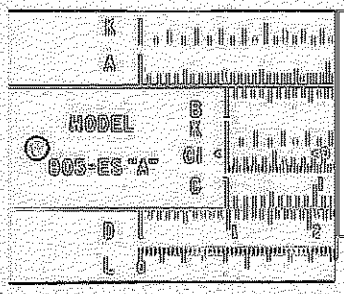


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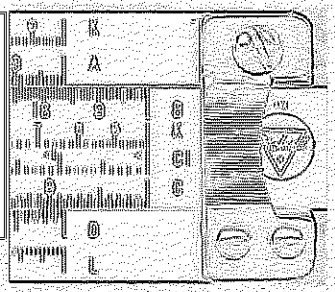
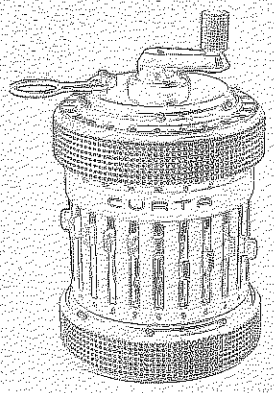
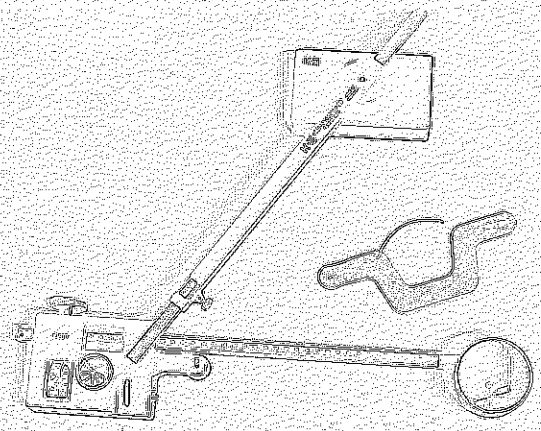
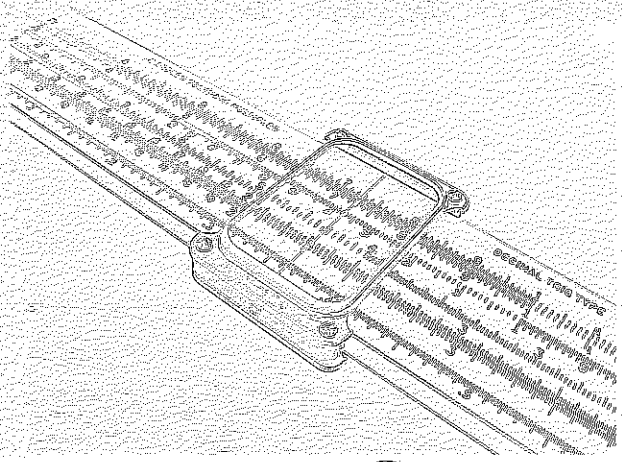
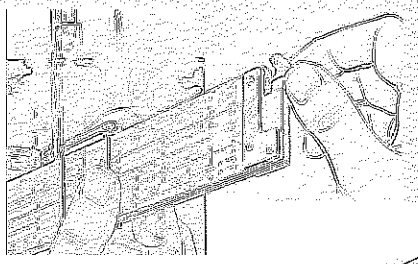


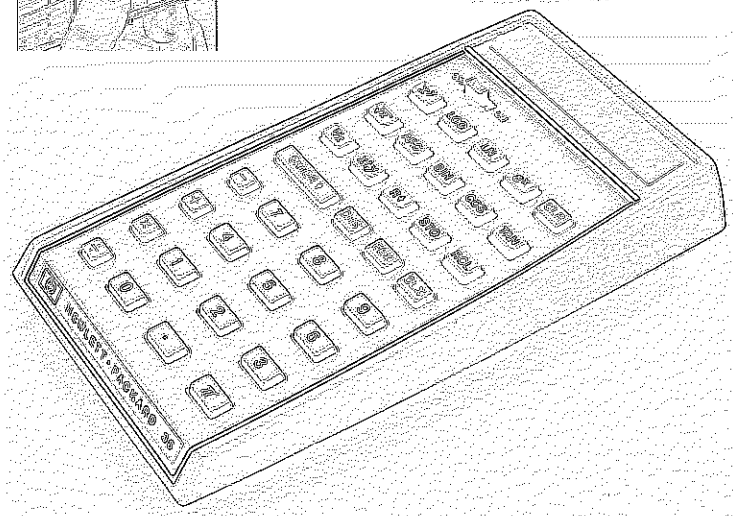
# *1970-71 UIL Number Sense*
# *(14 pages)*

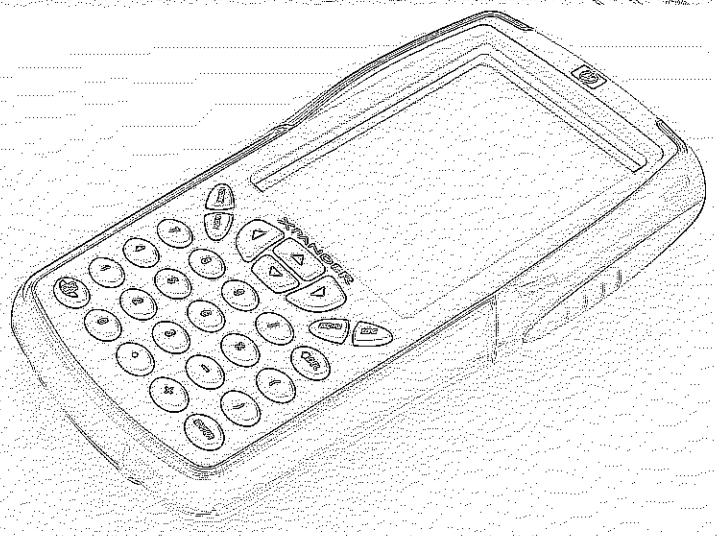


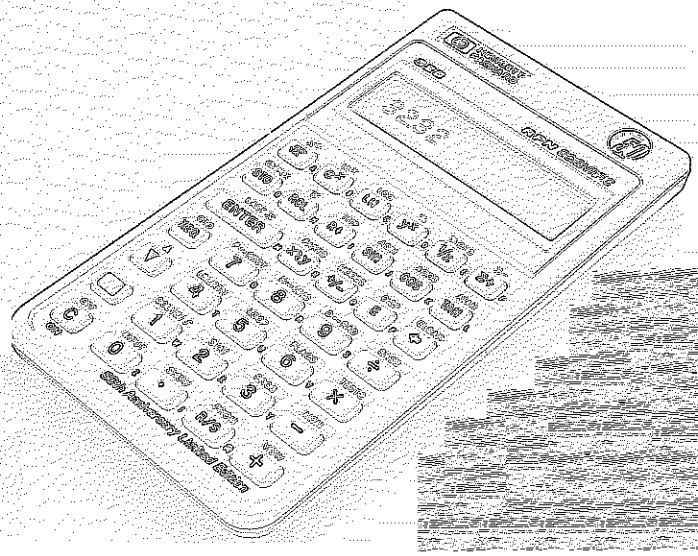



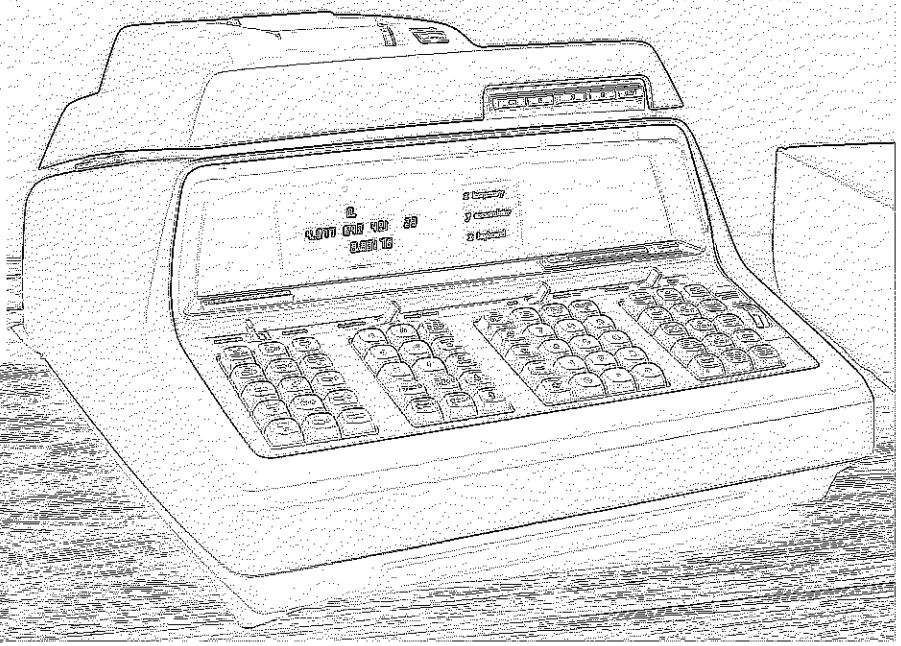




# The University of Texas Interscholastic League

# Number Sense Test, Series DD-1

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

**Read Directions Carefully Before Beginning Test**

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**Stop—Wait for Signal**

(1) $122 + 387 =$ .....

(2) $517 - 223 =$ .....

(3) $116 + 214 - 320 =$ .....

(4) $37 \times 43 =$ .....

(5) $12\frac{1}{2} \times 240 =$ .....

(6) $388 \div 16 =$ .....

(7) The positive square root of 2 28/36 = .....

(8) $15\frac{1}{8} - 10\frac{3}{8} + 4\frac{7}{8} =$ .....

(9) 42 sq. yd. = ..... sq. ft.

*(10) $256 \times 1492 =$ .....

(11) The interest on $40,000 for 5 yr. at $5\frac{1}{2}\%$ = $.....

(12) 72 = .....% of 6400?

(13) 176 = 5% of .....

(14) Change 101001101, base two, to base eight. .....

(15) The g. c. d. of 140 and 150 = .....

(16) The l. c. m. of 140 and 150 = .....

(17) 35 deg. = ..... min.

(18) $5^4 =$ .....

(19) The sum of the roots of $X^2 + X - 42 = 0$ is .....

*(20) The worth of $2\frac{1}{2}$ million barrels of oil at $5.50 per bbl. = $.....

(21) The product of the roots of $X^2 + X - 42 = 0$ is .....

(22) 247 days = ..... wk.

(23) If A = { 3, 4, 5 } , B = { 3, 4, 6 }, and C = { 4, 6, 8 } and U = {2, 3, 4, 5, 6, 7, 8, 9}, then A ∩ B ∩ C = {.....}.

(24) And (A∩ B) ∪ (A ∩ C) = {.....}.

(25) And A ∪ (B ∩ C) = {.....}.

(26) And the complement of B in U = {.....}.

(27) A shirt marked $5 was discounted 25% and then was discounted on the reduced price 20%. The final marked price was $.....

(28) How old is Tom if he is half as old as he will be in 10 years from now? .....yrs.

(29) Add 948, base eleven, to 436, base eleven, and give answer, base eleven. .....

*(30) The volume of a 39′ by 127′ by 321′ rectangular box is ..... cu. ft.

(31) Multiply 345, base six, by four, base six, giving product, base six. .....

(32) The probability that three heads will come up when three nickels are tossed is .....

(33) 20 unlike pairs of socks are put unpaired in a drawer. If I draw a sock, then another, what is the probability of my getting a matched pair? .....

(34) $150 \div 37\frac{1}{2} =$ .....

(35) 138 = ..... doz.

(36) $1 + 2 + 3 + 4 + 5 + 6 + 7 =$ .....

(37) The next term of 2, 3, 5, 7, 11, · · · is .....

(38) To which of 17/25, 25/36, 156/205 is 1092/1435 equal? .....

(39) $62\frac{1}{2}\%$ of 160 plus $66\frac{2}{3}\%$ of 360 = .....

*(40) $17{,}271 + 3256 + 18{,}923 + 9213 =$ .....

(41) $6\frac{2}{3} + 7\frac{1}{2} + 5\frac{1}{3} + 6\frac{1}{2} =$ .....

(42) Reduce to lowest terms: 105/161. .....

(43) The area of a rhombus with diagonals 19′ and 36′ is ..... sq. ft.

(44) The dollar value of 27 pesos at $12\frac{1}{2}$ to the dollar is ..... dollars.

(45) The number of subsets of { 3, 4, 5 } is .....

(46) The product of the l.c.m. and g.c.d. of 60 and 80 is .....

(47) Find the sum of all primes less than 18. .....

(48) If $X + Y = 17$ and $X - Y = 6$, the larger of X, Y is .....

(49) How many rational roots does the equation $X^2 + X + 1 = 0$ have? .....

(50) The length of a tangent to a circle of radius 5′ from a point 13′ from the center is ..... ft.

(51) How many positive integers are there which are less than 14 and relatively prime to 14? .....

(52) $16\frac{1}{8} + 5\frac{3}{4} + 4\frac{5}{8} + 2\frac{1}{2} =$ .....

(53) If $\log_6 N = 4$, then $N =$ .....

(54) Change 1021, base three, to base seven. .....

(55) Subtract 245, base six, from 1033, base six, and give answer, base six. .....

(56) Write as a common fraction: $0.727272 \cdots$ .....

(57) Write as a decimal: 7/250. .....

(58) At $12\frac{1}{2}$ to the dollar, 215 dollars = ..... pesos.

(59) The length of a line segment whose endpoints are (—1, —1) and (2, —2) is ..... units.

(60) If it is 59 miles from D to E, how long is 3 round trips? ..... ..... miles.

(61) If Y varies directly as the square of X and $Y = 4$ when $X = 3$, find Y when $X = 3/2$. .....

(62) Find the set of integers X, such that $3X - 2 > \frac{1}{4}$. .....

(63) $(6i + 4) - (2i - 3) + (5 - i) =$ .....

(64) $(4 - 3i)^2 =$ .....

(65) The center of the circle of equation $X^2 - 2X + Y^2 + 5Y = 3$ is (.....,.....).

(66) $\cos 30° + \csc 150° =$ .....

(67) The slope of the line passing through (2, 0) and (3, —2) is ..... .....

(68) The largest integer X such that $X^3 < 2000$ is .....

(69) $18 \times 92 + 70 \times 92 =$ .....

(70) The cost of sheetrocking the ceiling of a room, 14′ by 16′, at \$,20 per sq. ft. is \$.....

(71) $\frac{5}{6} \times 360 =$ .....

(72) $\sum_{K=1}^{3}(3K - 1) =$ .....

(73) The average of 21, 46, 72, 45 is .....

(74) If $\cot B = 4$ and $\sin B > 0$, then $\cos B =$ .....

(75) The largest positive value cos X can have is .....

(76) What is the value of $3X^2 - 4X + 2$ at $X = -2$. .....

(77) 340 deg. = ..... radians.

(78) The angle supplementary to 141° 17′ is .....°.....′.

(79) A box contains only 4 red balls and 3 green ones. What is the probability that the first two draws will be green (no balls are replaced)? .....

(80) What are the odds against getting two green balls in the above problem? .....

# The University of Texas Interscholastic League
# Number Sense Test, Series DD-2

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

**Read Directions Carefully Before Beginning Test**

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**Stop—Wait for Signal**

(1) $873 - 605 =$ .....

(2) $\$18.95 + \$4.73 + \$23.19 = \$$.....

(3) $121 \times 119 =$ .....

(4) $55{,}620 \div 27 =$ .....

(5) $9908 + 4026 + 5236 =$ .....

(6) $70.50 \div 75 =$ .....

(7) $3\frac{3}{4} + 6\frac{5}{8} =$ .....

(8) Change $66\frac{2}{3}\%$ to a fraction. .....

(9) How many bushels are there in 1600 quarts at 32 quarts per bushel? ..... bu.

*(10) What is the interest on $460,000 for two years 3 months when the rate is 5% per year? $.....

(11) $17^2 =$ .....

(12) Change 111 base eight to base two. .....

(13) If a 169 sq. ft. lot cost $1027, what is the cost per front foot if the lot is square? $.....

(14) What is the area of a rectangle whose altitude is 7.5 in. and whose base is 16 in.? ..... sq. in.

(15) 6 is what percent of 40? .....%.

(16) If U = {—7, —3, —1, 0, 2, 4, 5, 6}, A = {—3, 0, 2, 5}, B = {—1, 0, 2, 6}, C = { — 7, —1, 4, 6 }, and $\phi$ is the null set, find A $\cap$ B $\cap$ C. {.....}.

(17) Using the same sets, (B $\cap$ C) $\cup$ (A $\cap$ C) = {.....}.

(18) And the complement of B in U is {.....}.

(19) And (A $\times$ B) $\cap$ $\phi$ = .....

*(20) $\sqrt{46656} =$ .....

(21) What is the cost of a $14\frac{1}{2}$ lb. turkey at 65¢ a pound? $.....

(22) Find the greatest common divisor of 372 and 126. .....

(23) Find the least common multiple of 30 and 126. .....

(24) What is the sum of the roots of $5X^2 - 2X + 6 = 0$. .....

.....

(25) What is the product of the roots of $5X^2 - 2X + 6 = 0$. .....

.....

(26) Find the largest prime divisor of 428. .....

(27) Add 753 in base eight to 625 in base eight and give your answer in base eight. .....

(28) Multiply 243 in base five by 2 in base five and give your answer in base five. .....

(29) Divide 524 in base six by 4 in base six and give your answer in base six. .....

*(30) $34567 \times 217 =$ .....

(31) What is the larger root of $4X^2 - 2X - 3 = 0$? .....

(32) $\text{Log}_5\ 625 =$ .....

(33) How many dollars in 535 pesos at $12\frac{1}{2}$ pesos per dollar? ..... dollars.

(34) If two die are tossed what is the probability of the sum being eleven? .....

(35) If 3 black balls, 8 white balls, and 5 green balls are placed in a jar, what is the probability of drawing 2 white balls if 2 balls are drawn in succession without replacing any ball? .....

(36) If a team's probability of winning a game is 7/10, what is the expected ratio of the wins to the losses, with no ties? .....

(37) Find the average of 171, 33, and 36. .....

(38) Change 194, base eleven, to base four. .....

(39) $7\frac{1}{2} \div (-3\frac{3}{4}) =$ .....

*(40) $317^2 + 11 =$ .....

(41) $(2 - 5i)^2 =$ .....

(42) $\sqrt{289} =$ .....

(43) Find the smallest integer X, such that $(X/-2) + 5 < -4$. .....

.....

(44) If $F(X) = |3X - 1| + \frac{1}{2}X$, find $F(-4)$ .....

(45) Find the length of the line segment whose endpoints are (3, 4) and (2, —6). .....

(46) If Y varies inversely as the cube of X and Y = 8 when X = 2, find Y when X = 3. .....

(47) If $1/Z = X + Y^3$ and X = 3 and Y = —3, find Z.

(48) Write as a common fraction: 0.636363 · · · .....

(49) Write as a decimal: 11/16. .....

*(50) $\frac{1}{4} \times 32.16 \times 8 \times 8$. .....

(51) If the ratio of 6 to X is the same as the ratio of X to 5, find X.

.....

(52) What is the center of the circle whose equation is $Y^2 - 3Y + X^2 + 4X = 5$. (....., .....).

(53) How many inches is 23 yards? ..... in.

(54) Subtract 274 in base nine from 1361 in base nine and give your answer in base nine. .....

(55) If the sales tax is 4½% and a dress costs $15.98, what is the total price? $.....

(56) How many minutes from 2:13 pm to 7:41 pm? .....min.

(57) Find the value of K so that the slope of the line $6KX + 2Y = 1$ is $-2$. .....

(58) Reduce to lowest terms: 388/520. .....

(59) What is the altitude of an equilateral triangle whose sides are 6 in.? ..... in.

*(60) $22^3 + 52 =$ .....

(61) How many subsets of {a, b, c, d, e} are there? .....

(62) $\sin 60° - \tan 135° =$ .....

(63) [ X ] is defined to be the greatest integer less than or equal to X. What is [ −7 ]? .....

(64) $\sum_{T=1}^{3} (2T - 1)$ (This means put in T = 1, 2, 3, and add results).

.....

(65) Factor $Y^3 - Y$. .....

(66) Find the slope of the line passing through the points (0,5) and (−4, −4). .....

(67) If $\sin^2 Q = \frac{2}{3}$, find $\cos^2 Q$. .....

(68) What is the radius of a circle whose equation is $X^2 - 5X + Y^2 + 2Y = -4$. .....

(69) Of 500 people interviewed who drank soft drinks, 190 liked orange, 160 liked root beer, and 252 liked coke. If none liked exactly two of the drinks, how many liked all three? .....

(70) What is the coordinate of the midpoint of a line segment on the number line whose endpoints are −5/8 and 13/6? .....

(71) What angle is complementary to an angle whose measure is 65° 19′? .....° .....′.

(72) A fourth of six gallons is how many quarts? ..... qts.

(73) How many pesos are in 6.5 dollars at 12½ pesos per dollar?

..... pesos.

(74) $6^3 =$ .....

(75) What is the perimeter of a square whose area is 49?

..... units.

(76) How many radians in 210 degrees? ..... rad.

(77) Four times the square of a number equals 25 times the number. Find the smallest such number. .....

(78) The fraction $(X - 2)^3/(X + 1)$ equals which of $(2 - X)^3 (X + 1)$ or $-(2 - X)^3/(X + 1)$? .....

(79) $6\frac{2}{3} \times 5 - 3\frac{1}{3} \times 3 =$ .....

(80) If $2Y - 3X = 2$ and $Y + X = -1$, find X. .....

# The University of Texas Interscholastic League
# Number Sense Test, Series DD-3

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

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**Stop—Wait for Signal**

(1) $345 + 982 + 65 =$ .....

(2) $762 - 143 =$ .....

(3) $(196 \times 12) + (13 \times 196) =$ .....

(4) How much should I repay if I borrow $360 for 75 days at 10%? $ .....

(5) $\sqrt{1369} =$ .....

(6) $.5 \times 2.013 =$ .....

(7) $5\frac{1}{4} - 4\frac{7}{8} + 3\frac{1}{2} =$ .....

(8) 27 is what % of 72? ..... %.

(9) $4^6 =$ .....

*(10) $46{,}916 \div 77 =$ .....

(11) $1653 \div 29 =$ .....

(12) A used car was advertised at $250 down and the balance in 18 monthly payments of $40 each. What was the total cost of the car? $.....

(13) Change 1032, base four, to base two. .....

(14) What is the sum of the roots of $2X^2 + 5X - 3 = 0$? .....

(15) What is the product of the roots of $2X^2 + 5X - 3 = 0$? .....

(16) 3744 square inches is how many square feet? ..... sq. ft.

(17) If $U = \{0, 2, 4, 6, 9, 10\}$, $B = \{2, 6, 9, 10\}$, what is the complement of B in U? { ..... }.

(18) Find the greatest common divisor of 385 and 528. .....

(19) Find the least common multiple of 60 and 72. .....

*(20) $587 \times 5143 =$ .....

(21) Add 198 in base eleven to 756 in base eleven and give your answer in base eleven. .....

(22) Multiply 345 in base six by 4 in base six and give your answer in base six. .....

(23) If $A = \{2, 3, 5, 7\}$, $B = \{1, 3, 5, 7, 9\}$, and $C = \{0, 1, 2, 5\}$, find $(A \cap B) \cup (B \cap C)$. { ..... }.

(24) With the same A, B, C, $A \cup B \cup C =$ { ..... }.

(25) And, $B \cap (C \cup A) =$ { ..... }.

(26) Find X if $2X - Y = 4$ and $5X - 3Y = 10$. .....

(27) If $\log_{10} N = -3$, find N. .....

(28) If a 10 pound weight causes a spring to stretch 3 inches, what weight will cause a stretch of 5 inches? ..... lb.

(29) Find the set of integers X, such that $-2 < X < 1$ or $|X| = 3$. { ..... }.

*(30) $321 \times 154 =$ .....

(31) How many cubic inches in 10 cubic feet? ..... cu. in.

(32) What is the probability of rolling a four in a game of craps? .....

(33) Write as a common fraction: $0.212121 \cdots$ .....

(34) If $\log 3 = .4$, find $\log 81$. .....

(35) Subtract 34 in base five from 210 in base five and give your answer in base five. .....

(36) Find the product of the common factors of $(9X, 15XY, 2XY)$. .....

(37) What is the probability of drawing an ace in a single draw from a deck of cards? .....

(38) List the largest prime divisor of 175. .....

(39) $(4 - 3i) - (7 + 5i) =$ .....

*(40) How much will 5 thousand feet of ribbon cost if it sells for 7¢ a yard? $.....

(41) $3\sqrt{343} =$ .....

(42) Find the diameter of a circle whose area is $17\pi$. ..... units.

(43) Find the slope of the line which is perpendicular to the line $7X + 2Y = 9$. .....

(44) How many pesos in 48.50 dollars at 12½ pesos per dollar? ..... pesos.

(45) Write as a decimal: 9/800. .....

(46) $27 \times 8\frac{2}{3} =$ .....

(47) A shoe dealer buys shoes at \$6.50 a pair and sells them at \$9.25 a pair. How many pairs will he have to buy and sell in order to make \$550? .....

(48) Find the largest root of $X^2 + 6X - 6 = 0$. .....

(49) If $F(X) = X^x + 3X$, $G(X) = X - 1$, find $F(G(3))$. .....

(50) $(3i + 19)(7 - 4i) =$ .....

(51) In the equation $3X^2 - (3K + 4)X + 6K - 2 = 0$, find K so that the product of the roots is equal to 5. .....

(52) If the square of X varies directly with Y, annd $X = 3$ when $Y = 2$, find Y when $X = 9$. .....

(53) What is the next term of the sequence: 0, ½, ⅔, ¾, ⅘, ⋯ .....

(54) What is the center of a circle whose equation is $3X^2 - 2X + 3Y^2 + 6Y = 4$? (.....,.....).

(55) Change 1302 in base four to base five. .....

(56) Find the slope of the line which passes through the points (5, —6) and (3, 0). .....

(57) Find the average of 75, 39, 48, and 126. .....

(58) How many two letter "words" can be formed from 5 letters if repetition is permitted? .....

(59) Reduce to lowest terms: 456/834. .....

(60) The hypotenuse of a right triangle is 8 and one leg is $\sqrt{3}$; find the length of the other leg. ..... units.

(61) What is the length of the tangent to a circle from a point 12 feet from the center if the radius is 8 ft.? ..... ft.

(62) $\sum_{I=0}^{4} 3I =$ .....

(63) .01472 ÷ 0.23 .....

(64) $\cos^2 3\pi/2 =$ .....

(65) What angle is complementary to an angle whose measure is 73° 14′? .....° .....′.

(66) 5½ gallons is how many pints? ..... pts.

(67) [X] is defined to be the greatest integer less than or equal to X. What is $[-2\frac{3}{4}]$? .....

(68) Of 375 cars examined, 136 had tape players and 321 had radios. How many had both if each car had at least one of these? .....

(69) What is the radius of a circle whose center is (3, 4) and which passes through the point (1, —2)? ..... units.

(70) If $\tan A = 3$ annd $\cos A < 0$, find csc A. .....

(71) Sec 180° = .....

(72) In how many different ways can 5 people be seated at a round table? .....

(73) How many distinct roots does $X^2 - 7X + 2 = 0$ have? .....

(74) How many dollars in 250 pesos at 12½ pesos per dollar? ..... dollars.

(75) Find the mode (the number of greatest frequency) of 3, 4, 5, 2, 4, 7, 5, 4. .....

(76) What is the perimeter of a square whose diagonal is 4? ..... units.

(77) The sum of two numbers is 10 and their product is 24. Find the smaller of the numbers. .....

(78) How many minutes are there from 11:15 am to 4:46 pm? ..... min.

(79) How many degrees in $8\pi/15$ radians? ..... degrees.

(80) What is the Y-intercept of the line $AX + BY + T = 0$? .....

# The University of Texas Interscholastic League

# Number Sense Test, Series DD-4

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

**Read Directions Carefully Before Beginning Test**

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**Stop—Wait for Signal**

(1) $1318 + 865 =$ .....

(2) $208 - 359 =$ .....

(3) $\$28.37 + \$66.89 + \$43.65 = \$$.....

(4) $(237 \times 8) + (237 \times 12) =$ .....

(5) 25% of 9752 is .....

(6) Find the interest on \$240 for 60 da. at 7½%. \$.....

(7) Change 1,001,001 in base two to base eight .....

(8) At 12½ pesos per dollar, 432 dollars = ..... pesos.

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

(10) $\sqrt{784} =$ .....

(11) $29 \times 29 =$ .....

(12) $45.6 \div 57 =$ .....

(13) At 33⅓¢ per pound, 120 lb. bird seed costs \$.....

(14) Find the product of the roots of $7X^2 - 2X - 3 = 0$. .....

(15) The sum of the roots of $7X^2 - 2X - 3 = 0$ is .....

(16) If U = { —3, —2, —1, 0, 1, 2, 3, 4 }, A = { —2, 0, 3, 4 }, find the complement of A in U. { .....}.

(17) $.62\frac{1}{2} \times 240 =$ .....

(18) Find the radius of a circle of circumference of $9\pi$ in. ..... in.

(19) The least common multiple of 56 and 21 is .....

(20) The greatest common divisor, (g.c.d.), of 560 and 210 is .....

(21) $\text{Log}_7 49 =$ .....

(22) Add 236, base seven, and 65 in base seven and give answer in base seven. .....

(23) If 14 and 3 are each in base five, multiply and give answer in base five. .....

(24) Change 54 in base eight to base ten. .....

(25) $3\frac{1}{4} + 6\frac{1}{2} + 9\frac{3}{4} =$ .....

(26) $14\frac{1}{2} \div 3\frac{5}{8} =$ .....

(27) Find the probability of tossing on a single toss of one die a number less than 5. .....

(28) 6 white and 5 red balls are in a box; two balls are drawn in succession without replacing any ball. The probability of drawing two white ones is .....

(29) How many primes are between 120 annd 130? .....

(30) Find the average of 76, 58, 94 and 24. .....

(31) How many positive prime divisors does 78 have? .....

(32) Find the smaller root of $3X^2 - 5X + 2 = 0$. .....

(33) $(-5/8) - (-16/3) =$ .....

(34) $(4 - 3i) - (2 - 5i) =$ .....

(35) Find the smallest integer, X, such that $X/-3 + 2 < -5$. .....

(36) 3.6 is what percent of 80? .....

(37) Write as a common fraction: 0.05555 · · · .....

(38) The bill of \$6.72 included 5% sales tax. The bill without tax was \$.....

(39) If 6 tickets cost \$5.34, how much will 8 cost? \$.....

(40) $(6 - 5i)\ (i - 3) =$ .....

(41) If $\log_{10} 4 = .6$, and $\log_{10} 6 = .8$, then $\log_{10} 3/2 =$ .....

(42) If $F = (9/5)\ C + 32$ and $C = 75$, then $F =$ .....

(43) If Y varies inversely as the square of X and $Y = 5$ when $X = 3$, find Y when $X = 1$. .....

(44) Find the g.c.d. of $5^3 - 5$, $5^3 - 5^2$, and $5^2 - 1$. .....

(45) Find the g.c.d. of 0 and 36. .....

(46) If $1/R = 1/S + 1/T$ and $R = 6$, $T = 8$, find S. .....

(47) $(-3/2 + 7/12) \div (-2/5 + 3/8) =$ .....

(48) 5% of 80% = .....%.

(49) Find K in $2X^2 + (K - 3)X + 3K - 5 = 0$, so that the sum and products of the roots are equal. .....

(50) The distance between the points (6, 25) and (—1, 1) is ..... units.

(51) $\sqrt{1936} =$ .....

(52) Find K so that the points (K, 10), (4, 6) and (2, 8) lie on the same line. .....

(53) 780 sec. = ..... min.

(54) Find the center of the circle with equation $X^2 + 6X + Y^2 - 4Y = 8$. (.....,.....).

(55) Find the slope of the line through (—2, 6) and (4, 8). .....

(56) If $F(X) = \frac{1}{2}X + 1$, find $F(\frac{1}{2})$. .....

(57) How many committees of two members each can be formed from 5 people? .....

(58) Find the probability of drawing a heart from a deck of 52 bridge cards. .....

(59) If $\tan^2 A = 4$, find $\sec^2 A$. .....

(60) Cot 225° = .....

(61) What is the slope of the line $3X + Y = 4$? .....

(62) Change 34 in base six to base three. .....

(63) How many dollars at 12½ pesos to the dollar are 150 pesos? ..... dollars.

(64) Reduce to lowest terms: 156/324. .....

(65) 360 of 500 people interviewed watched program A while 295 watched program B. How many watched both if each person watched at least one? .....

(66) The number of subsets of {2, 4, 5, 6} is .....

(67) If R = {a, b, c}, T = {b, d, r, g}, X = {b, c, r, t}, then $R \cap (T \cap X) =$ {.....}.

(68) With the same R, T and X, $(R \cup T) \cap X =$ {.....}.

(69) Find the diagonal (radical) of a square whose area is 36. ..... units.

(70) If $F(X) = 3^x + 1$ and $G(X) = 2$, find $F(G(X))$ .....

(71) Find X if $3X - 2Y = 8$ and $X + Y = 1$. X = .....

(72) $85^2 =$ .....

(73) If the sum of two numbers is 7 and the sum of their squares is 25, the smaller of the numbers is .....

(74) Express 13/40 in decimal form. .....

(75) What is the next term in the sequence: 3, 7, 11, 15, 19, · · · .....

(76) $\sin^2 2\pi/3 + \cos^2 2\pi/3 =$ .....

(77) 3½ gallons is how many pints? ..... pts.

(78) The radius of the circle with equation $X^2 - 4X + Y^2 = -3$ is ..... units.

(79) 5 sq. yd. = ..... sq. ft.

(80) $3\pi/5$ radians = ..... degrees.

# The University of Texas Interscholastic League
# Number Sense Test, Series DD-5

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

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**Stop—Wait for Signal**

(1) $2103 + 839 + 1444 =$ .....

(2) $76 \times 3 =$ .....

(3) $123 - 56 =$ .....

(4) Find the interest on $900 for 6 months at 3%. $.....

(5) A clerk saves 15% of his salary. If he earns $300 a month, in how many years can he pay cash for a $8100 house? .....yr.

(6) $1/2 - 5/12 + 3/10 =$ .....

(7) $\sqrt{361} =$ .....

(8) $4131 - 8286 =$ .....

(9) Change 375, base eight, to base two. .....

*(10) $19{,}912 \div 76 =$ .....

(11) $7^4 =$ .....

(12) How many feet are in 16 rods at 16½ feet per rod? .....ft.

(13) $2.4 \times .125 =$ .....

(14) A farmer sold ⅝ of his potato crop for $60. At that rate, what did he get for the rest of his crop? $.....

(15) Find the g.c.d. of 123 and 205. .....

(16) Find the l.c.m. of 45 and 36. .....

(17) What is the area of a triangle whose base is 19 and altitude is 26? .....

(18) The sum of the roots of $2X^2 - 9X + 4 = 0$ is .....

(19) The product of the roots of $2X^2 - 9X + 4 = 0$ is .....

*(20) $83 \times 4907 =$ .....

(21) Your ball club won 80% of the games played and lost the others. If they played 15 games, they lost ..... games.

(22) Add 538, base nine, and 824, base nine, giving the sum in base nine. .....

(23) Find the product, base eight, of 447, base eight, and 7, base eight, .....

(24) If $U = \{-3, -2, -1, 0, 1, 3, 4\}$, $K = \{-3, -1, 3\}$, $G = \{-2, 0, 4\}$, $H = \{0, 1, 3, 4\}$, then $G \cup H =$ {.....}.

(25) And $K \cap G =$ {.....}.

(26) And $(K \cup H) \cap (K \cup G) =$ {.....}.

(27) And the complement of H in U is {.....}.

(28) If $\log_3 \sqrt{3} = X$, then $X =$ .....

(29) A picture 3 in. high by 5 in. wide is enlarged so that it is 12 inches wide. Its height is .....in.

*(30) $19^4 =$ .....

(31) $143\frac{3}{4} - 65\frac{5}{8} =$ .....

(32) Write as a common fraction: .3636 . . . .....

(33) Subtract 534, base six, from 1421, base six, and give the answer in base six. .....

(34) What is the probability of rolling a seven in a crap game? .....

(35) Give the g.c.d. of $X^2 - 4$ and $X^2 - 3X + 2$. .....

(36) What are the odds favoring obtaining two heads in a single toss of two coins? .....

(37) The largest prime between 130 and 140 is .....

(38) Find $\log_{10} 30$ if $\log_{10} 2 = .3$, $\log_{10} 3 = .5$ and $\log_{10} 5 = .7$. .....

(39) Find the larger root of $Y^2 - 4Y + 3 = 0$. .....

*(40) Find F(38) if $F(X) = 2X^2 - 4X + 1$. .....

(41) $(2i - 5) - (6 + 5i) =$ .....

(42) The square of a positive integer plus the number itself equals 56. The number is .....

(43) A fruit dealer purchased 8 crates of 150 oranges each at $5 a crate and sold the oranges at $.48 a dozen. His total profit was $.....

(44) Write as a decimal: 3/125. .....

(45) $T^2$ varies inversely with S and $T = 3$ when $S = 5$. Find S when $T = 2$. .....

(46) In the equation $X^2 + (K - 2)X - 2K + 1 = 0$, find K so that the sum of the roots equals 4. .....

(47) $(7 - 4i)(-3i + 2) =$ .....

(48) Find the length of the line segment whose end points are (3, 2) and (−1, 5) .....

(49) The slope of the line $2X + 4Y = 3$ is .....

*(50) How much will 7 million eggs cost at $.59 a dozen? $.....

(51) $\sqrt[3]{512} =$ .....

(52) $13 \times 8\frac{2}{3} =$ .....

(53) What is the dollar value of 128 pesos at $12\frac{1}{2}$ pesos per dollar? ..... dollars.

(54) Find the center of a circle with equation $X^2 - 9X + Y^2 + 5 = 6$. (.....,.....).

(55) If $F(X) = (\log_2 X) + 7X$, find $F(8)$. .....

(56) Find the next term of: 1, 2, 4, 7, 11, 16, . . . .....

(57) The radius of the circle with circumference $22\pi$ is .....

(58) The average of 135, 276, 198 is .....

(59) $(-5/8 \div 4/-5)\ (128) =$ .....

(60) Change 172, base nine, to base five. .....

(61) Find the slope of the line through (3, 4) and (2, —5) .....

(62) 40 hours = ..... sec.

(63) If $\csc^2 A = 5$, find $\tan^2 A$. .....

(64) If $\cos B = \frac{2}{3}$ and $\tan B > 0$, find $\sin B$. .....

(65) How many different three-member committees can be formed from six members? .....

(66) Reduce to lowest terms: 234/522 .....

(67) Find the midpoint of the line segment whose end points are (2, 3) and (1, 4). (.....,.....).

(68) $\sum_{K=1}^{3} K^2 =$ .....

(69) The side of a right triangle opposite a 45° angle is 4. The hypotenuse is .....

(70) What is the radius of the circle with equation $X^2 - 3X + Y^2 + 7Y - 1 = 0$? .....

(71) What is the largest possible value of $\sin X$? .....

(72) A sixth of four feet = ..... in.

(73) The area of the square of perimeter 15′ is ..... sq. ft.

(74) Find X if $X^2 - 3X + Y = 0$ and $X^2 + Y = 3$. .....

(75) Find the median for 18, 13, 12, 14, 12, 11, 16, 15, 21. .....

(76) How many subsets are there for a set of nine elements? .....

(77) $\frac{2}{3}$ of $\frac{5}{6}$ of 30 = .....

(78) The distance from (1, 3) to (3, 1) is .....

(79) Let $0 \leq A \leq 180°$ and $\sin A = \sqrt{2}/2$. A's largest value is .....°.

(80) The angle supplementary to 133° 27′ is .....°.....′.

# The University of Texas Interscholastic League
# Number Sense Test, Series DD-6

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

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**Stop—Wait for Signal**

(1) $796 + 548 =$ .....

(2) $5376 - 4617 =$ .....

(3) If 6% of X is 21, what is X? .....

(4) What is the interest on \$720 for 3 months at 5½%? \$.....

(5) Change 1001101, base two, to base four. .....

(6) $287.2 - 149.9 =$ .....

(7) $8\ 3/5 + 12\ 5/6 + 7\ 9/10 =$ .....

(8) How many dollars in 525 pesos at 12½ pesos per dollar? ..... dollars.

(9) $\sqrt{1024} =$ .....

*(10) $7^5 =$ .....

(11) $24.79 \div 67 =$ .....

(12) 19 qt. = ..... gal.

(13) Find the diameter of a circle whose area is $36\pi$ ..... units.

(14) Find the g.c.d. of 52, 68, and 100. .....

(15) Find the g.c.d. of 96 and 156. .....

(16) 17 weeks is equal to how many days? ..... days.

(17) If U = {—2, —1, 0, 2, 4, 6}, A = {—2, 2, 4, 6}, and B = {—2, —1}, then the complement of A in U = {.....}.

(18) And A ∩ B = {.....}.

(19) How many subsets does A have? .....

*(20) How long will it take to drill a well that is to be 12,600 feet deep at 16⅔ minutes per foot? .....min.

(21) What is the product of the roots of $5X^2 - 3X = 4$? .....

(22) What is the sum of the roots of $5X^2 - 3X = 4$? .....

(23) $\text{Log}_3\ 81 =$ .....

(24) If X divides Y and each is positive, the g.c.d. of X, Y is ..... .....

(25) Add 376, base nine, and 845, base nine, and give the answer in base nine. .....

(26) Multiply 342, base six, by 4, base six, giving answer in base six. .....

(27) Change 2012, base three, to base seven. .....

(28) Find the average of 176, 47, 98. .....

(29) $5\ 7/12 - 3\ 1/4 =$ .....

*(30) $987 \times 426 =$ .....

(31) If tickets cost \$1.75 each, what will 13 cost? \$.....

(32) Find the largest integer, X, such that $X + (-1/2) < 3/2$. ..... .....

(33) $(-3 + 5i) - (7 + 2i) =$ .....

(34) What is the probability of tossing on a single throw of one die either an even number or a number less than 3? .....

(35) A jar contains 7 red balls, 3 black ones, and 5 white ones. If 2 balls are drawn in succession without replacing any, what is the probability of drawing 2 red ones? .....

(36) How many primes are there between 80 and 90? .....

(37) Find the largest prime divisor of 612. .....

(38) Find the larger root of $4X^2 - 7X + 3 = 0$. .....

(39) $1½ \div 22½ =$ .....

*(40) $8976 + 3795 + 5628 + 23{,}872 =$ .....

(41) A dress marked \$8.00 was discounted 15%. The sales tax was then 5%. The final price was \$.....

(42) If $\log_b 6 = ½$, find b. .....

(43) If $2^{x^2-x} = 64$, find a positive value of X. .....

(44) If $F(X) = |X| - X$, find $F(-2)$. .....

(45) If $F(X) = X^2$, $G(X) = 3$, and $H(X) = 1$, then $F(G(X)) + H(X) =$ .....

(46) If $1/X = (1 + R/S) \div (R + S)$, R= 2, and S = 4, then X = .....

(47) If the ratio of 14 to 5 is the same as that of 29 to X, then X = .....

(48) Find the l.c.m of $X^3 - X$, $X^3 - X^2$, $X^2 - 1$. .....

(49) If log 5 = .6, log 7 = .8, what is log 1225? .....

*(50) $107{,}246 \div 38 =$ .....

(51) In the equation $3X^2 + (K - 2)X + 2K - 7 = 0$, find K so that the sum of the roots equals twice their product. .....

(52) Subtract 37, base eight, from 214, base eight, giving the answer in base eight. .....

(53) Find the length of the line segment whose end points are (1, 3) and (5,—2). ..... units.

(54) Find the slope of the line which is perpendicular to the line tangent to the circle, $X^2 + Y^2 = 16$ at $(3, \sqrt{7})$. .....

(55) The side of the equilateral triangle with height 3″ is .....in.

(56) The volume of a cube of edge 4 in. is .....cu. in.

(57) 749 months = .....yr.

(58) The center of the circle with equation $2X^2 - 5X + 2Y^2 + 3Y = 9$ is (.....,.....)

(59) The slope of the line with equation $5Y - 4X = 6$ is .....

*(60) $3789 + 2941 + 17{,}862 - 4312 =$ .....

(61) Allowing no repetition of letters, how many three letter "words" can be made from the set {a, e. i, o, u}? .....

(62) The next term of 1, ½, ¼, ⅛, . . . is .....

(63) Find the ratio of the probability of winning to that of losing if the probability of winning is 2/7. .....

(64) If $\sin A = \frac{1}{3}$ and $\tan A < 0$, then $\sec A =$ .....

(65) If $\cos B = -\frac{1}{2}$ and $\tan B < 0$, then $\sin B =$ .....

(66) How many pesos are in 74 dollars at 12½ pesos to the dollar? ..... pesos.

(67) Of 150 boys who went camping, 65 had insect bites, 89 had sunburn, and 15 had both insect bites and sunburn. How many had neither? .....

(68) Reduce 49/77 to lowest terms. .....

(69) Change 176 in base nine to base five. .....

(70) For $1 \leq X \leq 15$, how many integers X are there such that X is relatively prime to 15? .....

(71) Find T if $2T + Z + 2X = 1$, $T - Z + 2X = 0$, and $T - X = 3$.
.....

(72) $7\pi/8$ rad. = .....deg.

(73) The midpoint of the segment of the number line with ends —3/4 and 7/15 is .....

(74) If $V = 8$ and $V = 80 - 32T$, find T. .....

(75) The first of two alloys contains 30% copper and the second 3/2 as much. The second contains .....%.

(76) $(3i - 4)(5 + 2i) =$ .....

(77) $(17\ 1/2 + 28\ 1/3)\ 6/5 =$ .....

(78) The sum of all primes less than 15 is .....

(79) The mode (number of greatest frequency) of 3, 6, 2, 6, 5, 6, 4, 1, 1 is .....

(80) If $\tan X = \sqrt{3}$ and $0 \leq X \leq \pi$, then X = ..... rad.

# The University of Texas Interscholastic League

**NOTE: If error is found in this Key, grade by the correct answer. Also, please report any error to the State Office, Box 8028, University Station, Austin 78712.**

## Key to Number Sense
### TEST SERIES DD-1

1. 509
2. 294
3. 10
4. 1591
5. 300
6. 24 1/4
7. 1 2/3 or 5/3
8. 9 1/3
9. 378 sq. ft.
10. 362,855–401,049
11. $11,000
12. 1 1/8% or 1.125%
13. 3520
14. 515
15. 10.
16. 2100
17. 2100 min.
18. 625
19. —1
20. $13,062,500–$14,437,500
21. —42
22. 49 4/7 wk.
23. [4]
24. [3,4]
25. [3,4,5,6]
26. [2,5,7,8,9]
27. $3.00
28. 10 yr.
29. 1283
30. 1,510,418–1,669,408 cu. ft.
31. 2312
32. 1/8
33. 1/39
34. 4.
35. 11 1/2 doz.
36. 28
37. 13
38. 156/205
39. 340
40. 46,230–51,096
41. 26
42. 15/23
43. 342 sq. ft.
44. 2.16 dollars
45. 8
46. 4800
47. 58
48. 11 1/2
49. 0
50. 12 ft.
51. 6
52. 29
53. 1296
54. 46
55. 344
56. 8/11
57. .028
58. 2687.5 pesos
59. $\sqrt{10}$
60. 354 mi.
61. 1
62. [1,2,3, . . .]
63. 3i + 12
64. 7—24i
65. (1. —5/2) or (1, —2 1/2)
66. $\frac{4+\sqrt{3}}{2}$
67. —2
68. 12
69. 8096
70. $44.80
71. 300
72. 15
73. 46
74. $4\sqrt{17}$ /17
75. 1
76. 22
77. $17\pi/9$ rad.
78. 38° 43′
79. 1/7
80. 6/1 or 6

## Key to Number Sense
### TEST SERIES DD-2

1. 268
2. $46.87
3. 14399
4. 2060
5. 19170
6. .94
7. 10 3/8
8. 2/3
9. 50 bu.
10. $49,162.50–$54,337.50
11. 289
12. 1,001,001
13. $79
14. 120. sq. in.
15. 15%
16. Φ or null set
17. [—1, 6]
18. [—7, —3,4,5,]
19. Φ or null set
20. 206–226
21. $9.42 1/2 or 9.43
22. 6
23. 630
24. 2/5
25. 6/5 or 1 1/5
26. 107
27. 1600
28. 1041
29. 121
30. 7125988–7876090
31. $(1+\sqrt{13})/4$
32. 4
33. 42.80 dollars
34. 1/18
35. 7/30 or .23 1/3
36. 7/3 or 2 1/3
37. 80
38. 3200
39. —2
40. 95,475–105,525
41. —21 —20i
42. 17
43. 19
44. 11
45. $\sqrt{101}$
46. 2 10/27 or 64/27
47. —1/24
48. 7/11
49. .6875
50. 488.84–540.28
51. $\sqrt{30}$
52. (—2, 3/2) or (—2, 1 1/2)
53. 828 in.
54. 1076
55. $16.70
56. 328 min.
57. 2/3
58. 97/130
59. $3\sqrt{3}$ in.
60. 10,165–11,235
61. 32
62. $\frac{(\sqrt{3}+2)}{2}$
63. —7
64. 9
65. y(y-1)(y+1)
66. 9/4 or 2 1/4
67. 1/3
68. $\sqrt{13}/2$
69. 102
70. 37/48
71. 24° 41′
72. 6 qt.
73. 81.25 or 81 1/4 pesos
74. 216
75. 28 units
76. $7\pi/6$ rad.
77. 0
78. $(2-X)^3/(X+1)$
79. 23 1/3
80. —4/5

## Key to Number Sense
### TEST SERIES DD-3

1. 1392
2. 619
3. 4900
4. $367.50
5. 37
6. 1.0065
7. 3 7/8
8. 37 1/2% or 37.5%
9. 4096
10. 578.9–639.7
11. 57
12. $970
13. 1,001,110
14. —5/2 or —2 1/2
15. —3/2 or —1 1/2
16. 26 sq. ft.
17. [0,4]
18. 11
19. 360
20. 2,867,994–3,169,888
21. 943
22. 2312
23. [1,3,5,7]
24. [0,1,2,3,5,7,9]
25. [1,3,5,7]
26. 2
27. 1/1000 or .001 or 10–3
28. 16 2/3 lb.
29. [—3,—1,0,3]
30. 46963–51905
31. 17280 cu. in.
32. 1/12 or .08 1/3
33. 7/33
34. 1.6
35. 121
36. x
37. 1/13 or .07 9/13
38. 7
39. —3—8i
40. $110.83–$122.50
41. 7
42. $2\sqrt{17}$
43. 2/7
44. 606.25 pesos or 606 1/4 pesos
45. .01125
46. 234
47. 200
48. $-3+\sqrt{15}$
49. 10
50. 145–55i
51. 17/6 or 2 5/6
52. 18
53. 5/6
54. (1/3, —1)
55. 424
56. —3
57. 72
58. 25
59. 76/139
60. $\sqrt{61}$ units
61. $4\sqrt{5}$ ft.
62. 30
63. .064
64. 0
65. 16°46′
66. 44 pts.
67. —3
68. 82
69. $2\sqrt{10}$ units
70. $-\sqrt{10}/3$
71. —1
72. 120
73. 2
74. 20 dollars
75. 4
76. $8\sqrt{2}$
77. 4
78. 331 min.
79. 96°
80. —t/b

## Key to Number Sense
### TEST SERIES DD-4

1. 2183
2. —151
3. $138.91
4. 4740
5. 2438
6. $3.00
7. 111
8. 5400 pesos
9. 6561
10. 28
11. 841
12. .8
13. $40.00
14. —3/7
15. 2/7
16. [—3,—1, 1, 2]
17. 150
18. 4 1/2 in. or 9/2 in.
19. 168
20. 70
21. 2
22. 334
23. 102
24. 44
25. 19 1/2
26. 4
27. 2/3 or .66 2/3
28. 3/11 or .27 3/11
29. 1
30. 63
31. 2
32. 2/3
33. 4 17/24
34. 2+2i
35. 22
36. 4 1/2% or 4.5%
37. 1/18
38. $6.40
39. $7.12
40. —13+21i
41. 0.2
42. 167
43. 45
44. 4
45. 36
46. 24
47. 36 2/3
48. 4%
49. 2
50. 25
51. 44
52. 0
53. 13 min.
54. (—3,2)
55. 1/3
56. 1 1/4 or 5/4
57. 10
58. 1/4 or .25
59. 5
60. 1
61. —3
62. 211
63. 12 dollars
64. 13/27
65. 155
66. 16
67. [b]
68. [b,c,r]
69. $6\sqrt{2}$ units
70. 10
71. 2
72. 7225
73. 3
74. .325
75. 23
76. 1
77. 28 pts.
78. 1 unit
79. 45 sq. ft.
80. 108°

## Key to Number Sense
### TEST SERIES DD-5

1. 4386
2. 228
3. 67
4. $13.50
5. 15 yr.
6. 23/60
7. 19
8. —4155
9. 11111101
10. 249–275
11. 2401
12. 264 ft.
13. .3
14. $100
15. 41
16. 180
17. 247
18. 4 1/2 or 9/2
19. 2
20. 386,917–427,645
21. 3
22. 1463
23. 4021
24. [—2, 0, 1, 3, 4]
25. Φ or null set
26. [—3, —1, 0, 3, 4]
27. [—3, —2, —1]
28. 1/2
29. 7 1/5 in.
30. 123,805–136,837
31. 78 3/8
32. 4/11
33. 443
34. 1/6 or .16 2/3
35. x—2
36. 1/3 or .33 1/3
37. 139
38. 1.5
39. 3.
40. 2601–2873
41. —11—3i
42. 7
43. $8.00
44. .024
45. 11 1/4 or 45/4
46. —2
47. 2—29i
48. 5
49. —1/2
50. $326,958.34 — $361,375
51. 8
52. 112 2/3
53. 10.24 dollars
54. (4½,—2½) or (9/2,—5/2)
55. 59
56. 22
57. 11
58. 203
59. 100
60. 1041
61. 9 or 9/1
62. 144,000 sec.
63. 1/4
64. $\sqrt{5}/3$
65. 20
66. 13/29
67. (1½, 3½) or (3/2, 7/2)
68. 14
69. $4\sqrt{2}$
70. $\sqrt{62}/2$
71. 1
72. 8 in.
73. 14 1/16 sq. ft.
74. 1
75. 14
76. 512
77. 16 2/3
78. $2\sqrt{2}$
79. 135°
80. 46°33′

## Key to Number Sense
### TEST SERIES DD-6

1. 1344
2. 759
3. 350
4. $9.90
5. 1031
6. 137.3
7. 29 1/3
8. 42 dollars
9. 32
10. 15,967–17,647
11. .37
12. 4 3/4 gal.
13. 12 units
14. 4
15. 12
16. 119 da.
17. [—1,0]
18. [—2]
19. 16
20. 199,500–220,500 min.
21. —4/5
22. 3/5
23. 4
24. x
25. 1332
26. 2252
27. 113
28. 107
29. 2 1/3
30. 399,439–441,485
31. $22.75
32. 1
33. —10+3i
34. 2/3 or .66 2/3
35. 1/5 or .2
36. 2
37. 17
38. 1
39. 1/15
40. 40,158–44,384
41. $7.14
42. 36
43. 3
44. 4
45. 10
46. 4
47. 10 5/14
48. $x^4—x^2$ or $x^2$ (x—1) (x+1)
49. 2.8
50. 2681–2963
51. 3 1/5 or 16/5
52. 155
53. $\sqrt{41}$ units
54. $\sqrt{7}/3$
55. $2\sqrt{3}$ units
56. 64 cu. units
57. 62 5/12 yr.
58. (1¼, —¾) or (5/4, —¾)
59. 4/5
60. 19,266–21,294
61. 60
62. 1/16
63. 2/5 or .4
64. $-3\sqrt{2}/4$
65. $\sqrt{3}/2$
66. 925 pesos
67. 11
68. 7/11
69. 1100
70. 8
71. 1 6/7 or 13/7
72. 157 1/2°
73. —17/120
74. 2 1/4 or 9/4
75. 45%
76. —26+7i
77. 55
78. 41
79. 6
80. $\pi/3$ rad.