.....

(29) The number of distinct prime divisors of 396 is .....

*(30) $\sqrt{89124} =$.....

(31) What is the probability that the sum of the dots on the faces is 8 when a pair of dice is tossed? .....

(32) The distance between the points (4, 3) and (0, 1) is a $\sqrt{b}$, and $b =$.....

(33) The largest number of $.8\overline{23}$, $.\overline{823}$, .824 and $.82\overline{3}$ is .....

(34) If $-x + 3 \leq 2x + 4$, the smallest value of x is .....

(35) If 1 centimeter equals 0.39 inches, 5 meters = ...inches.

(36) $\frac{3}{4}$ of 7 ft 6 in is .....inches.

(37) If the sides of an equilateral triangle are 6", the area of the triangle is .....sq. in.

(38) If $f(x) = 3x^2 - 4x$, $f(-2) =$.....

(39) How many ways can some 3 of 6 people be seated in 3 chairs in a row? .....

*(40) $(21660 \div 570) \times 30 =$.....

(41) The negative reciprocal of $-2\frac{7}{8}$ is .....

(42) $3^2 + 4^{-\frac{1}{2}} =$.....

(43) 50% of .9 = ...

(44) The slope of the line $6y - 4x = 7$ is .....

(45) Solve for x: $\begin{aligned} 3x - 2y &= 4 \\ 2x + y &= 5 \end{aligned}$ .....

(46) Assuming boys and girls are born with equal frequency, what are the odds in favor of having three boys in a three-child family?

.....

(47) If $2x^2 - 3x + k = 0$, find k so that the solution set of the equation contains one number. .....

(48) What is the probability of drawing two queens if two cards are drawn, without replacement, from a deck of 52? .....

(49) If $f(x) = 2|x| - 3$, $f(-4) =$.....

*(50) The number of feet in 78 miles is .....ft.

(51) If b/13 has a remainder of 5 and c/13 has a remainder of 6, the remainder for bc/13 is .....

(52) If $\log_x \frac{1}{4} = -\frac{1}{2}$, x = ...

(53) The median of 21, 24, 18, 19, 17, 22 is .....

(54) $5^x \times 5^2 = 5^6$, x = ...

(55) The radius of a circle whose circumference is 32π is .....

(56) How many 3 member committees can be formed from a group of 7 people? .....

(57) If sec A = 4, tan A > o, tan A = ...

(58) $47\frac{1}{3} - 19\frac{5}{6}$ = ...

(59) The conjugate of 5 — 3i is .....

*(60) $(27890)^2$ = ...

(61) The center of the circle with equation $x^2 + 6x + y^2 - 4y = 20$ is (a, b) and a = ...

(62) The domain of the relation {(1, 0), (—2, 1), (3, 4), (7 ,8)} is .....{.....}.....

(63) The coefficient of the x term in the expansion of $(x - 3)^4$ is .....

(64) 7 π radians = ...degrees.

(65) How many elements are there in the power set for {a, b, c, d, e, f}? .....

(66) Change 0.23, base four, to a decimal in base ten. .....

(67) The slope of the line perpendicular to 5x — 3y = 4 is .....

(68) The sum of the coefficients in the binomial expansion of $(5x - 3y)^4$ is .....

(69) If $3x^2 - 2x - 1 = 0$ and x > 0, x = ...

*(70) $\sum_{k=1}^{8} (2k^2 - k)$ = ...

(71) Evaluate the determinant $A = \begin{vmatrix} 4 & -2 \\ 3 & 4 \end{vmatrix}$; .....

(72) Change 41, base five, to base four; .....four.

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

(74) The slope of the line tangent to $y = 3x^3 - 4x^2$ at the point (1, —1) is .....

(75) The remainder when $f(x) = 4x^5 - 3x^4 - 2x + 3$ is divided by x — 1 is .....

(76) If $f(x) = 4x^3 - 3$ and $g(x) = 2$, $f(g(x))$ = ...

(77) If $f(x) = \frac{2}{3}x - 4$, the inverse function $f^{-1}(x) = ax + b$ and a = ...

(78) $\int_1^3 2x^3 dx$ = ...

(79) If the matrix A = [2, 0, —1] and the matrix $B = \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix}$ AB = ...

*(80) 91 (278 + 1342) = ...

The University of Texas Interscholastic League

Note: If error is found in this key, grading should be done by correct answer. The state office will appreciate a report of any error found.

Key to Number Sense Test Series HH-1

1. 4038
2. 9801
3. 128
4. 454
5. 84
6. 1739
7. 23
8. 729
9. 5016
*10. 137180-151620
11. 178
12. 10/91
13. 71/60 or 1 11/60
14. 57.68
15. 2
16. 664225
17. 9
18. $3.50
19. 343 seven
*20. 235866-260694
21. 39¢
22. 56
23. 12500 mm.
24. 80%
25. 6561
26. 45
27. 2/3
28. 3/8
29. $16.10
*30. 39216-43344
31. 7/8
32. 181/99
33. 3
34. 332 five
35. 11
36. 225 pesos
37. 31 3/7 or 220/7
38. 5/36
39. 64
*40. 941-1039
41. 2
42. 9
43. 20/3 or 6 2/3
44. 0.258
45. –4/5
46. 62.8
47. 6
48. $0.3\overline{4}$
49. 12 seven
*50. 2028820-2242380
51. –2
52. 5.5% or 5 1/2%
53. 3/2 or 1 1/2
54. 2
55. 5–5i
56. 24
57. –4/3 or –1 1/3
58. 216
59. 30.48 cm.
*60. 8778-9702
61. 11–60 i
62. (1, –3)
63. 5/3 or 1 2/3
64. 240°
65. 30
66. .375
67. 3/4
68. 81
69. $\{2,4,8\}$
*70. 932976-1031184
71. 26
72. 3
73. 3
74. 60
75. 123 five
76. 92
77. 3/2 or 1 1/2
78. 2
79. 5
*80. 399-441

Key to Number Sense Test Series HH-2

1. 9041
2. 2356
3. 35
4. 324
5. 896
6. 49
7. 280
8. 8342
9. 18
*10. 303314-335241
11. 1/15
12. 3/8
13. 8.94
14. 29
15. 9/500
16. 5 1/12
17. 42812
18. 420
19. 6 lbs
*20. 209-230
21. 680625
22. 250
23. 8/27
24. 39
25. 5/19
26. 75%
27. 3/8
28. 350 pesos
29. 7
*30. 30554-33770
31. 223 seven
32. 3
33. 52
34. $\sqrt{13}$
35. 15
36. 79
37. $0.\overline{757}$
38. 39/16 or 2 7/16
39. 1
*40. 13,768,587
15,217,911
41. –3/128
42. 241/333
43. 1
44. $20\sqrt{3}$
45. 0
46. $25
47. 9
48. –2/5
49. 1/4 or 1 to 4
*50. 601920-665280
51. 8
52. 5/2 or 2 1/2 or 2.5
53. 2
54. 20
55. 3
56. 36 32/35 or
1292/35
57. 35
58. 16/7 or 2 2/7
59. 2
*60. 2813748-3109932
61. 3
62. $\{-2,3\}$
63. –1
64. 17
65. 11/9
66. 3 or three
67. .875
68. 16
69. 270
*70. 167-183
71. 122 three
72. –6
73. –2
74. 243/5 or 48 3/5
75. 33
76. 1/3
77. 8
78. –2
79. 13
*80. 244-268

Key to Number Sense Test Series HH-3

1. 208
2. 1652
3. 37 2/9
4. 361
5. 540
6. 1591
7. 343
8. 3735
9. 56
*10. 456743 - 504821
11. 31
12. 35/17 or 2 1/17
13. 11/3 or 3 2/3
14. 706
15. 2204 five
16. 33/8 or 4 1/8
17. 6
18. 2/5 or .4
19. $5.95
*20. 59199475 - 65430997
21. 47003
22. 5.9
23. 22.86
24. $29.25
25. 3
26. 45/2 or 22 1/2 or 22.5
27. 5
28. 25/13
29. 11 4/7 gal.
*30. 214 - 236
31. 72 11/12 or 875/12
32. 38
33. 1
34. 89
35. 242/333
36. 20%
37. 1/13
38. 1
39. 5
*40. 249037 - 275251
41. 4/3 or 4 to 3
42. 7/29
43. 368
44. 4
45. 300 cu. in.
46. 290 sq. in.
47. 1/8
48. 2
49. 2/3
*50. 50502 - 55818
51. $\sqrt{5}$
52. 7
53. 9
54. 1/6
55. 6
56. 5
57. 1/2
58. $\{1, -3, 7\}$
59. –6
*60. 491568 - 543312
61. 1
62. –2/5
63. 81
64. 1/2
65. 5/12
66. 32
67. –216
68. .84
69. (–1, 2)
*70. 467837 - 517083
71. 5
72. 12
73. 4
74. 10
75. 21
76. 3
77. 1/2
78. 11
79. 56
*80. 96102 - 106218

Key to Number Sense Test Series HH-4

1. 10373
2. 923
3. 3113
4. 784
5. 837
6. 4891
7. 525625
8. 25 4/5 or 129/5 or 25.8
9. 94.5 or 94 1/2
*10. 2513662-2778258
11. 52
12. 1566
13. 44 3/14
14. 28.45
15. 12 1/4 or 12.25
16. 13
17. 29
18. 104
19. 362
*20. 5339 - 5901
21. 33 1/3 or 100/3 cm.
22. 72 cents
23. 32 in.
24. 2.5% or 2 1/2%
25. 304
26. $5.76
27. .9 or 9/10
28. 256
29. 2
*30. 96411203 - 106559749
31. 1 to 4 or 1/4
32. 43
33. 11/27
34. 441 seven
35. 5.60 dollars
36. 347
37. 275/14 sq. in. or
19 9/14 sq. in.
38. 5/2 or 2 1/2 or 2.5
39. 97.5 or 97 1/2
*40. 840 - 927
41. 1
42. 10
43. $0.\overline{454}$
44. 0.125
45. 2
46. 245 six
47. 4
48. 32
49. 72
*50. 41838 - 46242
51. 96 sq. in.
52. 9
53. –8
54. 1/221
55. $78.75
56. 1/2
57. 1/3
58. 1/5
59. 8/3 or 2 2/3
*60. 191399 - 211545
61. 64
62. 2
63. 2/3
64. 5/4 or 1 1/4
65. 10
66. 1/9
67. $\{-4,2,0\}$
68. 13
69. 6
*70. 201894 - 223146
71. –1/3
72. 181
73. 6
74. 5
75. –3
76. 4
77. 2
78. (–3,7)
79. –6
80. 308 – 340

Key to Numzer Sense Test Series HH-5

1. 8382
2. 11038
3. 31833
4. 301
5. 231
6. 531
7. 182
8. 54813
9. 27
*10. 143013 - 158067
11. 81/125
12. 1331
13. 57
14. 493/9 or 54 7/9
15. 80%
16. 43
17. $.92
18. 16
19. –15
*20. 31122 - 34398
21. 6.40 dollars
22. 0.035
23. 16
24. 50 in.
25. 40
26. 2
27. 2.4
28. 7/31
29. 3/25 or .12
*30. 595162213 - 657810867
31. 33.5 or 33 1/2
32. 17
33. 4 six
34. 160
35. 16
36. 47
37. 1/26
38. 2
39. 11
*40. 609 - 672
41. 17/5 or 3 2/5
42. 4/7
43. 103/165
44. 7
45. 6/5 or 1 1/5
46. 7/4 or 1 3/4
47. 352
48. 64 in.
49. 14
*50. 624834 - 690606
51. 5
52. 4
53. 1 or 1 to 1
54. 9
55. $\{2, -3, 5, 3\}$
56. 3/4
57. –3/2 or –1.5 or –1 1/2
58. 120
59. 3
*60. 741 - 819
61. 294 sq. in.
62. 343 cu. in.
63. –10
64. 32
65. –6/5 or –1 1/5
66. 150 degrees
67. .68
68. –540
69. (2, –1/2)
*70. 23085 - 25515
71. 1011 three
72. 2
73. –12
74. 94
75. 17 1/3 or 52/3
76. 53
77. –1/3
78. –10
79. 10
*80. 229235 - 253365

Key to Number Sense Test Series HH-6

1. 810
2. 6723
3. –407
4. 334
5. 14
6. 131 1/6
7. 1495
8. 180
9. 18 9/32 or 585/32
*10. 469528 - 518952
11. 5423
12. 216
13. 85/33 or 2 19/33
14. 550 nine
15. 8/3 or 2 2/3
16. 30
17. 61
18. 5 1/4 qt. or 21/4 qt.
19. 340
*20. 5697720 - 6297480
21. 9
22. 35.2
23. $1.24
24. 855625
25. 16 eight
26. 1638
27. 175 pesos
28. .000343
29. 3
*30. 284 - 313
31. 5/36
32. 5
33. 824
34. –1/3
35. 195 in.
36. 67 1/2 in. or 67.5 in.
37. $9\sqrt{3}$ sq. in.
38. 20
39. 120
*40. 1083 - 1197
41. 8/23
42. 9 1/2 or 19/2 or 9.5
43. .45
44. 2/3
45. 2
46. 1/7 or 1 to 7
47. 9/8 or 1 1/8
48. 1/221
49. 5
*50. 391248 - 432432 ft.
51. 4
52. 16
53. 20
54. 4
55. 16
56. 35
57. $\sqrt{15}$
58. 27 14/15 or 419/15
59. $5+3i$
*60. 738959495–816744705
61. –3
62. $\{1, -2, 3, 7\}$
63. –108
64. 1260 degrees
65. 64
66. .6875
67. –3/5
68. 16
69. 1
*70. 354 - 390
71. 22
72. 111 four
73. –6
74. 1
75. 2
76. 29
77. 3/2
78. 40
79. 4
*80. 140049 - 154791