

**University Interscholastic League
2021 – 2022 Elementary Number Sense Test A**

Contestant's Number _____

Final		
2 nd		
1 st		
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.

The person conducting this contest should explain these directions to the contestants.
Stop – Wait for Signal!

- | | |
|---|---|
| <p>(1) $22 - 19 =$ _____</p> <p>(2) $7 \times 12 =$ _____</p> <p>(3) $220 \div 4 =$ _____</p> <p>(4) $2021 + 2022 =$ _____</p> <p>(5) $12 \times 5 \times 10 =$ _____</p> <p>(6) $132 \times 5 =$ _____</p> <p>(7) $143 \div 11 =$ _____</p> <p>(8) $73 - 28 - 25 =$ _____</p> <p>(9) $24 \times 25 =$ _____</p> <p>*(10) $201 \times 2021 =$ _____</p> <p>(11) 414599.6206 rounded to the thousands place is
_____</p> <p>(12) $22 \times 18 =$ _____</p> <p>(13) Which digit is in the hundred-thousandths place in 21340.65789? _____</p> <p>(14) $24 \times 12 =$ _____</p> <p>(15) What is the remainder for $2918 \div 9$? _____</p> <p>(16) There are _____ whole numbers between 6 and 26.</p> <p>(17) $2 \times 10^4 + 6 \times 10^1 + 8 \times 10^{-1} =$ _____ (decimal)</p> <p>(18) $8 \times 15 - 15 \times 2 =$ _____</p> <p>(19) MMXXI = _____ (Arabic Numeral)</p> | <p>*(20) $2022 \times 21 - 2022 =$ _____</p> <p>(21) $14 + 16 + 18 + 20 =$ _____</p> <p>(22) $18 \div 2 \times 3 =$ _____</p> <p>(23) $4 \frac{1}{7}$ weeks = _____ days</p> <p>(24) $5 \frac{3}{4} \% =$ _____ decimal</p> <p>(25) $\frac{13}{24} + \frac{5}{24} =$ _____</p> <p>(26) $92 \times 93 =$ _____</p> <p>(27) $0.96 =$ _____ common fraction</p> <p>(28) If 48 ♣ costs 64¢ then 36 ♣ cost _____ ¢</p> <p>(29) $79 \times 11 =$ _____</p> <p>*(30) $667 \times 239 =$ _____</p> <p>(31) 17 quarters = _____ nickels</p> <p>(32) The sum of the two largest primes less than 10 is
_____</p> <p>(33) \$3.20 minus 3 quarters = \$ _____</p> <p>(34) $\frac{9}{100} \div \frac{27}{100} =$ _____</p> <p>(35) 72 inches = _____ feet</p> <p>(36) The LCM of 12 and 9 is _____</p> <p>(37) $48 \times 101 =$ _____</p> |
|---|---|

- (38) $87\frac{1}{2}\%$ = _____ common fraction
- (39) The ratio of ounces in 1 pint to 1 quart is _____
- *(40) $44\frac{4}{9}\%$ \times 6299 = _____
- (41) 16^2 = _____
- (42) 4^3 = _____
- (43) The volume of a cube with side 4-cm is _____ cm^3
- (44) The perimeter of a rectangle with sides 11-m and 19-m is _____ m
- (45) If $15 + x = 36$, then $x =$ _____
- (46) $\frac{9}{10} \div \frac{3}{5} =$ _____
- (47) $6\frac{1}{3} \times 6\frac{2}{3} =$ _____ (mixed number)
- (48) $37 \times 33 =$ _____
- (49) If $x = 15$, then $3x - 20 =$ _____
- *(50) $13 \times 15 \times 17 =$ _____
- (51) What is the number, k , in the sequence:
1, 1, 2, 3, k , 8, 13, ...? _____
- (52) If the area of a circle is 144π , what is the diameter of the circle? _____
- (53) What is the area of a right triangle with hypotenuse 5 in. and leg 4 in.? _____ in^2
- (54) $125 \times 16 =$ _____
- (55) What whole number squared minus eight equals twenty-eight? _____
- (56) A triangle has sides of 10-in, 12-in and 14-in. What is its semi-perimeter? _____ in
- (57) How many elements are in the intersection of the sets $\{1, 2, 3, \dots, 10\}$ and $\{2, 4, 6, \dots, 20\}$? _____
- (58) How many elements are in the power set of $\{T, H, R, E, E\}$? _____
- (59) What is the perimeter of the rhombus with a side length of $16\frac{1}{4}$? _____
- *(60) 2991 weeks = _____ days
- (61) 27 (base 10) = _____ (base 9)
- (62) $-2^4 \div 4 =$ _____
- (63) 10 square feet = _____ sq.in.
- (64) $32^2 =$ _____
- (65) Two fair dice are thrown. What is the probability that the sum of the two sides showing is 5? _____
- (66) 15 quarters plus 18 nickels plus 9 dimes plus 15 cents = \$ _____
- (67) The volume of a rectangular box that measures 10-m by 8-m by 12-m is _____ m^3
- (68) If $x + 12 < 8$, then $x <$ _____
- (69) $\frac{7}{9} + \frac{9}{7} =$ _____ (mixed number)
- *(70) $1111 \times 809 + 1 =$ _____
- (71) 390 seconds = _____ minutes
- (72) For a rectangle with sides 4-cm and 8-cm, what is the ratio of its perimeter to its area? _____
- (73) If 9% of x is 4.5% of 6, then $x =$ _____
- (74) $(-18) + (-24) \div (-2) =$ _____
- (75) $36^2 + 12^2 =$ _____
- (76) $28^2 - 18^2 =$ _____
- (77) What is the distance between -12 and 12 on the number line? _____
- (78) $143 \times 28 =$ _____
- (79) The area of a square with diagonal 8 is _____
- *(80) $\sqrt{81796} =$ _____

2021 – 2022 University Interscholastic League Elementary Number Sense Test A – Key

(1) 3	*(20) 38418 – 42462	(38) $\frac{7}{8}$	(59) 65
(2) 84	(21) 68	(39) $\frac{1}{2}; .5$	*(60) 19891 – 21983
(3) 55	(22) 27	*(40) 2660 – 2939	(61) 30
(4) 4043	(23) 29	(41) 256	(62) -4
(5) 600	(24) .0575	(42) 64	(63) 1440
(6) 660	(25) $\frac{3}{4}; .75$	(43) 64	(64) 1024
(7) 13	(26) 8556	(44) 60	(65) $\frac{1}{9}$
(8) 20	(27) $\frac{24}{25}$	(45) 21	(66) 5.70
(9) 600	(28) 48	(46) $\frac{3}{2}; 1\frac{1}{2}; 1.5$	(67) 960
*(10) 385910 – 426532	(29) 869	(47) $42\frac{2}{9}$	(68) -4
(11) 415000	*(30) 151443 – 167383	(48) 1221	(69) $2\frac{4}{63}$
(12) 396	(31) 85	(49) 25	*(70) 853860 – 943740
(13) 9	(32) 12	*(50) 3150 – 3480	(71) $6.5; 6\frac{1}{2}; \frac{13}{2}$
(14) 288	(33) 2.45	(51) 5	(72) $\frac{3}{4}; .75$
(15) 2	(34) $\frac{1}{3}$	(52) 24	(73) 3
(16) 19	(35) 6	(53) 6	(74) -6
(17) 20060.8	(36) 36	(54) 2000	(75) 1440
(18) 90	(37) 4848	(55) 6	(76) 460
(19) 2021		(56) 18	(77) 24
		(57) 5	(78) 4004
		(58) 32	(79) 32
			*(80) 272 – 300

Note: *(Number) x – y means an integer between x and y inclusive.

If an answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or $\overline{.6}$.

University Interscholastic League
2021 – 2022 Junior High Number Sense Test A

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|--|--|
| <p>(1) $32 \times 11 =$ _____</p> <p>(2) $21 + 22 =$ _____</p> <p>(3) $205 \div 5 =$ _____</p> <p>(4) $12 + 6 \div 3 =$ _____</p> <p>(5) $\frac{7}{12} + \frac{1}{6} =$ _____</p> <p>(6) $234 \times 0.5 =$ _____</p> <p>(7) $101 \div 0.25 =$ _____</p> <p>(8) $23^2 =$ _____</p> <p>(9) $12 \times 6 \times 5 =$ _____</p> <p>*(10) $2021 \div 0.0125 =$ _____</p> <p>(11) $15.25 \times 4 =$ _____</p> <p>(12) What is the median of 2, 6, 9 and 8? _____</p> <p>(13) Which is larger: $\frac{8}{15}$ or $\frac{13}{25}$? _____</p> <p>(14) $25 \times 38 =$ _____</p> <p>(15) $105 - 17 - 33 =$ _____</p> <p>(16) $28 \times 88 =$ _____</p> <p>(17) $176 \div 11 =$ _____</p> <p>(18) $13 + 18 + 23 + 28 =$ _____</p> <p>(19) MCMXXV = _____ (Arabic Numeral)</p> | <p>*(20) $1818 \times 88 + 16 =$ _____</p> <p>(21) $0.25 \times 24 + 0.5 \times 24 =$ _____</p> <p>(22) If $f(x) = 3x^2 + 5$, then $f(-3) =$ _____</p> <p>(23) The ratio of ounces in 3 cups to 1 quart is _____</p> <p>(24) $6\frac{1}{3} \times 12\frac{1}{3} =$ _____ (mixed number)</p> <p>(25) $5\frac{3}{4} + 4\frac{5}{6} =$ _____</p> <p>(26) $111 \times 64 =$ _____</p> <p>(27) The negative square root of 169 is _____</p> <p>(28) If n is to 8 as 3 is to 4, then $n =$ _____</p> <p>(29) If $12 - 4x$ is 16 then $x =$ _____</p> <p>*(30) $18 \times 20 \times 22 =$ _____</p> <p>(31) $84 \times 75 =$ _____</p> <p>(32) The sum of the two largest prime numbers less than 20 is _____</p> <p>(33) If $0.75 - 0.25 = n$, the $n^{-1} =$ _____</p> <p>(34) The product of the lcm and gcd of 8 and 24 is _____</p> <p>(35) 1 mile = _____ feet</p> <p>(36) 8 percent = _____ (common fraction)</p> <p>(37) The total cost of item that costs \$160 with a sales tax of $6\frac{1}{4}\%$ is \$ _____</p> |
|--|--|

- (38) $46 \times 44 =$ _____
- (39) The area of an equilateral triangle with side 4-cm is $a\sqrt{3}$ and $a =$ _____ cm^2
- *(40) $19\sqrt{14400} =$ _____
- (41) 23 (base 4) = _____ (base 2)
- (42) $9^3 =$ _____
- (43) \$5 minus 3 quarters minus 4 nickels = \$ _____
- (44) What is the length of a diagonal of a rhombus with an area of 36 m^2 and other diagonal 4 m? _____ m
- (45) 23 (base 5) – 14 (base 5) = _____ (base 5)
- (46) $72 \times 68 =$ _____
- (47) What is the length of an edge of a cube with surface area 2400? _____
- (48) $95 \times 96 =$ _____
- (49) $10 \times (0.1 + 0.2 + 0.3 + \dots + 1.0) =$ _____
- *(50) $502\pi^2 =$ _____
- (51) In the sequence: 1, 4, a , 16, 25, b , 49, ...
 $a - b =$ _____
- (52) If $\frac{1}{3}x - 12 > 15$, then $x >$ _____
- (53) What is the area of a right triangle with leg 5 cm and hypotenuse 13 cm? _____ cm^2
- (54) $23(\text{base } 5) \times 4(\text{base } 5) =$ _____ (base 5)
- (55) What number times eight and added to fifteen equals nineteen? _____
- (56) What is the area of a trapezoid with bases 26, 24 and altitude 25? _____
- (57) If set $\mathbf{A} = \{S, A, N, M, A, R, C, O, S\}$ and set $\mathbf{B} = \{S, A, N, A, N, T, O, N, I, O\}$, then the number of elements in $\mathbf{A} \cap \mathbf{B}$ is _____
- (58) $(14^2 - 8 \times 6) \div 5$ has a remainder of _____
- (59) $101 \times 243 =$ _____
- *(60) $749 \times 361 =$ _____
- (61) $2 \times (2^{-1} + 2^{-2}) =$ _____
- (62) 3 miles = _____ yards
- (63) 30 miles per hour = _____ ft/sec
- (64) 20% of 55% of 100 = _____
- (65) What are the odds of picking a red queen from a standard deck of 52 cards? _____
- (66) The number of minutes between 10:12 AM and 3:30 PM of the same day is _____
- (67) How many whole numbers will evenly divide into 18? _____
- (68) $0! =$ _____
- (69) $4\frac{1}{4} \div \frac{1}{8} =$ _____
- *(70) $249700 \div 126 =$ _____
- (71) $25^2 + 75^2 =$ _____
- (72) $0.777\dots =$ _____ (common fraction)
- (73) $0.8333\dots =$ _____ (common fraction)
- (74) The volume of a right cylinder with length 12 and radius 4 is $k\pi$, and $k =$ _____
- (75) The fourth triangular number is _____
- (76) $286 \times 7 =$ _____
- (77) What is the distance between the points (0, 5) and (-12, 0)? _____
- (78) $\frac{8!}{6!} + 25 =$ _____
- (79) $37^2 - 26^2 =$ _____
- *(80) 15 square miles = _____ acres

2021 – 2022 University Interscholastic League Junior High Number Sense Test A – Key

(1) 352	*(20) 152000 – 168000	(38) 2024	(59) 24543
(2) 43	(21) 18	(39) 4	*(60) 256870 – 283908
(3) 41	(22) 32	*(40) 2166 – 2394	(61) $1.5; 1\frac{1}{2}; \frac{3}{2}$
(4) 14	(23) $\frac{3}{4}; .75$	(41) 1011	(62) 5280
(5) $\frac{3}{4}; .75$	(24) $78\frac{1}{9}$	(42) 729	(63) 44
(6) 117	(25) $10\frac{7}{12}; \frac{127}{12}$	(43) 4.05	(64) 11
(7) 404	(26) 7104	(44) 18	(65) $\frac{1}{25}; .04$
(8) 529	(27) -13	(45) 4	(66) 318
(9) 360	(28) 6	(46) 4896	(67) 6
*(10) 153596 – 169764	(29) -1	(47) 20	(68) 1
(11) 61	*(30) 7524 – 8316	(48) 9120	(69) 34
(12) 7	(31) 6300	*(50) 4707 – 5202	*(70) 1883 – 2080
(13) $\frac{8}{15}$	(32) 36	(51) -27	(71) 6250
(14) 950	(33) 2	(52) 81	(72) $\frac{7}{9}$
(15) 55	(34) 192	(53) 30	(73) $\frac{5}{6}$
(16) 2464	(35) 5280	(54) 202	(74) 192
(17) 16	(36) $\frac{2}{25}$	(55) $.5; \frac{1}{2}$	(75) 10
(18) 82	(37) 170.00	(56) 625	(76) 2002
(19) 1925		(57) 5	(77) 13
		(58) 3	(78) 81
			(79) 693
			*(80) 9120 – 10080

Note: *(Number) x – y means an integer between x and y inclusive.

If an answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or $\overline{.6}$.

**University Interscholastic League
2021 – 2022 Elementary Number Sense Test B**

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|---|--|
| <p>(1) $221 + 19 =$ _____</p> <p>(2) $12 \times 9 =$ _____</p> <p>(3) $2200 \div 5 =$ _____</p> <p>(4) $2021 - 1951 =$ _____</p> <p>(5) $8 \times 10 \times 7 =$ _____</p> <p>(6) $337 \times 6 =$ _____</p> <p>(7) $165 \div 11 =$ _____</p> <p>(8) $49 - 8 - 22 =$ _____</p> <p>(9) $32 \times 25 =$ _____</p> <p>*(10) $301 \times 2022 =$ _____</p> <p>(11) 414599.6206 rounded to the tens place is
_____</p> <p>(12) $37 \times 43 =$ _____</p> <p>(13) Which digit is in the thousands place in
21340.65789? _____</p> <p>(14) $12 \times 17 =$ _____</p> <p>(15) What is the remainder for $4518 \div 9$? _____</p> <p>(16) There are _____ whole numbers between 30 and 7.</p> <p>(17) $3 \times 10^3 + 2 \times 10^2 + 1 \times 10^{-1} =$ _____ (decimal)</p> <p>(18) $11 \times 7 - 11 \times 5 =$ _____</p> <p>(19) MMXXII = _____ (Arabic Numeral)</p> | <p>*(20) $4680 \times 29 + 4679 =$ _____</p> <p>(21) $18 + 23 + 28 + 33 =$ _____</p> <p>(22) $24 \div 4 \times 8 =$ _____</p> <p>(23) $4\frac{1}{2}$ days = _____ hours</p> <p>(24) $3\frac{3}{8}\%$ = _____ decimal</p> <p>(25) $\frac{5}{16} + \frac{3}{16} =$ _____</p> <p>(26) $99 \times 95 =$ _____</p> <p>(27) 0.82 = _____ common fraction</p> <p>(28) If 60 ♣ costs 80¢ then 45 ♣ cost _____ ¢</p> <p>(29) $11 \times 85 =$ _____</p> <p>*(30) $329 \times 667 =$ _____</p> <p>(31) 56 quarters = _____ nickels</p> <p>(32) The sum of the two largest primes less than 30 is
_____</p> <p>(33) \$7.31 minus 5 quarters = \$ _____</p> <p>(34) $\frac{21}{100} \div \frac{27}{100} =$ _____</p> <p>(35) 108 inches = _____ yards</p> <p>(36) The LCM of 18 and 12 is _____</p> <p>(37) $101 \times 89 =$ _____</p> |
|---|--|

- (38) $12\frac{1}{2}\%$ = _____ common fraction
- (39) The ratio of ounces in 1 cup to 1 quart is _____
- *(40) $77\frac{7}{9}\%$ \times 1798 = _____
- (41) 24^2 = _____
- (42) 6^3 = _____
- (43) The volume of a cube with side 3-cm is _____ cm^3
- (44) The perimeter of a rectangle with sides 23-m and 37-m is _____ m
- (45) If $49 + x = 211$, then $x =$ _____
- (46) $\frac{7}{12} \div \frac{14}{15} =$ _____
- (47) $12\frac{4}{5} \times 12\frac{1}{5} =$ _____ (mixed number)
- (48) $69 \times 49 =$ _____
- (49) If $x = 22$, then $3x - 22 =$ _____
- *(50) $39 \times 40 \times 41 =$ _____
- (51) What is the number, k , in the sequence:
2, 5, 10, 17, k , 37, 50, . . .? _____
- (52) If the area of a circle is 256π , what is the diameter of the circle? _____
- (53) What is the area of a right triangle with hypotenuse 13 in. and leg 5 in.? _____ in^2
- (54) $24 \times 125 =$ _____
- (55) What whole number squared plus sixteen equals forty-one? _____
- (56) A triangle has sides of 8-in, 12-in and 12-in. What is its semi-perimeter? _____ in
- (57) How many elements are in the intersection of the sets $\{1, 2, 3, \dots, 12\}$ and $\{1, 3, 5, \dots, 21\}$? _____
- (58) How many elements are in the power set of $\{T, E, N\}$? _____
- (59) What is the perimeter of a regular hexagon with a side length of $6\frac{5}{6}$? _____
- *(60) 2021 years = _____ months
- (61) 21 (base 10) = _____ (base 3)
- (62) $-4^3 \div 8 =$ _____
- (63) 11 square feet = _____ sq.in.
- (64) $81^2 =$ _____
- (65) Two fair dice are thrown. What is the probability that the sum of the two sides showing is 11? _____
- (66) 9 quarters plus 8 nickels plus 19 dimes plus 24 cents = \$ _____
- (67) The volume of a rectangular box that measures 11-m by 5-m by 12-m is _____ m^3
- (68) If $x + 24 > 8$, then $x >$ _____
- (69) $\frac{5}{8} + \frac{8}{5} =$ _____ (mixed number)
- *(70) $271 \times 1111 + 9 =$ _____
- (71) 450 seconds = _____ minutes
- (72) For a rectangle with sides 6-cm and 10-cm, what is the ratio of its perimeter to its area? _____
- (73) If 6% of x is 18% of 6, then $x =$ _____
- (74) $(-12) + (-36) \div (-3) =$ _____
- (75) $33^2 + 11^2 =$ _____
- (76) $34^2 - 22^2 =$ _____
- (77) What is the distance between -8 and 18 on the number line? _____
- (78) $49 \times 143 =$ _____
- (79) The area of a square with diagonal 12 is _____
- *(80) $\sqrt{378225} =$ _____

2021 – 2022 University Interscholastic League Elementary Number Sense Test B – Key

(1) 240	*(20) 133380 – 147418	(38) $\frac{1}{8}$	(59) 41
(2) 108	(21) 102	(39) $\frac{1}{4}$; .25	*(60) 23040 – 25464
(3) 440	(22) 48	*(40) 1329 – 1468	(61) 210
(4) 70	(23) 108	(41) 576	(62) -8
(5) 560	(24) .03375	(42) 216	(63) 1584
(6) 2022	(25) $\frac{1}{2}$; .5	(43) 27	(64) 6561
(7) 15	(26) 9405	(44) 120	(65) $\frac{1}{18}$
(8) 19	(27) $\frac{41}{50}$	(45) 162	(66) 4.79
(9) 800	(28) 60	(46) $\frac{5}{8}$; .625	(67) 660
*(10) 578191 – 639053	(29) 935	(47) $156\frac{4}{25}$	(68) -16
(11) 414600	*(30) 208471 – 230415	(48) 3381	(69) $2\frac{9}{40}$
(12) 1591	(31) 280	(49) 44	*(70) 286036 – 316144
(13) 1	(32) 52	*(50) 60762 – 67158	(71) $7.5; 7\frac{1}{2}; \frac{15}{2}$
(14) 204	(33) 6.06	(51) 26	(72) $\frac{8}{15}$
(15) 0	(34) $\frac{7}{9}$	(52) 32	(73) 18
(16) 22	(35) 3	(53) 30	(74) 0
(17) 3200.1	(36) 36	(54) 3000	(75) 1210
(18) 22	(37) 8989	(55) 5	(76) 672
(19) 2022		(56) 16	(77) 26
		(57) 6	(78) 7007
		(58) 8	(79) 72
			*(80) 585 – 645

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- | | |
|---|---|
| <p>(1) $12 \times 50 =$ _____</p> <p>(2) $34 + 32 =$ _____</p> <p>(3) $244 \div 4 =$ _____</p> <p>(4) $18 - 12 \div 4 =$ _____</p> <p>(5) $\frac{3}{8} + \frac{1}{4} =$ _____</p> <p>(6) $0.5 \times 114 =$ _____</p> <p>(7) $101 \div 0.10 =$ _____</p> <p>(8) $18^2 =$ _____</p> <p>(9) $14 \times 4 \times 5 =$ _____</p> <p>*(10) $21200 \div 0.025 =$ _____</p> <p>(11) $8.25 \times 8 =$ _____</p> <p>(12) What is the median of 11, 18, 7 and 15? _____</p> <p>(13) Which is smaller: $\frac{9}{13}$ or $\frac{13}{18}$? _____</p> <p>(14) $42 \times 25 =$ _____</p> <p>(15) $333 - 56 - 34 =$ _____</p> <p>(16) $72 \times 32 =$ _____</p> <p>(17) $198 \div 11 =$ _____</p> <p>(18) $21 + 25 + 29 + 33 =$ _____</p> <p>(19) MDCCLXXXVI = _____ (Arabic Numeral)</p> | <p>*(20) $1818 \times 66 + 12 =$ _____</p> <p>(21) $0.55 \times 42 + 0.45 \times 42 =$ _____</p> <p>(22) If $f(x) = 3x^2 - 15$, then $f(-3) =$ _____</p> <p>(23) The ratio of ounces in 5 cups to 3 pints is _____</p> <p>(24) $4\frac{3}{7} \times 4\frac{4}{7} =$ _____ (mixed number)</p> <p>(25) $8\frac{7}{9} + 3\frac{5}{6} =$ _____</p> <p>(26) $77 \times 111 =$ _____</p> <p>(27) The negative square root of 289 is _____</p> <p>(28) If 4 is to n as 2 is to 3, then $n =$ _____</p> <p>(29) If $24 - 2x$ is 16 then $x =$ _____</p> <p>*(30) $42 \times 40 \times 38 =$ _____</p> <p>(31) $76 \times 75 =$ _____</p> <p>(32) The sum of the two largest prime numbers less than 40 is _____</p> <p>(33) If $0.125 + 0.25 = n$, the $n^{-1} =$ _____</p> <p>(34) The product of the lcm and gcd of 18 and 15 is _____</p> <p>(35) 2 miles = _____ feet</p> <p>(36) 6 percent = _____ (common fraction)</p> <p>(37) The total cost of item that costs \$80 with a sales tax of $6\frac{1}{4}\%$ is \$ _____</p> |
|---|---|

- (38) $56 \times 54 =$ _____
- (39) The area of an equilateral triangle with side 2-cm is $a\sqrt{3}$ and $a =$ _____ cm^2
- *(40) $24\sqrt{22501} =$ _____
- (41) 31 (base 4) = _____ (base 2)
- (42) $7^3 =$ _____
- (43) \$8 minus 6 quarters minus 7 nickels = \$ _____
- (44) What is the length of a diagonal of a rhombus with an area of 10 m^2 and other diagonal 5 m? _____ m
- (45) 42 (base 6) – 23 (base 6) = _____ (base 6)
- (46) $89 \times 91 =$ _____
- (47) What is the length of an edge of a cube with surface area 600? _____
- (48) $97 \times 93 =$ _____
- (49) $20 \times (0.1 + 0.2 + 0.3 + \dots + 1.0) =$ _____
- *(50) $8990\pi^2 =$ _____
- (51) In the sequence: 1, 1, a , 3, 5, b , 13, . . .
 $2a - b =$ _____
- (52) If $\frac{1}{3}x + 32 > 14$, then $x >$ _____
- (53) What is the area of a right triangle with leg 6 cm and hypotenuse 10 cm? _____ cm^2
- (54) 43 (base 8) \times 4 (base 8) = _____ (base 8)
- (55) What number times fifteen and added to ten equals seventy? _____
- (56) What is the area of a trapezoid with bases 12.5, 23.5 and altitude 20? _____
- (57) If set $\mathbf{A} = \{C, O, M, A, L\}$ and set $\mathbf{B} = \{H, I, D, A, L, G, O\}$, then the number of elements in $\mathbf{A} \cup \mathbf{B}$ is _____
- (58) $(22^2 + 9 \times 7) \div 6$ has a remainder of _____
- (59) $767 \times 101 =$ _____
- *(60) $239 \times 749 =$ _____
- (61) $4 \times (2^{-1} - 2^{-2}) =$ _____
- (62) One-fourth mile = _____ yards
- (63) 60 miles per hour = _____ ft/sec
- (64) 75% of 24% of 100 = _____
- (65) The odds of picking a blue marble from a black bag containing 6 red, 4 black and 8 blue marbles is _____
- (66) The number of minutes between 11:40 AM and 3:30 PM of the same day is _____
- (67) How many whole numbers will evenly divide into 30? _____
- (68) $5! =$ _____
- (69) $6\frac{2}{3} \div \frac{1}{6} =$ _____
- *(70) $349670 \div 175 =$ _____
- (71) $54^2 + 18^2 =$ _____
- (72) $0.7272 \dots =$ _____ (common fraction)
- (73) $0.2777 \dots =$ _____ (common fraction)
- (74) The volume of a right cylinder with length 10 and radius 12 is $k\pi$, and $k =$ _____
- (75) The sixth triangular number is _____
- (76) $286 \times 14 =$ _____
- (77) What is the distance between the points (0, 8) and (-6, 0)? _____
- (78) $\frac{9!}{7!} - 25 =$ _____
- (79) $107^2 - 93^2 =$ _____
- *(80) 12 square miles = _____ acres

2021 – 2022 University Interscholastic League Junior High Number Sense Test B – Key

(1) 600	*(20) 114000 – 126000	(38) 3024	(59) 77467
(2) 66	(21) 42	(39) 1	*(60) 170061 – 187961
(3) 61	(22) 12	*(40) 3421 – 3780	(61) 1
(4) 15	(23) $\frac{5}{6}$	(41) 1101	(62) 440
(5) $\frac{5}{8}; .625$	(24) $20\frac{12}{49}$	(42) 343	(63) 88
(6) 57	(25) $12\frac{11}{18}; \frac{227}{18}$	(43) 6.15	(64) 18
(7) 1010	(26) 8547	(44) 4	(65) $\frac{4}{5}; .8$
(8) 324	(27) -17	(45) 15	(66) 230
(9) 280	(28) 6	(46) 8099	(67) 8
*(10) 805600 – 890400	(29) 4	(47) 10	(68) 120
(11) 66	*(30) 60648 – 67032	(48) 9021	(69) 40
(12) 13	(31) 5700	(49) 110	*(70) 1899 – 2098
(13) $\frac{9}{13}$	(32) 68	*(50) 84292 – 93164	(71) 3240
(14) 1050	(33) $\frac{8}{3}; 2\frac{2}{3}$	(51) -4	(72) $\frac{8}{11}$
(15) 243	(34) 270	(52) -54	(73) $\frac{5}{18}$
(16) 2304	(35) 10560	(53) 24	(74) 1440
(17) 18	(36) $\frac{3}{50}$	(54) 124	(75) 21
(18) 108	(37) 85.00	(55) 4	(76) 4004
(19) 1776		(56) 360	(77) 10
		(57) 9	(78) 47
		(58) 1	(79) 2800
			*(80) 7296 – 8064

Note: *(Number) x – y means an integer between x and y inclusive.

If an answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or $\overline{.6}$.

**University Interscholastic League
2021 – 2022 Elementary Number Sense Test C**

Contestant's Number _____

Final		
2 nd		
1 st		
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.

The person conducting this contest should explain these directions to the contestants.
Stop – Wait for Signal!

- | | |
|--|---|
| <p>(1) $222 + 19 =$ _____</p> <p>(2) $12 \times 8 =$ _____</p> <p>(3) $2020 \div 5 =$ _____</p> <p>(4) $2022 - 1981 =$ _____</p> <p>(5) $7 \times 10 \times 6 =$ _____</p> <p>(6) $6 \times 336 =$ _____</p> <p>(7) $154 \div 11 =$ _____</p> <p>(8) $53 - 7 - 13 =$ _____</p> <p>(9) $16 \times 25 =$ _____</p> <p>*(10) $2021 \times 399 =$ _____</p> <p>(11) 414599.6206 rounded to the hundreds place is
_____</p> <p>(12) $52 \times 48 =$ _____</p> <p>(13) Which digit is in the ten-thousandths place in 21340.65789? _____</p> <p>(14) $22 \times 12 =$ _____</p> <p>(15) What is the remainder for $3672 \div 9$? _____</p> <p>(16) There are _____ whole numbers between 11 and 3.</p> <p>(17) $5 \times 10^3 + 6 \times 10^1 + 1 \times 10^{-1} =$ _____ (decimal)</p> <p>(18) $11 \times 23 - 11 \times 15 =$ _____</p> <p>(19) MMXIX = _____ (Arabic Numeral)</p> | <p>*(20) $8218 \times 29 + 8220 =$ _____</p> <p>(21) $16 + 21 + 26 + 31 =$ _____</p> <p>(22) $36 \div 6 \times 2 =$ _____</p> <p>(23) $5\frac{1}{2}$ days = _____ hours</p> <p>(24) $5\frac{3}{8}\%$ = _____ decimal</p> <p>(25) $\frac{7}{16} + \frac{3}{16} =$ _____</p> <p>(26) $98 \times 97 =$ _____</p> <p>(27) 0.62 = _____ common fraction</p> <p>(28) If 60 ♣ costs 80¢ then 15 ♣ cost _____ ¢</p> <p>(29) $11 \times 47 =$ _____</p> <p>*(30) $269 \times 667 =$ _____</p> <p>(31) 53 quarters = _____ nickels</p> <p>(32) The sum of the two largest primes less than 25 is
_____</p> <p>(33) \$7.31 minus 6 quarters = \$ _____</p> <p>(34) $\frac{21}{100} \div \frac{33}{100} =$ _____</p> <p>(35) 108 inches = _____ feet</p> <p>(36) The LCM of 24 and 16 is _____</p> <p>(37) $101 \times 69 =$ _____</p> |
|--|---|

- (38) $62\frac{1}{2}\%$ = _____ common fraction
- (39) The ratio of ounces in 1 cup to 1 pint is _____
- *(40) $77\frac{7}{9}\%$ \times 3601 = _____
- (41) 19^2 = _____
- (42) 5^3 = _____
- (43) The volume of a cube with side 2-cm is _____ cm^3
- (44) The perimeter of a rectangle with sides 14-m and 36-m is _____ m
- (45) If $57 + x = 214$, then $x =$ _____
- (46) $\frac{7}{9} \div \frac{14}{15} =$ _____
- (47) $11\frac{4}{5} \times 11\frac{1}{5} =$ _____ (mixed number)
- (48) $78 \times 38 =$ _____
- (49) If $x = 19$, then $3x - 19 =$ _____
- *(50) $29 \times 30 \times 31 =$ _____
- (51) What is the number, k , in the sequence:
0, 3, 8, 15, k , 35, 48, . . . ? _____
- (52) If the area of a circle is 169π , what is the diameter of the circle? _____
- (53) What is the area of a right triangle with hypotenuse 13 in. and leg 12 in.? _____ in^2
- (54) $32 \times 125 =$ _____
- (55) What whole number squared plus nineteen equals one hundred? _____
- (56) A triangle has sides of 24-in, 18-in and 18-in. What is its semi-perimeter? _____ in
- (57) How many elements are in the intersection of the sets $\{1, 2, 3, \dots, 15\}$ and $\{1, 3, 5, \dots, 21\}$? _____
- (58) How many elements are in the power set of $\{F, I, V, E\}$? _____
- (59) What is the perimeter of a regular hexagon with a side length of $7\frac{5}{6}$? _____
- *(60) 2022 years = _____ months
- (61) 24 (base 10) = _____ (base 3)
- (62) $-4^2 \div 8 =$ _____
- (63) 12 square feet = _____ sq.in.
- (64) $73^2 =$ _____
- (65) Two fair dice are thrown. What is the probability that the sum of the two sides showing is 7? _____
- (66) 8 quarters plus 8 nickels plus 11 dimes plus 15 cents = \$ _____
- (67) The volume of a rectangular box that measures 12-m by 5-m by 12-m is _____ m^3
- (68) If $x + 24 > 16$, then $x >$ _____
- (69) $\frac{5}{7} + \frac{7}{5} =$ _____ (mixed number)
- *(70) $181 \times 1111 + 9 =$ _____
- (71) 440 seconds = _____ minutes
- (72) For a rectangle with sides 5-cm and 8-cm, what is the ratio of its perimeter to its area? _____
- (73) If 9% of x is 18% of 6, then $x =$ _____
- (74) $(-15) + (-36) \div (-9) =$ _____
- (75) $42^2 + 14^2 =$ _____
- (76) $51^2 - 40^2 =$ _____
- (77) What is the distance between -12 and 18 on the number line? _____
- (78) $56 \times 143 =$ _____
- (79) The area of a square with diagonal 14 is _____
- *(80) $\sqrt{396900} =$ _____

2021 – 2022 University Interscholastic League Elementary Number Sense Test C – Key

(1) 241	*(20) 234215 – 258869	(38) $\frac{5}{8}$	(59) 47
(2) 96	(21) 94	(39) $\frac{1}{2}; .5$	*(60) 23051 – 25477
(3) 404	(22) 12	*(40) 2661 – 2940	(61) 220
(4) 41	(23) 132	(41) 361	(62) -2
(5) 420	(24) .05375	(42) 125	(63) 1728
(6) 2016	(25) $\frac{5}{8}; .625$	(43) 8	(64) 5329
(7) 14	(26) 9506	(44) 100	(65) $\frac{1}{6}$
(8) 33	(27) $\frac{31}{50}$	(45) 157	(66) 3.65
(9) 400	(28) 20	(46) $\frac{5}{6}$	(67) 720
*(10) 766061 – 846697	(29) 517	(47) $132\frac{4}{25}$	(68) -8
(11) 414600	*(30) 170452 – 188394	(48) 2964	(69) $2\frac{4}{35}$
(12) 2496	(31) 265	(49) 38	*(70) 191045 – 211155
(13) 8	(32) 42	*(50) 25622 – 28318	(71) $7\frac{1}{3}; \frac{22}{3}$
(14) 264	(33) 5.81	(51) 24	(72) $\frac{13}{20}$
(15) 0	(34) $\frac{7}{11}$	(52) 26	(73) 12
(16) 7	(35) 9	(53) 30	(74) -11
(17) 5060.1	(36) 48	(54) 4000	(75) 1960
(18) 88	(37) 6969	(55) 9	(76) 1001
(19) 2019		(56) 30	(77) 30
		(57) 8	(78) 8008
		(58) 16	(79) 98
			*(80) 599 – 661

Note: *(Number) x – y means an integer between x and y inclusive.

If an answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or $\overline{.6}$.

**University Interscholastic League
2021 – 2022 Junior High Number Sense Test C**

Contestant's Number _____

Final		
2 nd		
1 st		
Score	Initials	

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The person conducting this contest should explain these directions to the contestants.
Stop – Wait for Signal!

- | | |
|---|--|
| <p>(1) $14 \times 50 =$ _____</p> <p>(2) $42 + 35 =$ _____</p> <p>(3) $255 \div 5 =$ _____</p> <p>(4) $20 - 18 \div 2 =$ _____</p> <p>(5) $\frac{3}{10} + \frac{1}{4} =$ _____</p> <p>(6) $0.5 \times 322 =$ _____</p> <p>(7) $101 \div 0.5 =$ _____</p> <p>(8) $19^2 =$ _____</p> <p>(9) $16 \times 5 \times 2 =$ _____</p> <p>*(10) $6250 \div 0.025 =$ _____</p> <p>(11) $12.25 \times 4 =$ _____</p> <p>(12) What is the median of 9, 17, 20 and 11? _____</p> <p>(13) Which is smaller: $\frac{9}{11}$ or $\frac{11}{13}$? _____</p> <p>(14) $52 \times 25 =$ _____</p> <p>(15) $246 - 33 - 37 =$ _____</p> <p>(16) $42 \times 62 =$ _____</p> <p>(17) $253 \div 11 =$ _____</p> <p>(18) $19 + 23 + 27 + 31 =$ _____</p> <p>(19) MDCCCLXXXV = _____ (Arabic Numeral)</p> | <p>*(20) $1818 \times 77 + 14 =$ _____</p> <p>(21) $0.27 \times 37 + 0.73 \times 37 =$ _____</p> <p>(22) If $f(x) = 3x^2 - 25$, then $f(-4) =$ _____</p> <p>(23) The ratio of ounces in 2 cups to 3 pints is _____</p> <p>(24) $6\frac{2}{7} \times 6\frac{5}{7} =$ _____ (mixed number)</p> <p>(25) $6\frac{2}{3} + 4\frac{5}{6} =$ _____</p> <p>(26) $66 \times 111 =$ _____</p> <p>(27) The negative square root of 361 is _____</p> <p>(28) If 8 is to n as 2 is to 5, then $n =$ _____</p> <p>(29) If $24 - 4x$ is 16 then $x =$ _____</p> <p>*(30) $52 \times 50 \times 48 =$ _____</p> <p>(31) $68 \times 75 =$ _____</p> <p>(32) The sum of the two largest prime numbers less than 50 is _____</p> <p>(33) If $0.125 + 0.375 = n$, the $n^{-1} =$ _____</p> <p>(34) The product of the lcm and gcd of 22 and 20 is _____</p> <p>(35) One-half mile = _____ feet</p> <p>(36) 4 percent = _____ (common fraction)</p> <p>(37) The total cost of item that costs \$32 with a sales tax of $6\frac{1}{4}\%$ is \$ _____</p> |
|---|--|

- (38) $77 \times 73 =$ _____
- (39) The area of an equilateral triangle with side 16-cm is $a\sqrt{3}$ and $a =$ _____ cm^2
- *(40) $26\sqrt{25601} =$ _____
- (41) 33 (base 4) = _____ (base 2)
- (42) $8^3 =$ _____
- (43) \$6 minus 6 quarters minus 6 nickels = \$ _____
- (44) What is the length of a diagonal of a rhombus with an area of 20 m^2 and other diagonal 5 m? _____ m
- (45) 41 (base 6) – 23 (base 6) = _____ (base 6)
- (46) $39 \times 41 =$ _____
- (47) What is the length of an edge of a cube with surface area 96? _____
- (48) $99 \times 99 =$ _____
- (49) $30 \times (0.1 + 0.2 + 0.3 + \dots + 1.0) =$ _____
- *(50) $7502\pi^2 =$ _____
- (51) In the sequence: 1, 1, a , 3, 5, b , 13, . . .
 $3a - b =$ _____
- (52) If $\frac{1}{3}x + 32 > 24$, then $x >$ _____
- (53) What is the area of a right triangle with leg 9 cm and hypotenuse 15 cm? _____ cm^2
- (54) 42 (base 8) \times 4 (base 8) = _____ (base 8)
- (55) What number times twelve and added to twelve equals eighty-four? _____
- (56) What is the area of a trapezoid with bases 12.5, 9.5 and altitude 20? _____
- (57) If set $\mathbf{A} = \{\text{H, A, R, R, I, S}\}$ and set $\mathbf{B} = \{\text{T, A, R, R, A, N, T}\}$, then the number of elements in $\mathbf{A} \cup \mathbf{B}$ is _____
- (58) $(23^2 + 9 \times 8) \div 6$ has a remainder of _____
- (59) $484 \times 101 =$ _____
- *(60) $641 \times 749 =$ _____
- (61) $8 \times (2^{-1} - 2^{-2}) =$ _____
- (62) Three-fourths mile = _____ yards
- (63) 45 miles per hour = _____ ft/sec
- (64) 75% of 48% of 100 = _____
- (65) The odds of picking a black marble from a black bag containing 6 red, 4 black and 8 blue marbles is _____
- (66) The number of minutes between 12:40 PM and 3:30 PM of the same day is _____
- (67) How many whole numbers will evenly divide into 28? _____
- (68) $4! =$ _____
- (69) $8\frac{2}{3} \div \frac{1}{6} =$ _____
- *(70) $369670 \div 185 =$ _____
- (71) $48^2 + 16^2 =$ _____
- (72) $0.3636\dots =$ _____ (common fraction)
- (73) $0.3888\dots =$ _____ (common fraction)
- (74) The volume of a right cylinder with length 11 and radius 9 is $k\pi$, and $k =$ _____
- (75) The seventh triangular number is _____
- (76) $286 \times 28 =$ _____
- (77) What is the distance between the points (0, 12) and (-9, 0)? _____
- (78) $\frac{6!}{4!} - 25 =$ _____
- (79) $103^2 - 97^2 =$ _____
- *(80) 11 square miles = _____ acres

2021 – 2022 University Interscholastic League Junior High Number Sense Test C – Key

(1) 700	*(20) 133000 – 147000	(38) 5621	(59) 48884
(2) 77	(21) 37	(39) 64	*(60) 456104 – 504114
(3) 51	(22) 23	*(40) 3953 – 4368	(61) 2
(4) 11	(23) $\frac{1}{3}$	(41) 1111	(62) 1320
(5) $\frac{11}{20}$	(24) $42\frac{10}{49}$	(42) 512	(63) 66
(6) 161	(25) $11\frac{1}{2}$; 11.5; $\frac{23}{2}$	(43) 4.20	(64) 36
(7) 202	(26) 7326	(44) 8	(65) $\frac{2}{7}$
(8) 361	(27) -19	(45) 14	(66) 170
(9) 160	(28) 20	(46) 1599	(67) 6
*(10) 237500 – 262500	(29) 2	(47) 4	(68) 24
(11) 49	*(30) 118560 – 131040	(48) 9801	(69) 52
(12) 14	(31) 5100	*(50) 70340 – 77743	*(70) 1899 – 2098
(13) $\frac{9}{11}$	(32) 90	(51) -2	(71) 2560
(14) 1300	(33) 2	(52) -24	(72) $\frac{4}{11}$
(15) 176	(34) 440	(53) 54	(73) $\frac{7}{18}$
(16) 2604	(35) 2640	(54) 120	(74) 891
(17) 23	(36) $\frac{1}{25}$	(55) 6	(75) 28
(18) 100	(37) 34.00	(56) 220	(76) 8008
(19) 1885		(57) 7	(77) 15
		(58) 1	(78) 5
			(79) 1200
			*(80) 6688 – 7392

Note: *(Number) x – y means an integer between x and y inclusive.

If an answer is of the type like $\frac{2}{3}$ it cannot be written as .666... or $\overline{.6}$.