The University Interscholastic League
Number Sense Test • HS SAC • 2007

Final _____ _____

Contestant's Number _____ 2nd _____ _____

1st _____ _____

Score Initials

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.

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STOP -- WAIT FOR SIGNAL!

(1) $2007 + 2008 =$ _____

(2) $8002 - 2007 =$ _____

(3) $25 \times 2008 =$ _____

(4) $2008 \div 9 =$ _____ (mixed number)

(5) $2.008 + 80.02 =$ _____ (decimal)

(6) $\frac{2}{7} \div \frac{3}{8} =$ _____

(7) $(-3) \times 1\frac{1}{2} =$ _____ (mixed number)

(8) $28\ \% =$ _____ (proper fraction)

(9) $4 + 64 \div 16 \times 8 - 32 =$ _____

*(10) $38 + 979 + 1176 =$ _____

(11) $14^2 =$ _____

(12) $33 \times 27 =$ _____

(13) $3\frac{4}{5} \times 1\frac{2}{3} =$ _____ (mixed number)

(14) 1.4 is what % of 20? _____ %

(15) MMX — II = _____ (Arabic Numeral)

(16) The LCM of 5, 6, and 15 is _____

(17) Which is smaller, $\frac{4}{7}$ or $\frac{5}{9}$? _____

(18) The mean of 18 and 26 is _____

(19) 9 ft. × 6 ft. × 3 ft. = _____ cubic yards

*(20) $20708 \div 278 =$ _____

(21) $12345 \div 4$ has a remainder of _____

(22) 56 has _____ positive prime divisors

(23) $\sqrt[3]{-1331} =$ _____

(24) If a pen cost 13¢ then 12 pens cost $ _____

(25) $.121212... + .151515... =$ _____

(26) $200_8 =$ _____ $_{10}$

(27) The set {M,A,T,H} has _____ subsets

(28) If $\frac{x}{4} = \frac{4}{5}$, then x = _____

(29) $1.5 \times 2.5 \times 4.4 =$ _____ (decimal)

*(30) $29 \times 33 + 29 \times 66 =$ _____

(31) If $f(x) = x^2 - 2x - 3$ then f(3) is _____

(32) $123 \times 17 =$ _____

(33) 33 plus 25% of 44 is _____

(34) $(41 + 9 \times 12) \div 7$ has a remainder of _____

(35) $(8)^{\frac{2}{3}}$ = _____

(36) $1 + 1 + 2 + 3 + 5 + 8 + 13$ = _____

(37) A regular hexagon with side length of 4" has a perimeter of _____ inches

(38) The smallest root of $x^2 + x = 20$ is _____

(39) $123 \times 9 + 4$ = _____

*(40) $\sqrt{13579}$ = _____

(41) If $6^x = 30$ then $6^{(x-1)}$ = _____

(42) $64 \div .25$ = _____

(43) The smallest leg of a right triangle with integral sides is 7". The hypotenuse is ____"

(44) If $2x + 3 = 4$ then $5x - 6$ = _____

(45) The x-intercept of the line $3x - 2y = 1$ is (h, k). Find h. _____

(46) 202^2 = _____

(47) If $x < 3$, then $x^2 + 1 <$ _____

(48) 112×401 = _____

(49) $22 \times 4! + 32 \times 3!$ = _____

*(50) $15^3 \times 9^3 \div 3^3$ = _____

(51) ${}_5P_3$ = _____

(52) $(1 - 2i)(3 + 4i) = (a + bi)$. Find b. _____

(53) If x and y vary directly and $x = 3$ when $y = 12$, find x when $y = 8$. _____

(54) 12% of $233\frac{1}{3}$ is _____

(55) If $\log_x 36 = 2$ then x = _____

(56) The largest integer such that $2x - 2 \leq 2$ is _____

(57) $9 + 3 + 1 + \frac{1}{3} + \ldots$ = _____

(58) The radius of the circle $x^2 + y^2 = 16$ is ____

(59) $55_6 + 5_6$ = _____ 6

*(60) $625 \times 888 \div 55$ = _____

(61) If $\sqrt{1 + \sqrt{2 + \sqrt{x}}} = 3$ then x = _____

(62) $\frac{6}{11} - \frac{16}{35}$ = _____

(63) 67^2 = _____

(64) The volume of a right circular cylinder 3" high with a radius of 1" is $k\pi$ cu. in. k = ___

(65) $\sqrt{9801}$ = _____

(66) The slope of the line $3x - 2y = 5$ is _____

(67) $2 \sin \frac{\pi}{12} \cos \frac{\pi}{12}$ = _____

(68) The simplified coefficient of the x^2 term in the expansion of $(2x - 3)^3$ is _____

(69) If $\left(\sqrt{a^3}\right)\left(\sqrt[3]{a^4}\right) = \left(\sqrt[n]{a^k}\right)$ then k = ___

*(70) $7e^2 \times 9\pi^2$ = _____

(71) If $f(x) = 2 - x$ and $g(x) = x + 2$ then $g(f(-2))$ = _____

(72) The smaller root of $8x^2 + 25x + 3 = 0$ is ___

(73) Change .12 base 5 to a base 10 fraction. ___

(74) Find k, $0 \leq k \leq 7$, if $(4!)(2!) \cong k \pmod 8$. ___

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

(76) A vertical asymptote for $y = \frac{1}{x+1}$ is x = ____

(77) $\frac{1}{42} + \frac{1}{56} + \frac{1}{72}$ = _____

(78) $\int_0^2 x^3 \, dx$ = _____

(79) 111×45 = _____

*(80) $898 \div 37.5\% \times \frac{1}{8}$ = _____

The University Interscholastic League
Number Sense Test • HS Invitational A • 2008

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(1) $2008 + 208 - 28 =$ _____

(2) $50 \times 200.8 =$ _____

(3) $\frac{2}{7} + 2\frac{1}{8} =$ _____ **(mixed number)**

(4) $\frac{7}{8} \div .2 =$ _____ **(improper fraction)**

(5) $(24 + 18) \div 12 \times (3 - 6) =$ _____

(6) $7.5\% =$ _____ **(proper fraction)**

(7) $15 \times 28 =$ _____

(8) $28 \div 11 + 82 \div 11 =$ _____

(9) $23^2 =$ _____

***(10)** $41 \times 411 + 4111 =$ _____

(11) The largest prime divisor of 65 is _____

(12) $11 \div 1\frac{2}{3} =$ _____ **(decimal)**

(13) If 12 ounces of nuts costs $1.25 then 3 pounds of nuts will cost $_____

(14) 280 plus 30% of 320 is _____

(15) Which is smaller, $1\frac{1}{3}$ or 1.3 ? _____

(16) 2 ft. × 3 ft. × 4 ft. = _____ cubic yards

(17) $(34 + 65 + 96) \div 3$ has a remainder of _____

(18) The mode of 2, 8, 4, 8, 2, 4, 8, 4, & 8 is _____

(19) MMVIII − MIV = _____ **(Arabic Numeral)**

***(20)** $987 - 654 \times 321 =$ _____

(21) If A = 3, B = 5, and C = B, then BC + A = _____

(22) $7.777... - 3.333... =$ _____

(23) Find the simple interest on $500.00 at 5% for five years. $_____

(24) $(4)^{-1} + (4)^{-2} =$ _____

(25) 6 pints is what per cent of a gallon? _____%

(26) Which of the following is a triangular number, 9, 15, or 18? _____

(27) $\sqrt[3]{2197} =$ _____

(28) {s,l,o,p,e} ∩ {l,i,n,e} has _____ distinct elements

(29) If $\frac{3}{4} = \frac{3x}{5}$, then x = _____

***(30)** $118 \times 118 - 19 \times 121 =$ _____

(31) $43_8 - 21_8 =$ _____$_8$

(32) If $x - 3 = -4$, then $x + 3 =$ _____

(33) $1^2 + 1^2 + 2^2 + 3^2 + 5^2 + 8^2 =$ _____

(34) $(4^4 + 3^3 \times 2^2) \div 5$ has a remainder of _____

(35) $15\frac{1}{5} \times 5\frac{1}{5} =$ _____

(36) $\left|6 - |-3-6|\right| =$ _____

(37) The area of a rhombus is 135 in^2 and one diagonal is 18 in. The other diagonal is _____ in

(38) If a = 5 and b = 3, then $(a-b)(a^2+ab+b^2) =$ _____

(39) If $x+3y=5$ and $x-2y=4$ then $y =$ _____

*(40) $\sqrt[3]{1730} \times \sqrt{142} \times 12 =$ _____

(41) $63 \div 1.75 =$ _____

(42) If $3^4 \times 3^k \div 3^5 = 3^2$ then k = _____

(43) $212 \times 311 =$ _____

(44) The hypotenuse of a right triangle with integral sides is 41 in. The shortest leg is _____ in

(45) $45 \times 95 =$ _____

(46) (x,y) is the midpoint of the line segment whose endpoints are (2,5) and (5,9). y = _____

(47) $31 \times 4! + 36 \times 3! =$ _____

(48) The measure of an exterior angle of a regular n-gon is 18°. n = _____ sides

(49) $\frac{3}{14} =$ _____ %

*(50) $18^2 \div 9^3 \times 3^6 =$ _____

(51) Let $|2x+3| \leq 11$. The least value of x is _____

(52) 18% of $266\frac{2}{3}$ is _____

(53) The vertex of the parabola $y = x^2 + 8x$ is (h, k). Find h. _____

(54) $\frac{7}{9} - \frac{19}{29} =$ _____

(55) If y varies inversely with x and x = 4 when y = 3, find x when y = 8. _____

(56) $61 \times 69 + 16 =$ _____

(57) $(k-4i)^2 = -7-24i$. Find k. _____

(58) ${}_6C_3 =$ _____

(59) The tenth term of 2, 7, 12, 17,... is _____

*(60) $(24)^4 =$ _____

(61) If $\sqrt{12} + \sqrt{27} = \sqrt{x}$ then x = _____

(62) If $\log_x 3 = .5$ then x = _____

(63) The dot product for $u = (2,1)$ and $v = (4,3)$ is _____

(64) $f(x) = 5x^3 + 4x^2 + 3x - 2$ divided by x + 1 has a remainder of _____

(65) $\cos \frac{4\pi}{3} =$ _____

(66) If $A = \begin{bmatrix} 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ then AB = [_____]

(67) If $(\sqrt[4]{a^2})(\sqrt[3]{a}) = (\sqrt[n]{a^k})$, where n and k are relatively prime, then n = _____

(68) $\sqrt{444889} =$ _____

(69) The greatest integer function $f(x) = [x]$ has a value of _____ for $f(\pi)$

*(70) $(e\pi)^2 \times (\pi e)^2 =$ _____

(71) The larger root of $8x^2 + 25x + 3 = 0$ is _____

(72) The smallest value of x in the domain of f(x) so that $f(x) = \sqrt{4x+5}$ has a real valued range is _____

(73) The rectangular coordinates of the polar coordinates $(3\sqrt{2}, \frac{\pi}{4})$ are (x,y). x = _____

(74) $\lim_{x \to 4} \left(\frac{x^2+x-20}{x-4}\right) =$ _____

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

(76) $\int_{-2}^{2} x^2 \, dx =$ _____

(77) If the initial point of a vector is (3,7) and the terminal point is (−1,4), then $\|v\| =$ _____

(78) $111 \times 27 =$ _____

(79) $\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} =$ _____

*(80) $798 \div 44\frac{4}{9}\% \times .25 =$ _____

The University Interscholastic League
Number Sense Test • HS Invitational B • 2008

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(1) $2008 - 288 + 28 =$ _____

(2) $\frac{3}{4} \times \frac{8}{9} \times \frac{2}{3} =$ _____

(3) $2357 \div 9 =$ _____ (mixed number)

(4) $2 + (-6) + 4 + (-8) =$ _____

(5) $14 \times 3 + 16 \div 4 =$ _____

(6) $25 \times 2.8 =$ _____

(7) $31^2 =$ _____

(8) $18.75\% =$ _____ (proper fraction)

(9) Which is smaller, $-\frac{11}{13}$ or $-\frac{9}{11}$? _____

*(10) $55 \times 555 - 5555 =$ _____

(11) The LCM of 9, 15, and 18 is _____

(12) 34 is what % of 85? _____%

(13) The mean of 2, 8, 4, 8, 2, 4, 8, 4, & 8 is _____

(14) $(23 \times 19 - 15) \div 4$ has a remainder of _____

(15) If 6 apples cost $1.32 then 11 apples cost $ ____

(16) The product of the first 4 prime numbers is ___

(17) MCXI + DLI = _____ (Arabic Numeral)

(18) If 1 gram = .04 oz., then 4 oz. = _____ grams

(19) The sum of the positive integral divisors of 48 is _____

*(20) $\sqrt{959} \times \sqrt{1091} =$ _____

(21) If $3^x + 3 = 30$, then x = _____

(22) The discriminant of $2x^2 - 5x + 3 = 0$ is ____

(23) $|1 - 3| - 2|3 - 1| - 3| - 1 - 1| =$ _____

(24) $(13)^3 =$ _____

(25) Which of the following is a square number, 8, 27, or 64? _____

(26) $4^5 \div 11$ has a remainder of _____

(27) 130 base ten is equivalent to _____ base 5

(28) If $5x - y = 4$ and $x + 2y = 3$ then $y =$ _____

(29) Find the largest digit k such that 37195k is divisible by 6. k = _____

*(30) 2 days 7 hours 12 minutes = _____ minutes

(31) If P=2, Q= − 2, and R=4, then PQ + R = ____

(32) If $\frac{2}{3} + \frac{4}{5} = \frac{1}{x}$, then x = _____

(33) Picture A is 3" by 6" and B is 9" by 18". The ratio of A's perimeter to B's perimeter is _____

(34) The set {s,l,o,p,e} has _____ 3-elements subsets

(35) Solve for x: $\frac{2x-1}{3} - 4 = 5$. x = _____

(36) 2.8333... − 1.58333... = _____

(37) The area of an equilateral triangle is $16\sqrt{3}$ sq. cm. The perimeter of the triangle is _____ cm

(38) The sum of the roots of $2x^2 - 5x = 3$ is _____

(39) $2 + 1 + 3 + 4 + 7 + 11 + ... + 29 + 47 =$ _____

*(40) $(375 \times 79)^2 \div (40 \times 124) =$ _____

(41) The hypotenuse of an isosceles right triangle is $5\sqrt{2}$ cm. The area is _____ cm^2

(42) $404^2 =$ _____

(43) The measure of each of the interior angles of a regular pentagon is _____ degrees

(44) $35 \times 85 =$ _____

(45) Let $(k^4)^2 \div k^{(-1)} \times k^3 = k^x$, where k>0. Find x. _____

(46) $54 \times 6! - 24 \times 5! =$ _____

(47) The point (2, 7) is reflected across the y-axis to point (h,k). Find h. _____

(48) $\frac{5}{11} - \frac{29}{67} =$ _____

(49) The hypotenuse of a right triangle with integral sides is 41 in. The shortest leg is _____ in

*(50) $2142.857 \times 213 =$ _____

(51) A sector of a circle radius 12", central angle 30°, and arc length $k\pi$". Find k. _____

(52) If x varies directly with y^3 and x = 2 when y = 2, find x when y = 4. _____

(53) $\frac{2}{3} + \frac{1}{2} + \frac{3}{8} + ... =$ _____

(54) If $(\sqrt[3]{a^4})(\sqrt[5]{a^k}) = \sqrt[15]{a^{26}}$, then k = _____

(55) $(5 - 7i)(5 + 7i) = a + bi$. Find a + b. _____

(56) If $\log_4(3x + 2) = 1$ then x = _____

(57) $({}_7C_3)({}_7C_4) =$ _____

(58) $1234 \times 9 + 5 =$ _____

(59) If $\sqrt{12 - \sqrt{9 + \sqrt{6 - x}}} = 3$ then x = _____

*(60) The area of $11x^2 + 36y^2 = 396$ is _____

(61) When two dice are rolled, what is the probability that the sum is 2 or 12? _____

(62) The simplified coefficient of the x^2y term in the expansion of $(x - 4y)^3$ is _____

(63) $\cos|\sin^{-1}(\frac{\sqrt{3}}{2})| =$ _____

(64) $3^6 \div 5$ has a remainder of _____

(65) The greatest integer function $f(x) = [3x + 1]$ has a value of _____ for $f(e)$

(66) $66\frac{7}{10} \times 66\frac{7}{10} =$ _____

(67) The dot product for $u = (3,3)$ and $v = (1,1)$ is _____

(68) The smaller root of $12x^2 - 11x - 15 = 0$ is _____

(69) The eleventh term of 3, 8, 13, 18,... is _____

*(70) $2152008 \div 3579 =$ _____

(71) If the initial point of a vector is (5, − 2) and the terminal point is (1,1), then $\|v\| =$ _____

(72) Find x, if $\det\begin{vmatrix} 1 & -2 \\ x & 4 \end{vmatrix} = 5$. _____

(73) Change $\frac{3}{25}$ to a base 5 decimal. _____ 5

(74) $\lim_{x \to \infty} \frac{3x}{x - 1} =$ _____

(75) The polar coordinates of the rectangular coordinate $(3,\sqrt{3})$ are (r, θ). $\theta =$ _____°

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

(77) The horizontal asymptote of $y = 4^x + 2$ is _____

(78) $\int_2^3 x^2\,dx =$ _____

(79) $\frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} =$ _____

*(80) $779 \div 77\frac{7}{9}\% \times .75 =$ _____

2007-08 TMSCA High School Number Sense Test 6

(1) $2070 - 2800 =$ _____

(2) $2080 + 7020 =$ _____

(3) $2007 \div 8 =$ _____ (mixed number)

(4) $2008 \times 75 =$ _____

(5) $20 \times 70 - 80 \times 20 =$ _____

(6) $1\frac{3}{5} + 5\frac{1}{3} =$ _____ (mixed number)

(7) $(-.5) \div (-2.5) =$ _____ (decimal)

(8) $\frac{1}{40} =$ _____ %

(9) $18^2 =$ _____

*(10) $383 - 9779 + 56 =$ _____

(11) $5 + 10 \times 15 \div 20 - 25 =$ _____

(12) $28 \times 22 =$ _____

(13) The largest prime divisor of 51 is _____

(14) The GCD of 28 and 82 is _____

(15) The median of 7, 5, 3, and 2 is _____

(16) $\frac{2}{3}$ of 4 pounds 5 ounces = _____ ounces

(17) 2.5 is 25 % of what ? _____

(18) Which is larger, $-\frac{5}{6}$ or $-\frac{6}{7}$? _____

(19) MMVII ÷ IX = _____ (Arabic Numeral)

*(20) $123 \times 456 + 789 =$ _____

(21) $(4)^{\frac{3}{2}} =$ _____

(22) If $3x - 2 = 1$ then $3x + 2 =$ _____

(23) Mary drove 180 miles in 4.5 hours. Her average speed was _____ mph

(24) The multiplicative inverse of 1.75 is _____

(25) $|-1| - |-2| + |3| =$ _____

(26) If x is to 5 as 5 is to 8 then x = _____ (decimal)

(27) $\sqrt[3]{1728} =$ _____

(28) The set {s,i,x} has _____ proper subsets

(29) 200 base ten is equivalent to _____ base 8

*(30) 101.25% of 640 = _____

(31) 0.575757... = _____ (fraction)

(32) $(19 \times 8 - 7) \div 6$ has a remainder of _____

(33) 33 plus 75% of 44 is _____

(34) The perimeter of a square is 18 inches. The area of this square is _____ sq. inches

(35) The sum of the roots of $x^2 + x = 20$ is _____

(36) $1^2 + 1^2 + 2^2 + 3^2 + 5^2 =$ _____

(37) $1.1 \times 7.5 \times 4.4 =$ _____ (decimal)

(38) Which of the following is an abundant number, 40, 41, or 42? _____

(39) $123 \times 8 + 3 =$ _____

*(40) $\sqrt{246810} =$ _____

(41) $32 \times 0.0625 =$ _____

(42) The side opposite 30° in a right triangle is $2\frac{3}{8}$ cm. The hypotenuse is _____ cm

(43) If $8^x = 40$ then $8^{(x+1)} =$ _____

(44) $93 \times 94 =$ _____

(45) If $2x + y = 4$ and $x - y = 2$ then $y =$ _____

(46) $\frac{7}{10} - \frac{20}{31} =$ _____

(47) If $3 - x < 1$, then $2x >$ _____

(48) The y-intercept of the line $2x - 3y = 4$ is (h, k). Find k. _____

(49) $16 \times 5! + 20 \times 4! =$ _____

*(50) $12^4 \div 8^3 \times 4^2 =$ _____

(51) ${}_5C_3 =$ _____

(52) If $\log_5 (.2) = x$ then $x =$ _____

(53) $4 - 2 + 1 - \frac{1}{2} + \ldots =$ _____

(54) The units digit of 33^{33} is _____

(55) $(4 - i)(3 + 2i) = (a + bi)$. Find a. _____

(56) $34_6 - 5_6 =$ _____ $_6$

(57) $55 \div 1.666\ldots =$ _____

(58) If x and y vary inversely and $x = 3$ when $y = 20$, find x when $y = 5$. _____

(59) The area of $x^2 + 4y^2 = 4$ is $k\pi$. $k =$ _____

*(60) $26^4 =$ _____

(61) If $(\sqrt[3]{x^5})(\sqrt{x^3}) = (\sqrt[n]{x^k})$, where n and k are relatively prime, then $k =$ _____

(62) $999^2 =$ _____

(63) If $\det \begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = x$ then $x - 1 =$ _____

(64) The odds of rolling a 3 with one die is _____

(65) The greatest integer less than -2.3 is _____

(66) $\sqrt{4489} =$ _____

(67) $(\sin 30°)(\cos 60°) =$ _____

(68) The larger root of $9x^2 - 12x - 5 = 0$ is ___

(69) If $\sqrt{4 + \sqrt{5 + \sqrt{x - 1}}} = 3$ then $x =$ ___

*(70) $e^3 \times \pi^3 =$ _____

(71) $(2, \frac{\pi}{2})$ are polar coordinates for (x,y). $y =$ ___

(72) $\lim_{x \to 1} \frac{1}{2x} =$ _____

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

(74) Find the least value of k, so that the six digit number 3467k2 is divisible by 6. $k =$ _____

(75) $3^3 - 4^3 - 5^3 =$ _____

(76) Change .21 base 5 to a base 10 decimal. ____

(77) If $f(x) = \frac{3}{1-x}$ then $f^{-1}(2) =$ _____

(78) $\int_1^2 (x + 1)\,dx =$ _____

(79) If $\sin 1.2 = .9$ then $\csc 1.2 =$ _____

*(80) $639 \div 44\frac{4}{9}\% \times .125 =$ _____

2007-08 TMSCA High School Number Sense Test 12

(1) $28 - 208 - 2008 =$ _____

(2) $\frac{2}{7} \div 3\frac{1}{7} =$ _____

(3) $\$1.25 + \$20.08 = \$$ _____

(4) $1\frac{1}{8} \times 1.6 =$ _____ (decimal)

(5) $105\ \% =$ _____ (improper fraction)

(6) $19^2 =$ _____

(7) $15 \times 28 =$ _____

(8) $(7 - 14) \times 14 + (28 \div 7) =$ _____

(9) $1357 \div 9$ has a remainder of _____

*(10) $2008 \times 3 + 2007 =$ _____

(11) $47 \times 67 =$ _____

(12) 40% of 42 less 38 is _____

(13) $12 \div 1\ \frac{3}{5} =$ _____ (decimal)

(14) The LCM of 78 and 65 is _____

(15) DLV — CDXLIV = _____ (Arabic Numeral)

(16) The sum of the positive integral divisors of 51 is _____

(17) $-2 - (-3) + (-4) - 5 =$ _____

(18) The range of 2, 8, 4, 8, 2, 4, 8, 4, & 8 is _____

(19) If 2 pounds of peanuts costs \$1.88 then 8 ounces of peanuts will cost \$ _____

*(20) $24680 \div 111 =$ _____

(21) If $A = 1$, $B = 2A$, and $C = -3A$, then $(A + B) \div C =$ _____

(22) The additive inverse of $-\frac{4}{9}$ is _____

(23) If $\frac{5x}{8} = \frac{7}{10}$, then $x =$ _____ (mixed number)

(24) A 3-element set has _____ improper subsets

(25) $16^2 - 4^2 =$ _____

(26) What number added to 18 and multiplied by 4, gives the same results? _____

(27) If $2x + 3 = 4$ then $4x - 3 =$ _____

(28) $(2 + 3^2 \times 4^3) \div 5$ has a remainder of _____

(29) $0.444... - 0.888... =$ _____

*(30) $27^2 \div 9^2 \times 18^2 =$ _____

(31) If $8^2 \div 4^2 \times 2^3 = 2^k$, then $k =$ _____

(32) $1 - \left|2 - |-3 - 4|\right| =$ _____

(33) $9^3 =$ _____

(34) $1101011_2 =$ _____

(35) Which of the following is a deficient number, 36, 45, or 54? _____

(36) $1+1+2+3+5+8+\ldots+34+55=$ _____

(37) If $x+4y=1$ and $x-y=4$, then $x=$ _____

(38) The area of an equilateral triangle is $\sqrt{3}$ cm^2. The side of the triangle is _____ cm

(39) The roots of a cubic equation are 1, 2, and 3. The equation is $x^3-6x^2+11x=$ _____

*(40) $\sqrt{111011}=$ _____

(41) If $a^3 \times a^4 \div a^5 = a^k$ then $k=$ _____

(42) If A is 70% of B and B is 80% of C, then A is what percent of C? _____%

(43) The hypotenuse of a 30-60-90° triangle is $1\frac{2}{3}$ ft. The smaller leg is _____ inches

(44) The units digit of 17^{17} is _____

(45) The distance between the points $(-2,-2)$ and $(2,1)$ is _____

(46) $18 \times 5! - 30 \times 4! =$ _____

(47) The side length of a regular septagon is 6 cm. It's perimeter is _____ cm

(48) $123 \times 123 =$ _____

(49) If $2-3x<5$, then $4x>$ _____

*(50) $142.857 \times 78=$ _____

(51) The odds of winning are 3 to 8. The probability of not winning is _____ (proper fraction)

(52) The sides of a triangle are 4, 6, and x. The least value of x, where x is a natural number is ____

(53) $({}_5C_5)({}_5P_5)=$ _____

(54) $1-3-4-7-11-18-29=$ _____

(55) $34_6 \times 5_6=$ _____$_6$

(56) If y varies directly with x^2 and $y=8$ when $x=2$, find y when $x=5$. _____

(57) The simplified coefficient of the xy^2 term in the expansion of $(2x-y)^3$ is _____

(58) $(1-i)(1+i)=(a+bi)$. Find $a+b$. _____

(59) The foci of $25x^2+9y^2=225$ are (a, k) and $(a, -k)$. Find k. _____

*(60) $234678 \div 1111=$ _____

(61) If $x>0$ and $x^2=\sqrt{x^3+x^3+x^3}$ then $x=$ ____

(62) $(\sin 225°)(\cos 315°)=$ _____

(63) $987 \times 9+5=$ _____

(64) The surface area of a cube is 24 sq. cm. The edge of the cube is _____ cm

(65) If $\sqrt{4-\sqrt{3+\sqrt{x-2}}}=1$ then $x=$ _____

(66) If $f(x)=3x-4$ and $g(x)=4+3x$, then $f(g(1))=$ _____

(67) The smaller root of $9x^2-12x-5=0$ is ____

(68) The dot product for $u=(-2,1)$ and $v=(4,-3)$ is _____

(69) The greatest integer less than $\sqrt{22}$ is _____

*(70) $e^{\pi} \times \pi^e=$ _____

(71) If the domain of $f(x)=\sqrt{3x-5}$ is $\{x \mid x \geq 2\}$, then the range is $\{f(x) \mid f(x) \geq$ _____$\}$

(72) Change .67 base 8 to a base 10 fraction. _____

(73) The polar coordinates of the rectangular coordinates (11 , 60) are (r, θ). $r=$ _____

(74) Find k, $0 \leq k \leq 7$, if $\frac{(6!)(3!)}{(5!)} \cong k \pmod 8$. _____

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

(76) The sum of the first ten terms of the Lucas sequence 3, 4, 7, 11, 18, ... is _____

(77) $\int_0^5 (5-x)\,dx =$ _____

(78) $6^3-5^3+4^3=$ _____

(79) If $\csc\theta=1.1$ then $\sin\theta=$ _____

*(80) $693 \div 77\frac{7}{9}\% \times \frac{1}{3} =$ _____

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Number Sense Test • HS District 1 • 2008

Final _____ _____

Contestant's Number _____ 2nd _____ _____

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Score **Initials**

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STOP -- WAIT FOR SIGNAL!

(1) $3218 - 3288 =$ _____

(2) $2008 + 8002 =$ _____

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

(4) $3.2 \div .8 =$ _____

(5) $2 + 3 \div 4 \times 5 - 6 =$ _____

(6) $244 \times 25 =$ _____

(7) $27^2 =$ _____

(8) Which is smaller, $\frac{11}{12}$ or $\frac{12}{13}$? _____

(9) $7.5\% =$ _____ (proper fraction)

***(10)** $49 \times 449 + 4499 =$ _____

(11) $2700 \div 75 =$ _____

(12) $4\frac{7}{8} + 3\frac{5}{16} =$ _____ (mixed number)

(13) 30% of 33 less 36 is _____

(14) The mean of 23, 27, 35, & 31 is _____

(15) 1 inch + 2 feet + 3 yards = _____ inches

(16) The GCF of 24, 32, and 48 is _____

(17) 7 is 35% of _____

(18) MCM + CVIII = _____ (Arabic Numeral)

(19) $-9-(-7)-(-5)-3 =$ _____

***(20)** $\sqrt{1230} \times \sqrt{1220} =$ _____

(21) 235689 ÷ 8 has a remainder of _____

(22) The smallest root of $x^2 + 2x = 24$ is _____

(23) The time it will take Ted to drive 360 miles at an average speed of 45 mph is _____ hours

(24) $2^2 + 3^2 + 5^2 + 8^2 + 13^2 =$ _____

(25) A pentagon has _____ distinct diagonals

(26) 40 base 5 is equivalent to _____ base 8

(27) $314 \times 17 =$ _____

(28) If $x + 5 = -6$, then $x - 5 =$ _____

(29) If $\frac{5}{7} = \frac{5}{8x}$, then x = _____

***(30)** $22 \times 24 \times 26 =$ _____

(31) If A=3, B= − 4, and C=5, then B − AC = ____

(32) Circle O has a diameter of 7" and circle P has a diameter of 5". The ratio of O's circumference to P's circumference is _____

(33) $13^3 =$ _____

(34) 0.333... + 0.08333... − 0.1666... = _____

(35) $\{s,h,o,r,t\} \cup \{s,t,o,r,e\}$ has ___ distinct elements

(36) $33^2 + 11^2 =$ _____

(37) If $3.2 \times k = 1$, then k = _____

(38) 14 pints is what per cent of a gallon? _____ %

(39) A 3-digit perfect number is _____

*(40) 20 hours + 30 minutes + 40 seconds = _____ seconds

(41) The measure of an exterior angle of a regular n-gon is 45°. n = _____ sides

(42) $24 \times 6! + 36 \times 5! =$ _____

(43) $331 \times 122 =$ _____

(44) If $f < 60 < h$ are the integral sides of a right triangle then f is _____

(45) $\frac{4}{15} - \frac{27}{106} =$ _____

(46) The point $(3, -4)$ is reflected across the x-axis to point (h , k). Find h + k. _____

(47) If $A \neq 0$ and $A^4 \div A^k \times A^5 = A^2$ then k = ____

(48) $707^2 =$ _____

(49) The largest integer value x such that $7x + 5 \leq 3$ is _____

*(50) $12^4 \div 6^3 \times 3^2 =$ _____

(51) The ninth term of 9, 14, 19, 24,... is _____

(52) $2 - \left| -3 + \left| -5 \right| - 7 \right| =$ _____

(53) Point (h, k) is the vertex of the parabola $y = -2(x+1)^2 - 8$. Find h + k. _____

(54) ${}_{11}C_9 =$ _____

(55) If $\sqrt{16 - \sqrt{12\sqrt{4-x}}} = 2$ then x = _____

(56) $(4 + ki)^2 = -33 + 56i$. Find k. _____

(57) If $\log_5(3 - 4x) = 2$ then x = _____

(58) The smaller root of $12x^2 + 11x = 56$ is _____

(59) $66 \div 1.375 =$ _____

*(60) $875 \times 888 \div 77 =$ _____

(61) If $\left(\sqrt[3]{a^5}\right)\left(\sqrt[5]{a^3}\right) = \left(\sqrt[n]{a^k}\right)$, where n and k are relatively prime, then k = _____

(62) $\begin{bmatrix} 4 & -5 \end{bmatrix} \times \begin{bmatrix} -4 \\ 5 \end{bmatrix} =$ [_____]

(63) $\sin \frac{7\pi}{6} =$ _____

(64) $f(x) = 8x^3 - 27$ divided by $x - 4$ has a remainder of _____

(65) $\sqrt{44448889} =$ _____

(66) If the initial point of a vector is (2 , 3) and the terminal point is (4 , 5), then $\|v\|^2 =$ _____

(67) $71^2 - 70^2 + 69^2 - 68^2 =$ _____

(68) The diameter of the circle $x^2 + y^2 = 256$ is ___

(69) The greatest integer function $f(x) = [x^2]$ has a value of _____ for $f(e)$

*(70) $3212008 \div 2468 =$ _____

(71) If $f(x) = 3 - x^3$ and $g(x) = x^3 + 3$ then $g(f(-1)) =$ _____

(72) The smallest value of x in the domain of f(x) so that $f(x) = \sqrt{x^3 - 1}$ has a real valued range is _____

(73) $\frac{1}{35} + \frac{1}{63} + \frac{1}{99} =$ _____

(74) The horizontal asymptote of $\frac{3+x}{x^2-5}$ is _____

(75) If $f(x) = \sin(3x) + 4$, then $f'(\frac{\pi}{9}) =$ _____

(76) $111 \times 1111 =$ _____

(77) Change $\frac{11}{25}$ to a base 5 decimal. _____ 5

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

(79) $4^3 - 3^3 + 2^3 - 1^3 =$ _____

*(80) $17600 \times 9\frac{1}{11} \times 6.25\% =$ _____

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Number Sense Test • HS District 2 • 2008

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

Contestant's Number _____

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STOP -- WAIT FOR SIGNAL!

(1) $3205 - 3088 =$ _____

(2) $2080 + 8020 =$ _____

(3) $\frac{5}{7} \div 1\frac{1}{4} =$ _____

(4) $12.3 \times .4 =$ _____ (decimal)

(5) $6 - 5 \times 4 + 3 \div 2 =$ _____

(6) $404 \div 25 =$ _____ (mixed number)

(7) $\frac{3}{80} =$ _____ %

(8) $3443 \div 9$ has a remainder of _____

(9) $16^2 =$ _____

***(10)** $51 \times 551 - 5511 =$ _____

(11) $44 \times 36 =$ _____

(12) The largest prime divisor of 57 is _____

(13) 4.25 is what % of 25? _____ %

(14) If 8 ounces of candy costs $1.47 then 2 pounds of candy will cost $ _____

(15) $(36 \times 18 - 12) \div 5$ has a remainder of _____

(16) The LCM of 11, 18, and 33 is _____

(17) $5\frac{2}{5} - 2\frac{7}{10} =$ _____ (mixed number)

(18) $474 \times 11 =$ _____

(19) MMCDIX — CDI = _____ (Arabic Numeral)

***(20)** $453 + 231 \times 786 =$ _____

(21) 80 has _____ positive prime divisors

(22) $12345 \times 9 + 6 =$ _____

(23) The multiplicative inverse of 2.125 is _____

(24) $2.2 \times 12.5 \times 8.8 =$ _____

(25) If $x - y = 6$ and $x + y = -6$ then $xy =$ _____

(26) If $f(x) = 4x^2 - 4x + 1$ then $f(23)$ is _____

(27) The set {l,i,n,e,a,r} has ____ 4-elements subsets

(28) $24\frac{1}{8} \times 8\frac{1}{8} =$ _____ (mixed number)

(29) If $\frac{3}{4} - \frac{5}{6} = \frac{1}{x}$, then x = _____

***(30)** $\sqrt{346598} =$ _____

(31) $101100111_2 =$ _____ $_8$

(32) Find the smallest digit k such that 26480k is divisible by 6. k = _____

(33) $2345 \times 16 =$ _____

(34) $13 \times 13 \times 13 =$ _____

(35) What number added to 8 and divided by 4 gives the same results? _____

(36) Let x = 3, y = 2x, and z = x — y. Find xyz. ____

(37) 0.2333... = _____ (fraction)

(38) Which of the following is an abundant number, 140, 143, 147? _____

(39) 14 cups is what per cent of a quart? _____ %

*(40) $(249 \times 61)^2 \div (30 \times 126)$ = _____

(41) If $|x| < 4$, then $x^2 - 1 <$ _____

(42) 95×115 = _____

(43) The measure of each of the interior angles of a regular decagon is _____ degrees

(44) $67_9 - 8_9$ = _____ $_9$

(45) The y-intercept of the line $3x = 1 - 2y$ is (h, k). Find h + k. _____

(46) 131×223 = _____

(47) If $13 < b < 85$ are the integral sides of a right triangle then the area of the triangle is _____

(48) If $8^x = 80$ then $8^{(x+2)}$ = _____

(49) 24% of $333\frac{1}{3}$ is _____

*(50) $\sqrt[3]{6860} \times \sqrt{288} \times 15$ = _____

(51) A sector of a circle with radius 8" and central angle $\frac{\pi}{4}$ has arc length $k\pi$". k = _____

(52) $\frac{2}{5} + \frac{1}{3} + \frac{5}{18} + ...$ = _____

(53) If y varies inversely with x and y = 2 when x = — 2, find x when y = — 4. _____

(54) ${}_8P_3$ = _____

(55) $(8 + 4i)(8 - 4i) = a + bi$. Find a + b. _____

(56) $\ln e^{10} \div \log 10^5$ = _____

(57) The odds of losing is $\frac{7}{11}$. The probability of winning is _____

(58) If $\sqrt{98} - \sqrt{32} = \sqrt{x}$ then x = _____

(59) The sum of the coefficients of $(2x + 2y)^5$ is ___

*(60) $(35)^3$ = _____

(61) Let $n^2 = \sqrt{n^3 + n^3 + n^3 + n^3 + n^3}$, where $n > 0$. Find n^2. _____

(62) $1 + 1 + 2 + 3 + 5 + 8 + ... + 34 + 55$ = _____

(63) If $\log_x 4 = .25$ then x = _____

(64) $4^8 \div 10$ has a remainder of _____

(65) Find x, if $\det \begin{vmatrix} -2 & -1 \\ 1 & x \end{vmatrix} = 5$. _____

(66) $\tan \frac{\pi}{3} \times \cot \frac{\pi}{6}$ = _____

(67) $8883 \div 987$ = _____

(68) $84 \times 5! + 26 \times 6!$ = _____

(69) Vector u = (— 2,1) and vector v = (4, — 3). The dot product for u and v is _____

*(70) $3.1\pi \times 2.7e \times 1.6\phi$ = _____

(71) Change .63 base 7 to a base 10 fraction. _____

(72) $\lim_{x \to 4} \frac{x^2 - 1}{x + 1}$ = _____

(73) The rectangular coordinates of the polar coordinate $(\sqrt{3}, \frac{\pi}{3})$ are (x, y). y = _____

(74) Find k, $0 \leq k \leq 6$, if $(4!)(3!) \cong k \pmod 7$. _____

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

(76) $\frac{1}{56} + \frac{1}{72} + \frac{1}{90} + \frac{1}{110}$ = _____

(77) 203×111 = _____

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

(79) $1 + 2^2 + 3^3 + 4^4$ = _____

*(80) $678 \times 12.5\% \div .5$ = _____

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Final _____ _____

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STOP -- WAIT FOR SIGNAL!

(1) $4110 - 4128 + 2008 =$ _____

(2) $50 \div 2.5 =$ _____

(3) $1\frac{2}{3} \times 3\frac{4}{5} =$ _____ (mixed number)

(4) $\frac{8}{25} =$ _____ %

(5) $(8 + 12) \div (12 \times 2 - 4) =$ _____

(6) $66 \times 54 =$ _____

(7) $14 \div 2\frac{2}{3} =$ _____ (decimal)

(8) $24^2 =$ _____

(9) The median of $-2, -8, 16, \& 4$ is _____

*(10) $77 \times 888 + 9999 =$ _____

(11) The negative reciprocal of 1.375 is _____

(12) $11 \times 747 =$ _____

(13) Which is larger, $-1\frac{1}{6}$ or -1.6 ? _____

(14) 45 plus 45% of 45 is _____

(15) If 3 pounds of nuts costs \$3.60 then 20 ounces of nuts will cost \$ _____

(16) If GCD(64, k) = 16 and LCM(64, k) = 64 then k is _____

(17) CXLIV × XII = _____ (Arabic Numeral)

(18) $2 + (-4) - 6 - (-8) =$ _____

(19) The sum of the first 5 prime numbers is _____

*(20) $\sqrt{322} \times \sqrt{405} \times \sqrt{481} =$ _____

(21) 105 has _____ positive prime divisors

(22) $235_8 =$ _____ 2

(23) $6.666... - 7.777... + 3.333... =$ _____

(24) If $2x + 3 = -5$, then $x - 7 =$ _____

(25) Which of the following is a triangular number and a square number, 25, 36, or 81? _____

(26) {f,i,v,e} ∪ {e,i,g,h,t} has _____ distinct elements

(27) $(2^6 \times 3^5 - 5^4) \div 7$ has a remainder of _____

(28) $13 \times 246 =$ _____

(29) A convex nonagon has _____ distinct diagonals

*(30) 3 days 3 hours 3 minutes = _____ seconds

(31) 32 fluid ounces is _____% of a gallon

(32) $12\frac{1}{4} \times 4\frac{1}{4} =$ _____ (mixed number)

(33) $1 + 1 + 2 + 3 + 5 + ... + 34 + 55 =$ _____

(34) If $P = -2$, $Q = -3$, and $R = -5$, then $PQ + R - QR =$ _____

(35) If $a = 4$ and $b = 5$, then $(a - b)(a^2 + ab + b^2) =$ _____

(36) Find k if .75, $-$ .5, and k are the roots of $32x^3 - 14x - 3 = 0$. _____

(37) The diagonals of a rhombus are 15" and 18". Find the area of the rhombus. _____ sq. in.

(38) $14^3 =$ _____

(39) $123456 \times 9 + k = 1{,}111{,}111$. $k =$ _____

*(40) $75 \times 53 + 57 \times 35 =$ _____

(41) The longest side of a right triangle with integral sides is 41 cm. The triangle's area is _____ cm^2

(42) $506^2 =$ _____

(43) The point (h, k) is reflected across the line $y = x$ to point (1, 4). Find h. _____

(44) If $(\sqrt[4]{a^5})(\sqrt[3]{a^k}) = \sqrt[12]{a^{23}}$, $a >$ 1 and a is not a multiple of 3, then k = _____

(45) $412 \times 311 =$ _____

(46) $1331 \div 1.375 =$ _____

(47) $44 \times 3! + 11 \times 4! =$ _____

(48) $456_8 \times 7_8 =$ _____ 8

(49) The smaller root of $7x^2 + 30x + 8 = 0$ is _____

*(50) $\sqrt{84634221} =$ _____

(51) $\frac{7}{20} - \frac{55}{161} =$ _____

(52) If $(3 - 4i)^2 = a + bi$. Find $a + b =$ _____

(53) $3.5 - 2.1 + 1.26 - 0.756 + \ldots =$ _____

(54) If $\log_4(5x + 4) = 3$ then $x =$ _____

(55) If y varies directly with x and $x = -2$ when $y = 6$, find x when $y = -9$. _____

(56) The probability of winning is 75%. The odds of losing is _____ (proper fraction)

(57) The sum of the coefficients of $(x + y)^6$ is _____

(58) The 16^{th} term of 2, 7, 12, 17,... is _____

(59) ${}_8C_5 \div {}_8C_3 = {}_8C_k$. Find k. _____

*(60) $777 \times 4545 \div 77 =$ _____

(61) Vector $u = (-3, -6)$ and vector $v = (-4,8)$. The dot product for u and v is _____

(62) If $\log_x 6 = \frac{1}{3}$ then $x =$ _____

(63) Find x, if $\det \begin{vmatrix} 2 & -3 \\ 4 & -x \end{vmatrix} = 6$. _____

(64) $\tan \frac{5\pi}{6} \times \cot \frac{4\pi}{3} =$ _____

(65) $62^2 - 61^2 + 60^2 - 59^2 =$ _____

(66) The greatest integer function $f(x) = [2 - x]$ has a value of _____ for $f(e)$

(67) If $\sqrt{15 - \sqrt{12 + \sqrt{6 - x}}} = 3$ then $x =$ _____

(68) $\sqrt{4444.8889} =$ _____ (decimal)

(69) $4^9 \div 5$ has a remainder of _____

*(70) $(e)^{\pi} \times (\pi)^e \times \frac{\sqrt{5}-1}{2} =$ _____

(71) The smallest value of x in the domain of f(x) so that $f(x) = \sqrt{12 + 4x}$ has a real valued range is _____

(72) If $f(x) = 5x^3 - 4x^2 + 2$, then $f''(-1) =$ _____

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

(74) Change .88 base 9 to a base 10 fraction. _____

(75) The horizontal asymptote of $y = \frac{3x - 2}{5 - x}$ is _____

(76) $\int_0^{\pi} \sin(x)\, dx =$ _____

(77) If the initial point of a vector is (3, $-$ 5) and the terminal point is ($-$ 2,7), then $\|v\| =$ _____

(78) $\frac{1}{6} + \frac{1}{10} + \frac{1}{15} =$ _____

(79) $11^3 \times 121 =$ _____

*(80) $3333 \div 66\frac{2}{3}\% \times 3.6 =$ _____

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STOP -- WAIT FOR SIGNAL!

(1) $5308 - 3085 =$ _____

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

(3) $1.21 \times 1.1 =$ _____ (decimal)

(4) $\frac{8}{25} \div 3.125 =$ _____

(5) $14 + 16 \div 18 \times (20 - 22) =$ _____

(6) $28^2 =$ _____

(7) $37 \times 15 =$ _____

(8) $27.5\% =$ _____ (proper fraction)

(9) $50308 \div 9 =$ _____ (mixed number)

*(10) $41 \times 414 + 4141 =$ _____

(11) $1\frac{1}{5}$ is 42% of _____

(12) $88 \times 82 =$ _____

(13) If 5 gallons of gas costs $14.40 then 5 quarts of gas will cost $ _____

(14) If LCM(k, 48) = 96 and GCD(k, 48) = 16 then k is _____

(15) $(34 \times 56 - 78) \div 12$ has a remainder of _____

(16) If 1 gram = .04 oz., then 600 grams = _____ lbs.

(17) $CCXXV \times XV =$ _____ (Arabic Numeral)

(18) The largest prime divisor of 87 is _____

(19) The additive inverse of $1\frac{2}{3}$ is _____

*(20) $50308 \div 538 =$ _____

(21) $(4)^{-3} \times (4)^2 \div (4)^{-1} =$ _____

(22) The discriminant of $5 - 3x + 8x^2 = 0$ is _____

(23) If $\frac{9}{11x} = \frac{7}{9}$, then x = _____ (mixed number)

(24) $2.222... - 5.555... =$ _____

(25) Harry walked 1 mile in 15 minutes. What was his average speed? _____ mile per hour

(26) $503_8 =$ _____ $_{10}$

(27) $(3^3 + 4^4 \times 5^5) \div 6$ has a remainder of _____

(28) $28\frac{1}{7} \times 7\frac{1}{7} =$ _____ (mixed number)

(29) If $4 - x = 8$, then $x + 4 =$ _____

*(30) $119 \times 45 + 15 \times 143 =$ _____

(31) If A = 5, B = − 3, and C = 8, then $AB \div (AC) \times (C \div B) =$ _____

(32) Find the largest digit k such that 50308k is divisible by 6. k = _____

(33) $1^2 + 1^2 + 2^2 + 3^2 + 5^2 + 8^2 + 13^2 =$ _____

(34) 60% of 75 minus 90 is _____

(35) The sum of the roots divided by the product of the roots of $8x^3 - 18x^2 - 17x = 3$ is _____

(36) $\left|2 - |-3-5|\right| - 7 =$ _____

(37) If $3x + 4y = 5$ and $x - 2y = 3$, then $x =$ _____

(38) $\sqrt[3]{3375} =$ _____

(39) If 8 is to 20 as 14 is to x, then $x =$ _____

*(40) 1 mile + 2 yards + 3 feet = _____ inches

(41) $48 \times 0.1875 =$ _____

(42) $409^2 =$ _____

(43) $80 \times 3! + 16 \times 5! =$ _____

(44) $503_9 - 308_9 =$ _____ $_9$

(45) The x-intercept of the line containing the points (1 , 3) and (5 , 7) is (x , y). $x =$ _____

(46) The measure of an exterior angle of a regular dodecagon is _____ °

(47) If $A \neq 0$ and $A^3 \div A^5 \times A = A^k$ then $k =$ ____

(48) $221 \times 332 =$ _____

(49) The larger root of $5x^2 + 24x - 5 = 0$ is _____

*(50) $24^3 \div 12^2 \times 6^3 =$ _____

(51) $\frac{11}{14} - \frac{109}{141} =$ _____

(52) The sides of a triangle are 8, 11 and x. The least value of x, where x is a natural number, is ____

(53) Point (h, k) is the vertex of the parabola $y = 3(x+2)^2 + 5$. Find $h + k$. _____

(54) $(3 - ki)^2 = -16 - 30i$. Find k. _____

(55) If $6\log_x 2 = 2$ then $x =$ _____

(56) ${}_6P_6 \div {}_6P_3 = {}_6P_k$. Find k. _____

(57) If $\sqrt{108} + \sqrt{75} = \sqrt{x}$ then $x =$ _____

(58) $(4 + 9 \times 123) \div 11 =$ _____

(59) The area of $3x^2 + 12y^2 = 4$ is $k\pi$. $k =$ _____

*(60) $(16)^4 =$ _____

(61) $6x^3 + x^2 - 18x + 8$ divided by $x + 2$ has a remainder of _____

(62) If $\det \begin{vmatrix} x & -2 \\ 3 & -4 \end{vmatrix} + 5 = -6$, then $x =$ _____

(63) $\sin[\cos^{-1}(-\frac{\sqrt{3}}{2})] =$ _____

(64) Let $n^2 = \sqrt{n^5 + n^5 + n^5 + n^5 + n^5}$, where $n > 0$. Find n. _____

(65) $9876 \times 9 + 4 =$ _____

(66) The volume of a rectangular based prism with side lengths 4" and 6" is 120 cubic inches. The height of the prism is _____ inches

(67) $7^8 \div 9$ has a remainder of _____

(68) The probability of not rolling a 7 using two fair dice is _____

(69) The greatest integer less than $\sqrt{1100}$ is _____

*(70) $1.6\pi \times 3.1e \times 2.7\phi =$ _____

(71) The polar coordinates of the rectangular coordinates $(\sqrt{3}, 1)$ are $(r, \frac{\pi}{k})$. $k =$ _____

(72) If $f(x) = 6x^2 - 11x + 4$, then $f'(2) =$ _____

(73) Change $\frac{11}{36}$ to a base 6 decimal. _____ $_6$

(74) Find x, $0 \leq x < 7$, if $\frac{(5!)(3!)}{(2!)} \cong x \pmod 7$. ____

(75) $\frac{7}{110} + \frac{7}{132} + \frac{7}{156} =$ _____

(76) $\lim_{x \to 1} \frac{9x^2 - 6x + 1}{3x - 1} =$ _____

(77) $\int_{-1}^{1} (x + 1)\, dx =$ _____

(78) $5 - 4^2 + 3^3 - 2^4 + 1^5 =$ _____

(79) $161051 \div 121 =$ _____

*(80) $2828 \times 28\frac{4}{7}\% \times 2.8 =$ _____

University Interscholastic League - Number Sense Answer Key HS • SAC • Fall 2007

*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) 4015

(2) 5995

(3) 50200

(4) $223\frac{1}{9}$

(5) 82.028

(6) $\frac{16}{21}$

(7) $-4\frac{1}{2}$

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

(9) 4

*(10) 2084 — 2302

(11) 196

(12) 891

(13) $6\frac{1}{3}$

(14) 7

(15) 2008

(16) 30

(17) $\frac{5}{9}$

(18) 22

(19) 6

*(20) 71 — 78

(21) 1

(22) 2

(23) — 11

(24) $1.56

(25) $\frac{3}{11}$

(26) 128

(27) 16

(28) 3.2, $\frac{16}{5}$, $3\frac{1}{5}$

(29) 16.5

*(30) 2728 — 3014

(31) 0

(32) 2091

(33) 44

(34) 2

(35) 4

(36) 33

(37) 24

(38) — 5

(39) 1111

*(40) 111 — 122

(41) 5

(42) 256

(43) 25

(44) — 3.5, $-\frac{7}{2}$, $-3\frac{1}{2}$

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

(46) 40804

(47) 10

(48) 44912

(49) 720

*(50) 86569 — 95681

(51) 60

(52) — 2

(53) 2

(54) 28

(55) 6

(56) 2

(57) 13.5, $\frac{27}{2}$, $13\frac{1}{2}$

(58) 4

(59) 104

*(60) 9587 — 10595

(61) 3844

(62) $\frac{34}{385}$

(63) 4489

(64) 3

(65) 99

(66) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(67) .5 or $\frac{1}{2}$

(68) — 36

(69) 17

*(70) 4365 — 4824

(71) 6

(72) — 3

(73) $\frac{7}{25}$ or .28

(74) 0

(75) 2

(76) — 1

(77) $\frac{1}{18}$

(78) 4

(79) 4995

*(80) 285 — 314

University Interscholastic League - Number Sense Answer Key HS • Invitation A • 2008

*number) x – y means an integer between x and y inclusive

NOTE: If an answer is of the type like $\frac{1}{3}$ it cannot be written as a repeating decimal

(1) 2188

(2) 10040

(3) $2\frac{23}{56}$

(4) $\frac{35}{8}$

(5) ~~-10.5~~, $-\frac{21}{2}$, ~~$-10\frac{1}{2}$~~

(6) $\frac{3}{40}$

(7) 420

(8) 10

(9) 529

*(10) 19914 - 22010

(11) 13

(12) 6.6

(13) $ 5.00

(14) 376

(15) 1.3, $\frac{13}{10}$, $1\frac{3}{10}$

(16) $\frac{8}{9}$

(17) 0

(18) 8

(19) 1004

*(20) – 219395 – – 198499

(21) 28

(22) $\frac{40}{9}$, $4\frac{4}{9}$

(23) $ 125.00

(24) .3125, $\frac{5}{16}$

(25) 75

(26) 15

(27) 13

(28) 2

(29) 1.25, $\frac{5}{4}$, $1\frac{1}{4}$

*(30) 11044 – 12206

(31) 22

(32) 2

(33) 104

(34) 4

(35) 79.04, $\frac{1976}{25}$, $79\frac{1}{25}$

(36) 3

(37) 15

(38) 98

(39) .2, $\frac{1}{5}$

*(40) 1631 – 1802

(41) 36

(42) 3

(43) 65932

(44) 9

(45) 4275

(46) 7

(47) 960

(48) 20

(49) $21\frac{3}{7}$

*(50) 308 – 340

(51) – 7

(52) 48

(53) – 4

(54) $\frac{32}{261}$

(55) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(56) 4225

(57) 3

(58) 20

(59) 47

*(60) 315188 - 348364

(61) 75

(62) 9

(63) 11

(64) – 6

(65) – .5, $-\frac{1}{2}$

(66) 12

(67) 6

(68) 667

(69) 3

*(70) 5053 – 5584

(71) – .125, $-\frac{1}{8}$

(72) – 1.25, $-\frac{5}{4}$, $-1\frac{1}{4}$

(73) 3

(74) 9

(75) – 26

(76) $\frac{16}{3}$, $5\frac{1}{3}$

(77) 5

(78) 2997

(79) $\frac{2}{3}$

*(80) 427 – 471

University Interscholastic League - Number Sense Answer Key HS • Invitation B • 2008

*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) 1748

(2) $\frac{4}{9}$

(3) $261\frac{8}{9}$

(4) – 8

(5) 46

(6) 70

(7) 961

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

(9) $-\frac{11}{13}$

*(10) 23722 – 26218

(11) 90

(12) 40

(13) $\frac{16}{3}$, $5\frac{1}{3}$

(14) 2

(15) $2.42

(16) 210

(17) 1662

(18) 100

(19) 124

*(20) 972 – 1074

(21) 3

(22) 1

(23) – 8

(24) 2197

(25) 64

(26) 1

(27) 1010

(28) 1

(29) 8

*(30) 3147 – 3477

(31) 0

(32) $\frac{15}{22}$

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

(34) 10

(35) 14

(36) 1.25, $\frac{5}{4}$, $1\frac{1}{4}$

(37) 24

(38) 2.5, $\frac{5}{2}$, $2\frac{1}{2}$

(39) 122

*(40) 168097 – 185790

(41) 12.5, $\frac{25}{2}$, $12\frac{1}{2}$

(42) 163216

(43) 108

(44) 2975

(45) 12

(46) 36000

(47) – 2

(48) $\frac{16}{737}$

(49) 9

*(50) 433608 – 479249

(51) 2

(52) 16

(53) $\frac{8}{3}$, $2\frac{2}{3}$

(54) 2

(55) 74

(56) $\frac{2}{3}$

(57) 1225

(58) 11111

(59) 6

*(60) 60 – 65

(61) $\frac{1}{18}$

(62) – 12

(63) .5, $\frac{1}{2}$

(64) 4

(65) 9

(66) 4448.89, $\frac{444889}{100}$, $4448\frac{89}{100}$

(67) 6

(68) $-\frac{3}{4}$

(69) 53

*(70) 572 – 631

(71) 5

(72) .5, $\frac{1}{2}$

(73) .03

(74) 3

(75) 30

(76) 168

(77) 2

(78) $\frac{19}{3}$, $6\frac{1}{3}$

(79) .125, $\frac{1}{8}$

*(80) 714 – 788

2007-08 TMSCA High School Number Sense Test 6 - Answer Key

*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) – 730

(2) 9100

(3) $250\frac{7}{8}$

(4) 150600

(5) – 200

(6) $6\frac{14}{15}$

(7) .2

(8) 2.5, $\frac{5}{2}$, $2\frac{1}{2}$

(9) 324

*(10) (– 9807) – (– 8873)

(11) – 12.5, $-\frac{25}{2}$, $-12\frac{1}{2}$

(12) 616

(13) 17

(14) 2

(15) 4

(16) 46

(17) 10

(18) $-\frac{5}{6}$

(19) 223

*(20) 54034 – 59720

(21) 8

(22) 5

(23) 40

(24) $\frac{4}{7}$

(25) 2

(26) 3.125

(27) 12

(28) 7

(29) 310

*(30) 616 – 680

(31) $\frac{19}{33}$

(32) 1

(33) 66

(34) 20.25, $\frac{81}{4}$, $20\frac{1}{4}$

(35) – 1

(36) 40

(37) 36.3

(38) 42

(39) 987

*(40) 472 – 521

(41) 2

(42) 4.75, $\frac{19}{4}$, $4\frac{3}{4}$

(43) 320

(44) 8742

(45) 0

(46) $\frac{17}{310}$

(47) 4

(48) $-\frac{4}{3}$, $-1\frac{1}{3}$

(49) 2400

*(50) 616 – 680

(51) 10

(52) – 1

(53) $\frac{8}{3}$, $2\frac{2}{3}$

(54) 3

(55) 14

(56) 25

(57) 33

(58) 12

(59) 2

*(60) 434128 - 479824

(61) 19

(62) 998001

(63) – 3

(64) .2, $\frac{1}{5}$

(65) – 3

(66) 67

(67) .25, $\frac{1}{4}$

(68) $\frac{5}{3}$, $1\frac{2}{3}$

(69) 401

*(70) 592 – 653

(71) 2

(72) .5, $\frac{1}{2}$

(73) 5

(74) 2

(75) – 162

(76) .44

(77) – .5, $-\frac{1}{2}$

(78) 2.5, $\frac{5}{2}$, $2\frac{1}{2}$

(79) $\frac{10}{9}$, $1\frac{1}{9}$

*(80) 171 – 188

2007-08 TMSCA High School Number Sense Test 12 - Answer Key

*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) — 2188

(2) $\frac{1}{11}$

(3) 21.33

(4) 1.8

(5) $\frac{21}{20}$

(6) 361

(7) 420

(8) — 94

(9) 7

*(10) 7630 — 8432

(11) 3149

(12) — 21.2, $-\frac{106}{5}$, $-21\frac{1}{5}$

(13) 7.5

(14) 390

(15) 111

(16) 72

(17) — 8

(18) 6

(19) .47

*(20) 212 — 233

(21) — 1

(22) $\frac{4}{9}$

(23) $1\frac{3}{25}$

(24) 7

(25) 240

(26) 6

(27) — 1

(28) 3

(29) $-\frac{4}{9}$

*(30) 2771 — 3061

(31) 5

(32) — 4

(33) 729

(34) 153

(35) 45

(36) 143

(37) 3.4, $\frac{17}{5}$, $3\frac{2}{5}$

(38) 2

(39) 6

*(40) 317 — 349

(41) 2

(42) 56

(43) 10

(44) 7

(45) 5

(46) 1440

(47) 42

(48) 15129

(49) — 4

*(50) 10586 — 11699

(51) $\frac{8}{11}$

(52) 3

(53) 120

(54) — 71

(55) 302

(56) 50

(57) 6

(58) 2

(59) 4

*(60) 201 — 221

(61) 3

(62) — .5, $-\frac{1}{2}$

(63) 8888

(64) 2

(65) 38

(66) 17

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

(68) — 11

(69) 4

*(70) 494 — 545

(71) 1

(72) $\frac{55}{64}$

(73) 61

(74) 4

(75) 26

(76) 517

(77) 12.5, $\frac{25}{2}$, $12\frac{1}{2}$

(78) 155

(79) $\frac{10}{11}$

*(80) 283 — 311

University Interscholastic League - Number Sense Answer Key HS • District 1 • 2008

***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) — 70

(2) 10010

(3) .5, $\frac{1}{2}$

(4) 4

(5) — .25, — $\frac{1}{4}$

(6) 6100

(7) 729

(8) $\frac{11}{12}$

(9) $\frac{3}{40}$

***(10) 25175 - 27825**

(11) 36

(12) $8\frac{3}{16}$

(13) — 26.1, — $\frac{261}{10}$, — $26\frac{1}{10}$

(14) 29

(15) 133

(16) 8

(17) 20

(18) 2008

(19) 0

***(20) 1164 — 1286**

(21) 1

(22) — 6

(23) 8

(24) 271

(25) 5

(26) 24

(27) 5338

(28) — 16

(29) .875, $\frac{7}{8}$

***(30) 13042 — 14414**

(31) — 19

(32) 1.4, $\frac{7}{5}$, $1\frac{2}{5}$

(33) 2197

(34) .25, $\frac{1}{4}$

(35) 6

(36) 1210

(37) .3125, $\frac{5}{16}$

(38) 175

(39) 496

***(40) 70148 — 77532**

(41) 8

(42) 21600

(43) 40382

(44) 11

(45) $\frac{19}{1590}$

(46) 7

(47) 7

(48) 499849

(49) — 1

***(50) 821 — 907**

(51) 49

(52) — 3

(53) — 9

(54) 55

(55) — 140

(56) 7

(57) — 5.5, — $\frac{11}{2}$, — $5\frac{1}{2}$

(58) — $\frac{8}{3}$, — $2\frac{2}{3}$

(59) 48

***(60) 9587 — 10595**

(61) 34

(62) — 41

(63) — .5, — $\frac{1}{2}$

(64) 485

(65) 6667

(66) 8

(67) 278

(68) 32

(69) 7

***(70) 1237 — 1366**

(71) 67

(72) 1

(73) $\frac{3}{55}$

(74) 0

(75) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(76) 123321

(77) 21

(78) $\frac{26}{3}$, $8\frac{2}{3}$

(79) 44

***(80) 9500 — 10500**

University Interscholastic League - Number Sense Answer Key HS • District 2 • 2008

***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) 117

(2) 10100

(3) $\frac{4}{7}$

(4) 4.92

(5) $-12.5, -\frac{25}{2}, -12\frac{1}{2}$

(6) $16\frac{4}{25}$

(7) $3.75, \frac{15}{4}, 3\frac{3}{4}$

(8) 5

(9) 256

***(10) 21461 - 23719**

(11) 1584

(12) 19

(13) 17

(14) $5.88

(15) 1

(16) 198

(17) $2\frac{7}{10}$

(18) 5214

(19) 2008

***(20) 172919 – 191119**

(21) 2

(22) 111111

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

(24) 242

(25) 0

(26) 2025

(27) 15

(28) $196\frac{1}{64}$

(29) — 12

***(30) 560 – 618**

(31) 547

(32) 4

(33) 37520

(34) 2197

(35) $-\frac{32}{3}, -10\frac{2}{3}$

(36) — 54

(37) $\frac{7}{30}$

(38) 140

(39) 350

***(40) 57982 — 64084**

(41) 15

(42) 10925

(43) 144

(44) 58

(45) $.5, \frac{1}{2}$

(46) 29213

(47) 546

(48) 5120

(49) 80

***(50) 4596 — 5078**

(51) 2

(52) $2.4, \frac{12}{5}, 2\frac{2}{5}$

(53) 1

(54) 336

(55) 80

(56) 2

(57) $\frac{11}{18}$

(58) 18

(59) 1024

***(60) 40732 — 45018**

(61) 25

(62) 143

(63) 256

(64) 6

(65) — 2

(66) 3

(67) 9

(68) 28800

(69) — 11

***(70) 176 — 194**

(71) $\frac{45}{49}$

(72) 3

(73) $1.5, \frac{3}{2}, 1\frac{1}{2}$

(74) 4

(75) — 40

(76) $\frac{4}{77}$

(77) 22533

(78) 40

(79) 288

***(80) 162 — 177**

University Interscholastic League - Number Sense Answer Key HS • Regional • 2008

*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) 1990

(2) 20

(3) $6\frac{1}{3}$

(4) 32

(5) 1

(6) 3564

(7) 5.25

(8) 576

(9) 1

*(10) 74457 - 82293

(11) $-\frac{8}{11}$

(12) 8217

(13) $-\frac{7}{6}, -1\frac{1}{6}$

(14) 65.25, $\frac{261}{4}$, $65\frac{1}{4}$

(15) $1.50

(16) 16

(17) 1728

(18) 0

(19) 28

*(20) 7525 – 8316

(21) 3

(22) 10011101

(23) $\frac{20}{9}, 2\frac{2}{9}$

(24) – 11

(25) 36

(26) 7

(27) 3

(28) 3198

(29) 27

*(30) 256,671 – 283,689

(31) 25

(32) $52\frac{1}{16}$

(33) 143

(34) – 14

(35) – 61

(36) – .25, $-\frac{1}{4}$

(37) 135

(38) 2744

(39) 7

*(40) 5672 – 6268

(41) 180

(42) 256036

(43) 4

(44) 2

(45) 128132

(46) 968

(47) 528

(48) 4102

(49) – 4

*(50) 8740 – 9659

(51) $\frac{27}{3220}$

(52) – 31

(53) 2.1875, $\frac{35}{16}$, $2\frac{3}{16}$

(54) 12

(55) 3

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

(57) 64

(58) 77

(59) 8 , 0

*(60) 43571 – 48156

(61) – 36

(62) 216

(63) 3

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

(65) 242

(66) – 1

(67) – 570

(68) 66.67

(69) 4

*(70) 306 – 337

(71) – 3

(72) – 38

(73) 27

(74) $\frac{80}{81}$

(75) – 3

(76) 2

(77) 13

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

(79) 161051

*(80) 17099 – 18898

University Interscholastic League - Number Sense Answer Key HS • State • 2008

*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) 2223

(2) $13\frac{39}{40}$

(3) 1.331

(4) .1024, $\frac{64}{625}$

(5) $\frac{110}{9}$, $12\frac{2}{9}$

(6) 784

(7) 555

(8) $\frac{11}{40}$

(9) $5589\frac{7}{9}$

*(10) 20060 - 22170

(11) $\frac{20}{7}$, $2\frac{6}{7}$

(12) 7216

(13) $3.60

(14) 32

(15) 2

(16) 1.5, $\frac{3}{2}$, $1\frac{1}{2}$

(17) 3375

(18) 29

(19) $-\frac{5}{3}$, $-1\frac{2}{3}$

*(20) 89 – 98

(21) 1

(22) – 151

(23) $1\frac{4}{77}$

(24) $-\frac{10}{3}$, $-3\frac{1}{3}$

(25) 4

(26) 323

(27) 5

(28) $201\frac{1}{49}$

(29) 0

*(30) 7125 – 7875

(31) 1

(32) 8

(33) 273

(34) – 45

(35) 6

(36) – 1

(37) 2.2, $\frac{11}{5}$, $2\frac{1}{5}$

(38) 15

(39) 35

*(40) 60295 – 66641

(41) 9

(42) 167281

(43) 2400

(44) 184

(45) – 2

(46) 30

(47) – 1

(48) 73372

(49) .2, $\frac{1}{5}$

*(50) 19700 – 21772

(51) $\frac{25}{1974}$

(52) 4

(53) 3

(54) 5

(55) 8

(56) 1

(57) 363

(58) 101

(59) $\frac{2}{3}$

*(60) 62260 – 68812

(61) 0

(62) 4.25, $\frac{17}{4}$, $4\frac{1}{4}$

(63) .5, $\frac{1}{2}$

(64) .2, $\frac{1}{5}$

(65) 88888

(66) 5

(67) 4

(68) $\frac{5}{6}$

(69) 33

*(70) 176 – 194

(71) 6

(72) 13

(73) .15

(74) 3

(75) $\frac{21}{130}$

(76) 2

(77) 2

(78) 1

(79) 1331

*(80) 2150 – 2375