

Problem Sequencing

UIL High School Number Sense Test

Problem 1 - 20 *

- 1) Addition, subtraction, multiplication, & division of Integers, Mixed Numbers, Fractions, and Decimals
- 2) Order of Operations
- 3) Use of the Distributive Property
- 4) Comparison of Fractions and Decimals
- 5) Multiplication Short-Cuts
- 6) Squaring Numbers
- 7) Conversion Problems (either way):
Percent/Fractions, English/Metric,
Roman Numerals/Arabic Numerals,
Measurement units
(length, weight, capacity, time)
- 8) Greatest Common Divisor (GCD) and
Least Common Multiple (LCM)
- 9) Percent Problems
- 10) Mean, Median, & Mode
- 11) Sums of Integers
- 12) Remainder Problems
- 13) Consumer Type Problems
- 14) Number Theory Problems Involving:
Prime Numbers, Divisors, Sums of Divisors, etc.

Problems 21 - 40 *

- 1) Powers of Numbers
- 2) Substitution
- 3) Word Problems
- 4) Inverses
- 5) Absolute Value
- 6) Ratio/Proportion
- 7) Square Roots/Cube Roots
- 8) Sets
- 9) Base System Conversion Problems
- 10) Solving Simple Equations
- 11) Systems of Equations
- 12) Repeating Decimals to Fractions
- 13) More Remainder Type Problems
- 14) Perimeter & Area of Polygons and Circles
- 15) Sequences
- 16) Quadratic & Cubic Equation Problems

Problems 41 - 60 *

- 1) Laws of Exponents
- 2) Right Triangle Problems
- 3) Coordinate Geometry Problems
- 4) Regular Polygon Problems
- 5) Inequalities
- 6) Applications of Theorems from Geometry
- 7) Direct and Inverse Variation
- 8) Sequences & Series (Finite & Infinite)
- 9) Complex Numbers
- 10) Logarithms & Logarithmic Equations
- 11) Factorials, Permutations, & Combinations
- 12) Probability/Odds
- 13) Conics
- 14) Binomial Theorem (Expansion)
- 15) Base System Problems Using Operations
- 16) Roots of equations
- 17) Polygonal numbers

Problems 61 - 70 *

- 1) Volume & Surface Area
- 2) Greatest Integer
- 3) Application of Remainder Theorem
- 4) Trigonometry
- 5) Determinants
- 6) Matrices
- 7) Vectors
- 8) Composite Functions
- 9) Bases Involving Decimals or Fractions
- 10) Polar/Rectangular Coordinates

Problems 71 -80 *

- 1) Function domains and ranges
- 2) Modular Arithmetic
- 3) Limits
- 4) Derivatives
- 5) Slopes of Tangent Lines
- 6) Horizontal & Vertical Asymptotes
- 7) Determining Critical Values
- 8) Maximum & Minimum Problems
- 9) Definite Integration
- 10) Inverse functions

* A type of problem from a particular section could appear later in the test.
Example: A base problem could appear as problem #55, but should not appear earlier than problem #21.

UIL Number Sense Contest

Basic Ideas, Shortcuts and Problems #1-20 from the Sequence Chart

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What Pops into Your Mind?

1. 1728

2. 512

3. 1331

4. 289

5. 6.25%

6. 2.828...

7. 3.141...

8. 2.718...

9. 1.618...

10. 0.142857142857142857...

Mental Math -- How fast can you work these?

1. 12.5% of 96 =

2. $16 \div 0.1666\dots =$

3. $45 \times 0.444\dots =$

4. 75% of 48 is

5. $40 \div 0.625 =$

6. $33\frac{1}{3}\%$ of 60 =

7. $31^2 =$

Math Magic (Number Sense Strategies (Tricks))

- A. Memorize the first 35 squares, the first 15 cubes, and the square roots of 2, 3, 5, 6, 7, 8, & 10.
- B. Know the "One-sies" equivalents. (Fractions-Decimals-Percents)
 $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}, \frac{1}{16}$
- C. $\frac{3}{5} + \frac{5}{3} = ?$ (Is it a trick? Is it magic? See proof on page 4)
- D. Find the average of 25, 36, and 47 using a focus number.
- E. LCM (24, 42) is ?
- F. Write 0.1222... as a fraction.
- G. $(37 \times 13 + 19) \div 8$ has a remainder of ?
- H. $35 \times 35 = ?$ $35 \times 45 = ?$ $35 \times 55 = ?$ $35 \times 65 = ?$
- I. $\frac{13}{16} \times 13 = ?$
- J. $53 \times 47 = ?$
- K. Change 234 base 5 to base 10.
- L. $36^2 + 57^2 = ?$

Math Magic (solutions and tricks)

C. $\frac{3}{5} + \frac{5}{3} = 2\frac{4}{15}$ (Is it magic ?)

$\frac{a}{b} + \frac{b}{a}$ **Proof**

Let $x = \frac{a}{b} + \frac{b}{a}$

$$x = \frac{(a^2 + b^2)}{ab} \quad \text{(common denominator)}$$

$$x - 2 = \frac{(a^2 + b^2)}{ab} - 2 \quad \text{(subtract 2 from both sides)}$$

$$x - 2 = \frac{(a^2 + b^2 - 2ab)}{ab} \quad \text{(common denominator)}$$

$$x - 2 = \frac{(a - b)^2}{ab} \quad \text{(binomial square)}$$

$$x = 2 + \frac{(a - b)^2}{ab} \quad \text{(solve for x)}$$

D. The average of 25, 36, and 47 is 36.

Using 35 as a focus number,

add 10 to 25; subtract 1 from 36; subtract 12 from 47

$$- 10 + 1 + 12 = 3.$$

Since 3 divided by three numbers is 1, then $35 + 1 = 36$.

E. LCM (24, 42) = 168

use GCF(24, 42) which is 6

$$24 \div 6 = 4 \text{ and } 4 \times 42 = 168$$

F. $0.1222... = 11/90$

**$12 - 1 = 11$ and there is 1 repeater, the 2, hence one 9
and 1 non-repeater, the 1, hence one 0**

G. $(37 \times 13 + 19) \div 8$ has a remainder of 4

**$37 \div 8$ has remainder of 5, $13 \div 8$ has remainder of 5,
and $19 \div 8$ has remainder of 3**

So, $5 \times 5 + 3 = 28$ and $28 \div 8$ has remainder of 4

H. $35 \times 35 = 1225$ $35 \times 45 = 1575$ $35 \times 55 = 1925$ $35 \times 65 = 2275$

**$a5 \times b5 = a \times b +$ the integer portion of $(a + b) \div 2$
then put either 25 or 75 on the end depending on whether
 $(a + b)$ is even or odd**

I. $\frac{13}{16} \times 13 = 10\frac{9}{16}$

**numerator ---> $16 - 13 = 3$, and $3^2 = 9$
whole number ---> $13 - 3 = 10$**

J. $53 \times 47 = 2491$

difference of squares $(50 + 3)(50 - 3) = 50^2 - 3^2 = 2491$

K. 234 base 5 to base 10 = 69

$2 \times 25 + 3 \times 5 + 4 \times 1 = 69$

L. $36^2 + 57^2 = 4545$

**note $3 + 7 = 10$ and $6 - 5 = 1$
so $(3^2 + 6^2) \times 101 = 4545$**

SHORTCUTS

I. Multiplying numbers ending in 5

- A. First digits are equal: 1) always ends in 25
2) multiply first digit by first digit plus 1

Ex: $35 \times 35 = 3 \times (3 + 1)$ and ends in 25 = 1225
 $65 \times 65 = 6 \times (6 + 1)$ and ends in 25 = 4225

- B. First digits differ by 1: 1) always ends in 75
2) multiply smallest first digit by largest first digit plus 1

Ex: $45 \times 35 = 3 \times (4 + 1)$ and ends in 75 = 1575
 $65 \times 75 = 6 \times (7 + 1)$ and ends in 75 = 4875

- C. First digits differ by an even number: 1) always ends in 25
2) add first digits and divide by 2
3) multiply first digits and add quotient from step 2

Ex: $65 \times 25 = 6 \times 2 + ((6 + 2)/2)$ and ends in 25 = $6 \times 2 + 4$ and ends in 25 = 1625
 $35 \times 95 = 3 \times 9 + ((3 + 9)/2)$ and ends in 25 = $3 \times 9 + 6$ and ends in 25 = 3325

- D. First digits differ by an odd number: 1) always ends in 75
2) add first digits and divide by 2
3) multiply first digits and add integer part of quotient

Ex: $85 \times 55 = 8 \times 5 + (\text{int}((8 + 5)/2))$ and ends in 75 = $8 \times 5 + 6$ and ends in 75 = 4675
 $35 \times 65 = 3 \times 6 + (\text{int}((3 + 6)/2))$ and ends in 75 = $3 \times 6 + 4$ and ends in 75 = 2275

II. Multiplying by 11 or Teens

- A. Multiply by 11: 1) bring down units digit
2) add two digits at a time
3) bring down first digit plus any carry

Ex: $72 \times 11 = (7 + \text{carry}) \& (7 + 2) \& (2) = 7 \& 9 \& 2 = 792$
 $84 \times 11 = (8 + \text{carry}) \& (8 + 4) \& (4) = 8 \& 12 \& 4 = (8+1) \& 2 \& 4 = 924$
 $134 \times 11 = (1 + \text{carry}) \& (1 + 3 + \text{carry}) \& (3+4) \& 4 = 1 \& 4 \& 7 \& 4 = 1474$

- B. Multiply by teens:**
- 1) multiply units digit of the teen times units digit
 - 2) multiply units digit of the teen times other digits and add back plus carry
 - 3) bring down first digit plus any carry

Ex: $72 \times 13 = (7 + C) \& (3 \times 7 + 2) \& (3 \times 2) = 7 \& 23 \& 6 = (7 + 2) \& 3 \& 6 = 936$

$164 \times 12 = (1 + C) \& (2 \times 1 + 6 + C) \& (2 \times 6 + 4 + C) \& (2 \times 4) = 1968$

III. Multiplying by 25 or 75

- A. Multiply by 25:**
- 1) divide by 4
 - 2) last two digits 00, 25, 50, or 75 depends on the remainder

Ex: $64 \times 25 = 64 \div 4 = 16 \text{ R } 0 \& \text{ and remainder digits} = 1600$

$57 \times 25 = 57 \div 4 = 14 \text{ R } 1 \& \text{ add remainder digits} = 1425$

- B. Multiply by 75:**
- 1) divide by 4
 - 2) last two digits 00, 25, 50, or 75 depends on the remainder
 - 3) multiply results by 3

Ex: $64 \times 75 = 64 \div 4 = 16 \text{ R } 0 \& \text{ add remainder digits} = 1600 \times 3 = 4800$

$57 \times 75 = 57 \div 4 = 14 \text{ R } 1 \& \text{ add remainder digits} = 1425 \times 3 = 4275$

IV. Dividing by 25

- A. Divide by 25:**
- 1) multiply by 4
 - 2) place decimal so the answer has 2 decimal places

Ex: $64 \div 25 = 64 \times 4 = 256 \& \text{ place decimal} = 2.56$

$57 \div 25 = 57 \times 4 = 228 \& \text{ place decimal} = 2.28$

V. Multiplying by numbers when first or last digits total 10

- A. Multiply when units digits total 10 and first digits are equal:**
- 1) multiply first digit times first digit plus 1
 - 2) multiply units digits

Ex: $43 \times 47 = 4 \times (4 + 1) \& 3 \times 7 = 4 \times 5 \& 3 \times 7 = 2021$

$72 \times 78 = 7 \times (7 + 1) \& 2 \times 8 = 7 \times 8 \& 2 \times 8 = 5616$

- B. Multiply when first digits total 10 and units digits are equal:**
- 1) multiply first digits and add the units digit
 - 2) square the units digit

Ex: $27 \times 87 = 2 \times 8 + 7 \text{ \& } 7 \times 7 = 16 + 7 \text{ \& } 49 = 2349$
 $43 \times 63 = 4 \times 6 + 3 \text{ \& } 3 \times 3 = 24 + 3 \text{ \& } 9 = 2709$

VI. Multiplying by difference of squares

- A. Algebra: $a^2 - b^2 = (a + b)(a - b)$:**
- 1) easiest to see shortcut by examples

Ex: $53 \times 47 = (50 + 3) \times (50 - 3) = 50^2 - 3^2 = 2500 - 9 = 2491$
 $28 \times 32 = (30 - 2) \times (30 + 2) = 30^2 - 2^2 = 900 - 4 = 896$

VII. Least Common Multiple

- A. $LCM(a,b) = a \div GCF \times b$:**
- 1) find the greatest common factor (GCF)
 - 2) divide one number by the GCF
 - 3) multiply quotient times the other number

Ex: $LCM(8,14) \text{ --- GCF} = 2 \text{ --- } 8 \div 2 = 4 \text{ ---> } 4 \times 14 = 56 \text{ ---> } LCM(8,14) = 56$
 $LCM(24,99) \text{ --- GCF} = 3 \text{ --- } 24 \div 3 = 8 \text{ ---> } 8 \times 99 = 792 \text{ ---> } LCM(24,99) = 792$

VIII. Division by 9

- A. xyz divided by 9:**
- 1) add x plus y plus z and put sum over 9 (be sure to reduce)
 - 2) add x plus y plus carry
 - 3) bring down x plus carry

Ex. $201 \div 9 = (2 + C) \text{ \& } (2 + 0 + C) \text{ \& } (2 + 0 + 1)/9 = 22 \frac{3}{9} = 22 \frac{1}{3}$
 $1240 \div 9 = (1 + C) \text{ \& } (1 + 2 + C) \text{ \& } (1 + 2 + 4 + C) \text{ \& } (1 + 2 + 4 + 0)/9 = 137 \frac{7}{9}$

IX. Multiplying numbers close to 100

- A. Numbers close to and below 100:**
- 1) $A = 100$ minus first number and $B = 100$ minus second number
 - 2) subtract A from the second number (or vice versa)
 - 3) multiply A and B

Ex. $96 \times 99 \text{ --> } A = 4 \text{ \& } B = 1 \text{ --> } 99 - 4 \text{ (or } 96 - 1) = 95 \text{ --> } 4 \times 1 = 4 \text{ --> } 96 \times 99 = 9504$
 $92 \times 97 \text{ --> } A = 8 \text{ \& } B = 3 \text{ --> } 97 - 8 \text{ (or } 92 - 3) = 89 \text{ --> } 8 \times 3 = 24 \text{ --> } 92 \times 97 = 8924$

B. Numbers close to and above 100:

- 1) **A = first number minus 100 and B = second number minus 100**
- 2) **add A to the second number (or vice versa)**
- 3) **multiply A and B**

Ex. $106 \times 103 \rightarrow A = 6 \ \& \ B = 3 \rightarrow 6 + 103 \text{ (or } 3 + 106) = 109 \rightarrow 6 \times 3 = 18 \rightarrow 10918$

$112 \times 105 \rightarrow A = 12 \ \& \ B = 5 \rightarrow 12 + 105 \text{ (or } 5 + 112) = 117 \rightarrow 12 \times 5 = 60 \rightarrow 11760$

X. Repeating decimals converted to fractions

A. All digits repeat:

- 1) **the number of digits that repeat is the number of 9's in the denominator**
- 2) **one set of the repeating digits is the numerator (be careful to reduce)**

Ex: $0.\overline{13} \rightarrow$ two repeaters means two 9's $\rightarrow 13/99$

$0.341341341\dots \rightarrow$ three repeaters means three 9's $\rightarrow 341/999$

B. Some digits repeat and some don't:

- 1) **the number of digits that repeat is the number of 9's in the denominator**
- 2) **the number of non-repeating digits is the number of 0's in the denominator**
- 3) **subtract the non-repeating digits from the number before repetition starts for the numerator**

Ex: $0.12424\dots \rightarrow$ two repeaters and one non-repeater means two 9's and one 0

$\rightarrow 124 - 1 = 123 \rightarrow 0.12424\dots = 123/990$

$0.123\overline{5} \rightarrow$ two repeaters and two non-repeaters means two 9's and two 0's

$\rightarrow 1235 - 12 = 1223 \rightarrow 0.12353535\dots = 1223/9900$

UIL High School Number Sense Test Problem Sequencing

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- 3) Use of the Distributive Property**
- 4) Comparison of Fractions, Decimals and Percents**
- 5) Multiplication Short-Cuts**
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Percent/Fractions, English/Metric,
Roman Numerals/Arabic Numerals**
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Least Common Multiple (LCM)**
- 9) Percent Problems**
- 10) Mean, Median, & Mode**
- 11) Sums of Integers**
- 12) Remainder Problems**
- 13) Consumer Type Problems**
- 14) Number Theory Problems Involving:
Prime Numbers, Divisors, Sums of Divisors, etc.**

***** A type of problem from this section can appear later in the test, as well.**

Any questions on any of these?

**The University Interscholastic League
Number Sense Test • HS District • 2024**

- (1) $322 + 327 + 2024 =$ _____
- (2) $3\frac{2}{7} - 2\frac{2}{3} =$ _____
- (3) $(5.6)(7 + 8) =$ _____
- (4) $\frac{5}{8} \div \frac{4}{5} =$ _____
- (5) $31^2 =$ _____
- (6) $3.58333\dots =$ _____ (improper fraction)
- (7) The LCM of 98 and 56 is _____
- (8) $\frac{4}{5} =$ _____ %
- (9) $322327 \div 9$ has a remainder of _____
- * (10) $(2024 - 327) \times 22 =$ _____
- (11) If CDs cost \$4.75 each or a 3-pack for \$12.95, then how much is saved by buying a 3-pack? \$ _____
- (12) $\sqrt[3]{2744} =$ _____
- (13) 8% tax on \$322.00 is \$ _____
- (14) $3 \div (2 - 7) \times 2 + 2 - 3 =$ _____
- (15) 12.5% of 96 is _____
- (16) $\frac{5}{8}$ of 96 is _____
- (17) 0.75 times 96 is _____
- (18) There are _____ positive integral factors of 36
- (19) $33\frac{1}{3}\%$ of 20% of 15 is _____
- * (20) $300(\sqrt{2} + \sqrt{7}) =$ _____

District Answers

- (1) 2,673
- (2) $\frac{13}{21}$
- (3) 84
- (4) .78125, $\frac{25}{32}$
- (5) 961
- (6) $\frac{43}{12}$
- (7) 392
- (8) 80
- (9) 1
- *(10) 35,468 — 39,200
- (11) 1.30
- (12) 14
- (13) 25.76
- (14) $-2.2, -\frac{11}{5}, -2\frac{1}{5}$
- (15) 12
- (16) 60
- (17) 72
- (18) 9
- (19) 1
- *(20) 1,158 — 1,278

**The University Interscholastic League
Number Sense Test • HS Regional • 2024**

- (1) $330 - 2024 =$ _____
- (2) $2024 + 3 \times 2024 =$ _____
- (3) $30.24 \div 3 =$ _____ (decimal)
- (4) $27^2 =$ _____
- (5) $\frac{5}{16} =$ _____ % (decimal)
- (6) $333 \times \frac{1}{37} =$ _____
- (7) $33 \times 24 =$ _____
- (8) The GCD of 20, 24, and 30 is _____
- (9) $\text{MMXXX} - \text{CCCXX} =$ _____ (Arabic Numeral)
- * (10) $2024 - 330 + 3320 - 324 =$ _____
- (11) The sum of the prime numbers greater than 70 and less than 80 is _____
- (12) How many integers are between -20 and 24 ? ____
- (13) $33 \times \frac{31}{34} =$ _____ (mixed number)
- (14) $20 \div (2 - 4) \times 3 + 30 =$ _____
- (15) $30 \div \frac{2}{5} =$ _____
- (16) $30 \div 0.8 =$ _____
- (17) $30 \div 1\frac{1}{5} =$ _____
- (18) $33^2 - 29^2 = 31 \times$ _____
- (19) $\frac{1}{64} - \frac{1}{16} - \frac{1}{4} =$ _____
- * (20) $33 \times (\sqrt{20} + \sqrt{24}) =$ _____

Regional Answers

- (1) — 1,694
- (2) 8,096
- (3) 10.08
- (4) 729
- (5) 31.25
- (6) 9
- (7) 792
- (8) 2
- (9) 1,710
- *(10) 4,456 — 4,924
- (11) 223
- (12) 43
- (13) $30\frac{3}{34}$
- (14) 0
- (15) 75
- (16) 37.5, $\frac{75}{2}$, $37\frac{1}{2}$
- (17) 25
- (18) 8
- (19) — $\frac{19}{64}$
- *(20) 294 — 324

**The University Interscholastic League
Number Sense Test • HS State • 2024**

- (1) $5 \times 15 + 2024 =$ _____
- (2) $24 \div \frac{2}{3} - 15.5 =$ _____
- (3) $\frac{7}{9} \div \frac{2}{3} =$ _____
- (4) $\frac{7}{8} =$ _____ (decimal)
- (5) $5^3 - 15^2 + 24 =$ _____
- (6) $0.8333\dots =$ _____ (proper fraction)
- (7) $666 \times \frac{2}{37} =$ _____
- (8) $\text{MMXXIV} + \text{XV} \times \text{V} =$ _____ (Arabic Numeral)
- (9) Which is larger, $\frac{7}{12}$ or 0.58? _____
- * (10) $4202 \times 51 - 5 =$ _____
- (11) If hankies cost \$1.50 each or a dozen for \$15.75,
then how much is saved by buying a dozen? \$ _____
- (12) $24 \div (20 - 16) + 12 - 8 \times 4 =$ _____
- (13) $155 \times 14 =$ _____
- (14) $54 \times 54 =$ _____
- (15) $\frac{1}{27} - \frac{1}{9} - \frac{1}{3} =$ _____
- (16) $3 + 5 + 7 + 9 + \dots + 19 + 21 =$ _____
- (17) $25 \times 64 =$ _____
- (18) $26.25 \times 64 =$ _____
- (19) $102\frac{1}{2} \times 64 =$ _____
- * (20) $2024 \times (\sqrt{15} + \sqrt{5}) =$ _____

State Answers

- (1) 2,099
- (2) 20.5, $\frac{41}{2}$, $20\frac{1}{2}$
- (3) $\frac{7}{6}$, $1\frac{1}{6}$
- (4) .875
- (5) - 76
- (6) $\frac{5}{6}$
- (7) 36
- (8) 2,099
- (9) $\frac{7}{12}$
- *(10) 203,583 -
225,011
- (11) 2.25
- (12) - 14
- (13) 2,170
- (14) 2,916
- (15) - $\frac{11}{27}$
- (16) 120
- (17) 1,600
- (18) 1,680
- (19) 6,560
- *(20) 11,747 - 12,982

UIL Number Sense Contest

Problems #21-40 from the Sequence Chart

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First, lets look at some ESTIMATIONS

??? Estimating - Rounding - Truncating - Reasonableness ???

The following are from the UIL 2022 SAC test

*(10) $121 \times (121 + 129) =$ _____

*(20) $910 \times 1001 - 1029 \times 1105 =$ _____

*(30) $\sqrt{101295} =$ _____

*(40) $549822 \div 741 =$ _____

*(50) $142857 \times 15 =$ _____

*(60) An angle of 11 radians = _____ degrees

*(70) $\sqrt[3]{9101011} =$ _____

*(80) $0.1555... \times 9 \times 10^3 =$ _____

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- 5) Absolute Value
- 6) Ratio/Proportion
- 7) Square Roots/Cube Roots
- 8) Sets
- 9) Base System Problems
- 10) Solving Simple Equations
- 11) Simultaneous Equations
- 12) Repeating Decimals to Fractions
- 13) More Remainder Type Problems
- 14) Perimeter & Area Problems of Polygons
- 15) Sequences
- 16) Quadratic & Cubic Equation Problems

*** A type of problem from this section could appear later in the test, but not in the previous section. For example: A set problem could appear in sections #21-40, #41-60, and/or #61-80, but should not appear in section #1-20.

Any questions on any of these?

The University Interscholastic League Number Sense Test • HS District • 2024

- (21) Find digit $B > 0$, such that $B32 - 32B = 405$. _____
- (22) If $\frac{29}{33} = 0.ababab\dots$, then $a + b =$ _____
- (23) Write thirty-two and two-fifths million two thousand twenty-four in digits. _____
- (24) $[3 + 22 \times 3 - 27] \div 4$ has a remainder of _____
- (25) $8\frac{3}{7} \times 8\frac{4}{7} =$ _____ (mixed number)
- (26) $[\{t,r,i\} \cup \{q,u,a,d\}] \cap [\{b,i\} \cup \{p,e,n,t\}]$ contains how many distinct elements? _____
- (27) 322 base 7 is written as _____ base 10
- (28) If $\frac{1}{7} + \frac{1}{x} = \frac{1}{3}$, then $x =$ _____
- (29) $0.727272\dots =$ _____ (fraction)
- *(30) $\sqrt{3222724} =$ _____
- (31) $5993 \times 7 + 49 =$ _____
- (32) If $f(x) = 4x^2 + 20x + 25$, then $f(15) =$ _____
- (33) The multiplicative inverse of 0.24 is _____
- (34) Given: 2, 0, 3, 2, 5, 4, 7, p, q, 8, 13, ... Find pq. _____
- (35) 202 base 10 is written as _____ base 4
- (36) The cost of 15 pints at 32¢ each is \$ _____
- (37) The cost of 17 pints at 32¢ each is \$ _____
- (38) The cost of 8.5 pints at 32¢ each is \$ _____
- (39) Let $\frac{x+11}{x-8} + \frac{x-8}{x+11} = 2\frac{B}{C}$. Find B. _____
- *(40) $\sqrt[3]{322272024} =$ _____

District Answers

(21) 7

(22) 15

(23) 32,402,024

(24) 2

(25) $72\frac{12}{49}$

(26) 2

(27) 163

(28) 5.25, $\frac{21}{4}$, $5\frac{1}{4}$

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

*(30) 1,706 — 1,884

(31) 42,000

(32) 1,225

(33) $\frac{25}{6}$, $4\frac{1}{6}$

(34) 66

(35) 3022

(36) 4.80

(37) 5.44

(38) 2.72

(39) 361

*(40) 652 — 719

The University Interscholastic League
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- (21) $0.58333... \times 72 =$ _____
- (22) 324×14 is _____
- (23) Round $\sqrt{6}$ to the nearest hundredths place. _____
- (24) 23% of 40 is _____ % of 10
- (25) The number of positive integral factors of 30 is _____
- (26) $15\frac{3}{4} \times 8\frac{2}{3} =$ _____ (mixed number)
- (27) Divide 24 into 4 parts such that the ratio of the 4 parts is 1:2:3:4. The largest part is _____
- (28) $2\frac{4}{5} \div 3\frac{7}{10} =$ _____
- (29) How many integers between 3 and 63 are divisible by 8? _____
- *(30) $151222 \div 136 =$ _____
- (31) $1776 \times 24 + 576 =$ _____
- (32) If $x + y = 6$ and $x - y = 4$, then $x^2 + y^2 =$ _____
- (33) If $f(x) = 4x^2 - 12x + 9$, then $f(15) =$ _____
- (34) $41.5 - 7.75 =$ _____
- (35) $41\frac{1}{2} - 7\frac{3}{4} - 9\frac{7}{8} =$ _____
- (36) $41\frac{1}{2} + 7.75 - 9\frac{7}{8} =$ _____
- (37) Given: 0.125, $\frac{1}{4}$, 0.375, $\frac{5}{8}$, 1, m, 2.625, n, 6.875,
Find $m + n$. _____
- (38) The smaller root of $(4x - 1)^2 = 9$ is _____
- (39) $\{a, l, g\} \cup \{g, e, o, m\} \cup \{t, r, i, g\} \cap \{p, r, e, c, a, l\}$
contains how many distinct elements? _____
- *(40) $\sqrt[3]{4202033} =$ _____

Regional Answers

(21) 42

(22) 4,536

(23) 2.45

(24) 92

(25) 8

(26) $136\frac{1}{2}$

(27) 9.6, $\frac{48}{5}$, $9\frac{3}{5}$

(28) $\frac{28}{37}$

(29) 7

*(30) 1,057 — 1,167

(31) 43,200

(32) 26

(33) 729

(34) 33.75, $\frac{135}{4}$, $33\frac{3}{4}$

(35) 23.875, $\frac{191}{8}$, $23\frac{7}{8}$

(36) 39.375, $\frac{315}{8}$, $39\frac{3}{8}$

(37) 5.875, $\frac{47}{8}$, $5\frac{7}{8}$

(38) — .5, — $\frac{1}{2}$

(39) 4

*(40) 154 — 169

The University Interscholastic League
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- (21) $39 \times 31 =$ _____
- (22) $4\frac{2}{3} \div 2\frac{4}{9} =$ _____
- (23) $40 - 60\%$ of 80 is _____
- (24) $0.5151515\dots =$ _____ (fraction)
- (25) If $f(x) = 16x^2 - 40x + 25$, then $f(15) =$ _____
- (26) $63 \times 24 =$ _____
- (27) Write five and three-fifths million two thousand twenty-four in digits. _____
- (28) $10\frac{5}{7} \times 10\frac{2}{7} =$ _____ (mixed number)
- (29) 515 base 10 is written as _____ base 5
- * (30) $\sqrt{5504122} =$ _____
- (31) $51.5 - 20.24 =$ _____ (decimal)
- (32) If $x + y = 15$ and $x - y = 5$, then $x^2 + y^2 =$ _____
- (33) The reciprocal of $-6\frac{2}{3}$ is _____ (decimal)
- (34) $[51 + 5 \times 20 - 24] \div 7$ has a remainder of _____
- (35) $\sqrt[3]{13824} =$ _____
- (36) $3906 \times 6 - 36 =$ _____
- (37) How many integers greater than 12 and less than or equal to 72 are divisible by 8? _____
- (38) Given: 2, 3, 5, 4, 6, 10, 6, 9, 15, p, q, r, 10, 15, 25,
Find $p + q + r$. _____
- (39) Find the digit $B > 0$, such that
 $39B9 = [9(13 - B)]^2$. $B =$ _____
- * (40) $\sqrt[3]{515} \times \sqrt{515} \times 515 =$ _____

State Answers

- (21) 1,209
- (22) $\frac{21}{11}, 1\frac{10}{11}$
- (23) -8
- (24) $\frac{17}{33}$
- (25) 3,025
- (26) 1,512
- (27) 5,602,024
- (28) $110\frac{10}{49}$
- (29) 4030
- *(30) 2,229 $-$ 2,463
- (31) 31.26
- (32) 125
- (33) $- .15$
- (34) 1
- (35) 24
- (36) 23,400
- (37) 8
- (38) 40
- (39) 6
- *(40) 88,996 $-$ 98,363

UIL Number Sense Contest

Problems #41-60 from the Sequence Chart

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Some interesting thoughts and ideas

Right Triangles -- Pythagorean Triples -- Use in Trigonometry

1. $s^2 + m^2 = h^2$ (interesting labels ---- $a^2 + b^2 = c^2$)
2. Area of right triangle $A = (s \times m)/2$ (interesting labels ---- $A = (b \times h)/2$)
 $A = 1/2(a \times b \times \sin c)$
3. Altitude of right triangle $h = (a \times b)/c$ (interesting labels --- $a = (s \times m)/h$)
4. Given m & n --- a triple can be created by $m^2 - n^2$, $2mn$, & $m^2 + n^2$ provided:
 m & n are relatively prime integers
 $m > n$
 m is even and n is odd or vice versa
5. Special note: the product of the integral sides of a right triangle is divisible by 60.
6. A 30-60-90 triangle has side ratios of x , $\sqrt{3}x$, & 2
7. A 45-45-90 triangle has side ratios of x , x , $\sqrt{2}$
8. Pythagorean triples can be used to determine acute, obtuse, or right triangles.
9. Trig: $\sin = \text{opp/hyp} = y/r$
 $\cos = \text{adj/hyp} = x/r$
 $\tan = \text{opp/adj} = y/x$

Sample problems

1. The legs of a right \triangle are 5 and 12. The length of the altitude to the hypotenuse is
2. The leg opposite the 60° angle in a right triangle is $\sqrt{12}$. The hypotenuse is
3. The hypotenuse of an isoscles right triangle is $\sqrt{32}$ cm. The sum of the lengths of the two legs is
4. The legs of a right \triangle are 8 and 15. The length of the altitude to the hypotenuse is

UIL High School Number Sense Test Problem Sequencing

Problems 41 – 60

- 1) **Laws of Exponents**
- 2) **Right Triangle Problems**
- 3) **Coordinate Geometry Problems**
- 4) **Regular Polygon Problems**
- 5) **Inequalities**
- 6) **Applications of Theorems from Geometry**
- 7) **Direct and Inverse Variation**
- 8) **Sequences & Series (Finite & Infinite)**
- 9) **Complex Numbers**
- 10) **Logarithms & Logarithmic Equations**
- 11) **Factorials, Permutations & Combinations**
- 12) **Probability/Odds**
- 13) **Conics**
- 14) **Binomial Theorem (Expansion)**
- 15) **Base System Problems Using Operations**
- 16) **Roots of Equations**
- 17) **Polygonal Numbers**

***** A type of problem from this section could appear later in the test, but not in the previous sections. For example: A conics problem could appear in sections #41-60, and/or #61-80, but should not appear in section #1-20 or #21-40.**

Any questions on any of these?

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- (41) $(309)^2 =$ _____
- (42) The positive geometric mean of 4 and 16 is _____
- (43) The simple interest on \$322.00 at 7% for two years is \$ _____
- (44) The arithmetic mean of 22, 27, and 24 is _____
- (45) $54^2 + 66^2 =$ _____
- (46) $(2^5 + 7^5 - 2) \div 9$ has a remainder of _____
- (47) $(4x - 3y)^2 = ax^2 + bxy + cy^2$ and $a + b - c =$ _____
- (48) The product of the roots of $3x^2 - 4x + 7 = 0$ is _____
- (49) $327_8 + 322_8 - 24_8 =$ _____ $_8$
- *(50) $3272024 \div 322 =$ _____
- (51) The 11th term of 1, 1, 2, 3, 5, 8, ... is 89. The 12th term is _____
- (52) $(11^3 - 13^3) \div (11 - 13) =$ _____
- (53) $\frac{1}{28} + \frac{1}{70} + \frac{1}{130} =$ _____
- (54) $25 + 10 + 4 + 1.6 + \dots =$ _____
- (55) If $\sqrt{12 + \sqrt{8 + \sqrt{x - 8}}} = 4$, then $x =$ _____
- (56) Two dice are rolled. Find the odds that the sum of the numbers is less than 4. _____
- (57) Let $3\frac{2}{m} \times n\frac{2}{23} = 20$, where m, n are natural numbers. Find $n - m$. _____
- (58) $2024_6 \div 3_6$ has a remainder of _____
- (59) Let $4^5 \times 8^3 \div 128 = 2^k$. Find k . _____
- *(60) $125^2 \div 25^3 \times 5^5 =$ _____

District Answers

(41) 95,481

(42) 8

(43) 45.08

(44) $\frac{73}{3}$, $24\frac{1}{3}$

(45) 7,272

(46) 7

(47) -17

(48) $-\frac{7}{3}$, $-2\frac{1}{3}$

(49) 625

*(50) 9,654 — 10,669

(51) 144

(52) 433

(53) $\frac{3}{52}$

(54) $\frac{125}{3}$, $41\frac{2}{3}$

(55) 72

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

(57) -1

(58) 1

(59) 12

*(60) 2,969 — 3,281

**The University Interscholastic League
Number Sense Test • HS Regional • 2024**

- (41) 75% of 37.5% of 64 is _____
- (42) $(3^5 + 5^5 - 7) \div 8$ has a remainder of _____
- (43) $19200 = 144 + 1588 \times$ _____
- (44) Which is larger, $-\frac{11}{12}$ or $-\frac{10}{11}$? _____
- (45) $83^2 + 22^2 =$ _____
- (46) The sum of the measures of the interior angles of a regular heptagon is _____ degrees
- (47) Let $8\frac{3}{m} \times n\frac{34}{35} = 26$, where m, n are natural numbers. Find mn. _____
- (48) $(3! \times 6!) \div (5! \times 4!) =$ _____
- (49) $330_{11} - 42_{11} + A9_{11} =$ _____ $_{11}$
- *(50) $33^3 =$ _____
- (51) If $\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \dots + \frac{1}{n} = \frac{11}{13}$, then n = _____
- (52) $(708)^2 =$ _____
- (53) $8\frac{1}{2}$ is what percent less than $12\frac{1}{2}$? _____ %
- (54) $(3 + 7 + 10 + 17 + 27 + 44 + 71)$
 $+ (115 + 186 + 301) =$ _____
- (55) $33024_7 \div 4_7$ has a remainder of _____ $_7$
- (56) The perimeter of a square is decreased from 22 cm to 18 cm. Find the corresponding decrease in its area. _____ cm^2
- (57) $21 + 14 + 9\frac{1}{3} + 6\frac{2}{9} + \dots =$ _____
- (58) 150 fathoms = _____ inches
- (59) The coefficient of the x^3y^2 term in the expansion of $(5x - 2y)^5$ is _____
- *(60) A rectangular lot is $\frac{3}{8}$ of a mile by $\frac{7}{16}$ of a mile.
The area of the lot is _____ square feet

Regional Answers

(41) 18

(42) 1

(43) 12

(44) $-\frac{10}{11}$

(45) 7,373

(46) 900

(47) 8

(48) $1.5, \frac{3}{2}, 1\frac{1}{2}$

(49) 397

*(50) 34,141 — 37,733

(51) 78

(52) 501,264

(53) 32

(54) 781

(55) 2

(56) 10

(57) 63

(58) 10,800

(59) 5,000

*(60) 4,345,110 —
4,802,490

**The University Interscholastic League
Number Sense Test • HS State • 2024**

- (41) $\frac{2}{45} =$ _____ % (mixed number)
- (42) $(7^5 + 3^5 - 2) \div 10$ has a remainder of _____
- (43) 2401 has how many positive integral divisors? _____
- (44) The arithmetic mean of the set $\{5, 15, 24, k\}$ is 16.
Find k . _____
- (45) If $3x + y = 5$ and $x - 2y = 5$, then $x =$ _____
- (46) $123_4 \times 2_4 =$ _____ ₂
- (47) $(2! \times 3! \times 5!) \div (4! \times 6!) =$ _____
- (48) Two dice are rolled. The probability that the sum of the top faces is greater than 10 is _____ %
- (49) Let R_1 and R_2 be the roots of $(2x - 3)^2 = 5$.
Find $R_1 + R_2 - R_1 \times R_2$. _____
- * (50) $13141524 \div 515 =$ _____
- (51) $114 - 17\frac{1}{2} - 22.25 =$ _____
- (52) $114 + 17.5 - 22\frac{1}{4} =$ _____
- (53) $114.25 + 17\frac{1}{2} + 22 =$ _____
- (54) $2 + 7 + 9 + 16 + 25 + 41 + 66 + m +$
 $173 + n + 453 =$ _____
- (55) If $f(x) = 3x + \log_4(x)$, then $f(8) =$ _____
- (56) $4\frac{1}{5}$ is what percent more than $3\frac{1}{2}$? _____ %
- (57) $513_6 - 1415_6 + 2024_6 =$ _____ ₆
- (58) $48 + 32 + 21.333... + 14.222... + ... =$ _____
- (59) $37^{12} \div 23$ has a remainder of _____
- * (60) $(10\pi^2 - 1)^2 =$ _____

State Answers

(41) $4\frac{4}{9}$

(42) 8

(43) 5

(44) 20

(45) $\frac{15}{7}, 2\frac{1}{7}$

(46) 110110

(47) $\frac{1}{12}$

(48) $\frac{25}{3}, 8\frac{1}{3}$

(49) 2

*(50) 24,242 — 26,793

(51) 74.25, $\frac{297}{4}, 74\frac{1}{4}$

(52) 109.25, $\frac{437}{4},$
 $109\frac{1}{4}$

(53) 153.75, $\frac{615}{4},$
 $153\frac{3}{4}$

(54) 1,179

(55) 25.5, $\frac{51}{2}, 25\frac{1}{2}$

(56) 20

(57) 1122

(58) 144

(59) 9

*(60) 9,068 — 10,021

UIL Number Sense Contest

Problems #61-80 from the Sequence Chart

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Problems 61 - 70

- 1) **Volume & Surface Area**
- 2) **Greatest Integer**
- 3) **Application of Remainder Theorem**
- 4) **Trigonometry**
- 5) **Determinants**
- 6) **Matrices**
- 7) **Vectors**
- 8) **Composite Functions**
- 9) **Bases Involving Decimals or Fractions**
- 10) **Polar/Rectangle Coordinates**

Problems 71 - 80

- 1) **Function Domains and Ranges**
- 2) **Modular Arithmetic**
- 3) **Limits**
- 4) **Derivative**
- 5) **Slopes of Tangent Lines**
- 6) **Horizontal & Vertical Asymptotes**
- 7) **Determining Critical Values**
- 8) **Maximum & Minimum Problems**
- 9) **Definite Integration**
- 10) **Inverse Functions**

***** A type of problem from section #61-70 appear in this section and in section #71-80, but not in the previous sections. A type of problem from section #71-80 can appear only in its section and not in any previous sections.**

For example: A vector problem could appear in section #61-80, but should not appear in section #1-20, #21-40, or #41-60. And, a limits problem can only appear in section #71-80.

Any questions on any of these?

The University Interscholastic League
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- (61) $\sin\left(\frac{17\pi}{6}\right) =$ _____
- (62) If $(\sqrt[3]{a^{22}})(\sqrt[3]{a^{27}}) = (\sqrt[n]{a^k})$, where n and k are relatively prime, then $k =$ _____
- (63) The fifth hexagonal number is _____
- (64) $f(x) = \frac{x+1}{2-3x} - 4$ and $f^{-1}(5) =$ _____
- (65) If $x = 7$ and $y = -6$, then $(x+y)(x^2 - xy + y^2) =$ _____
- (66) The 2nd pentagonal number minus the 4th pentagonal number is _____
- (67) If $h(x) = x^2 - 3$ and $g(x) = x - 1$, then $h(g(0)) =$ _____
- (68) Change $\frac{12}{25}$ to a base 5 decimal. _____ 5
- (69) $24^9 \div 17$ has a remainder of _____
- *(70) A Jedi rocket traveling at a rate of 5280 miles per hour is traveling _____ feet per second
- (71) Find k , $0 \leq x \leq 22$, if $11^4 + 2^6 \cong k \pmod{22}$. _____
- (72) Let $h(x) = 3x^2 + 2x + 1$. Find $h'(-4)$. _____
- (73) $2\frac{2}{3}$ fathoms = _____ inches
- (74) Let (a, b) be an inflection point for $h(x) = 2x^3 - 3x + 5$. Find $a + b$. _____
- (75) $x^2 + y^2 = 4y$ has area of $k\pi$ sq. units and $k =$ _____
- (76) $\int_{-1}^2 (x-3) dx =$ _____
- (77) The domain of $f(x) = \frac{\sqrt{3x-5}}{\sqrt{7-2x}}$ is $w \leq x < y$ and $x \in \text{Reals}$. Find $w + y$. _____
- (78) Given: 8, 12, 20, 28, k , 52, 68, Find k . _____
- (79) $322 \times 327 =$ _____
- *(80) $322 \times 571.428 =$ _____

District Answers

(61) $.5, \frac{1}{2}$

(62) 49

(63) 45

(64) $\frac{17}{28}$

(65) 127

(66) -17

(67) -2

(68) .22

(69) 10

*(70) 7,357 — 8,131

(71) 9

(72) -22

(73) 192

(74) 5

(75) 4

(76) $-7.5, -\frac{15}{2},$
 $-7\frac{1}{2}$

(77) $\frac{31}{6}, 5\frac{1}{6}$

(78) 44

(79) 105,294

*(80) 174,800 —
193,199

**The University Interscholastic League
Number Sense Test • HS Regional • 2024**

- (61) Write in figures: three hundred and four-fifths million three thousand thirty. _____
- (62) Given: y varies inversely with x and $y = 12$ when $x = 7$. Find y when $x = 11$. _____
- (63) $\begin{bmatrix} 1 & 3 \\ 6 & 10 \end{bmatrix} \times \begin{bmatrix} 0 & -2 \\ k & 5 \end{bmatrix} = \begin{bmatrix} 12 & 13 \\ 40 & 38 \end{bmatrix}$. $k =$ _____
- (64) $47^{15} \div 29$ has a remainder of _____
- (65) The first 4 digits after the decimal point in the decimal representation of $\frac{13}{45}$ are _____
- (66) A coin is tossed 3 times. What is the probability of getting 2 heads and 1 tail? _____%
- (67) Let $(6 + 4i) \div 2i = a + bi$. Find b . _____
- (68) $\text{Arcsin}(\cos(\frac{\pi}{6})) =$ _____ degrees
- (69) 0.77 base 8 = _____ base 10 (fraction)
- *(70) $5^3 \div 4! \times 3^5 \div 2! =$ _____
- (71) $f(x) = \frac{5x-7}{3} + 2$ and $f^{-1}(11) =$ _____
- (72) Find $f(g(-\frac{2}{3}))$ when $f(x) = 3x + 5$ and $g(x) = 5x - 3$. _____
- (73) Let $f(x) = \cos(2x)$. Find $f''(\frac{2\pi}{3})$. _____
- (74) Given: $f(x) = -x^2 + 4x + 1$ has a maximum point at (a, b) . Find $a + b$. _____
- (75) Find the slope of the line tangent to $f(x) = x^3 + 2x$ at the origin. _____
- (76) $\int_1^2 \int_2^3 xy \, dy \, dx =$ _____
- (77) Let (x, y) be the focus of $x = y^2 - 1$. $x =$ _____
- (78) $330 \div 0.6875 =$ _____
- (79) Given: 1, 1, 3, 5, 6, 12, 10, 22, T, P, $T - P =$ _____
- *(80) $(\ln 100000)^3 =$ _____

Regional Answers

(61) 300,803,030

(62) $\frac{84}{11}, 7\frac{7}{11}$

(63) 4

(64) 11

(65) 2888

(66) $37.5, \frac{75}{2}, 37\frac{1}{2}$

(67) -3

(68) 60

(69) $\frac{63}{64}$

*(70) 602 — 664

(71) $6.8, \frac{34}{5}, 6\frac{4}{5}$

(72) -14

(73) 2

(74) 7

(75) 2

(76) $3.75, \frac{15}{4}, 3\frac{3}{4}$

(77) $-.75, -\frac{3}{4}$

(78) 480

(79) -20

*(80) 1,450 — 1,602

The University Interscholastic League
Number Sense Test • HS State • 2024

- (61) $\begin{bmatrix} 2 & 5 \\ 3 & -7 \end{bmatrix} \times \begin{bmatrix} 1 & -6 \\ 3 & 10 \end{bmatrix} = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$. $b + c =$ _____
- (62) $\tan\left(\frac{\pi}{3}\right) \times \tan\left(\frac{5\pi}{3}\right) =$ _____
- (63) 2.5 fathoms = _____ inches
- (64) If $300^\circ = k\pi$ radians, then $k =$ _____
- (65) 0.43 base 5 = _____ base 10 (decimal)
- (66) Which element of {21, 35, 45} is both a triangular number and a hexagonal number? _____
- (67) $\log_2(32) - \log_5(25) = \log_3(x)$ and $x =$ _____
- (68) If $x = 5$ and $y = 15$, then
 $(x - y)(x^2 + xy + y^2) =$ _____
- (69) $\sqrt{1000}_4 =$ _____ 4
- * (70) $(4 + 5 + 6 + \dots + 11 + 12 + 13)^2 =$ _____
- (71) If $f(x) = \frac{5x}{6} + \frac{3}{4}$ and $f^{-1}(x) = ax + b$,
then $a + b =$ _____
- (72) Let $f(x) = \sin(2x)$. Find $f''\left(\frac{\pi}{12}\right)$. _____
- (73) Find the sum of the squares of the diagonals of a parallelogram with side lengths 7 and 11. _____
- (74) $h(x) = (x + 3)^{\frac{1}{2}}$ has a relative minimum at $x =$ _____
- (75) $\int_1^2 \int_3^4 xy \, dydx =$ _____
- (76) The axis of symmetry of the graph of
 $f(x) = 5x^2 + 15x - 24$ is $x =$ _____
- (77) Given: 5, 1, 4, -3, 7, -10, 17, k, 44, $k =$ _____
- (78) $(402)^3 =$ _____
- (79) $28146 \times 111 =$ _____
- * (80) 93.75% of 51524 = _____

State Answers

(61) 20

(62) -3

(63) 180

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

(65) .92

(66) 45

(67) 27

(68) $-3,250$

(69) 20

*(70) 6,864 $-$ 7,586

(71) .3, $\frac{3}{10}$

(72) -2

(73) 340

(74) -3

(75) 5.25, $\frac{21}{4}, 5\frac{1}{4}$

(76) $-1.5, -\frac{3}{2}, -1\frac{1}{2}$

(77) -27

(78) 64,964,808

(79) 3,124,206

*(80) 45,889 $-$ 50,718