FOR GRADER USE ONLY
Score Test Below:

_____out of 250. Initials_____

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Papers contending to place:

_____out of 250. Initials_____

UiL

University Interscholastic League
A+ Mathematics Contest • Answer Sheet

Write your contestant number in the upper right corner, and circle your grade below.
**Circle Grade Level:**   6   7   8

1.	A	B	C	D	E	26.	A	B	C	D	E
2.	A	B	C	D	E	27.	A	B	C	D	E
3.	A	B	C	D	E	28.	A	B	C	D	E
4.	A	B	C	D	E	29.	A	B	C	D	E
5.	A	B	C	D	E	30.	A	B	C	D	E
6.	A	B	C	D	E	31.	A	B	C	D	E
7.	A	B	C	D	E	32.	A	B	C	D	E
8.	A	B	C	D	E	33.	A	B	C	D	E
9.	A	B	C	D	E	34.	A	B	C	D	E
10.	A	B	C	D	E	35.	A	B	C	D	E
11.	A	B	C	D	E	36.	A	B	C	D	E
12.	A	B	C	D	E	37.	A	B	C	D	E
13.	A	B	C	D	E	38.	A	B	C	D	E
14.	A	B	C	D	E	39.	A	B	C	D	E
15.	A	B	C	D	E	40.	A	B	C	D	E
16.	A	B	C	D	E	41.	A	B	C	D	E
17.	A	B	C	D	E	42.	A	B	C	D	E
18.	A	B	C	D	E	43.	A	B	C	D	E
19.	A	B	C	D	E	44.	A	B	C	D	E
20.	A	B	C	D	E	45.	A	B	C	D	E
21.	A	B	C	D	E	46.	A	B	C	D	E
22.	A	B	C	D	E	47.	A	B	C	D	E
23.	A	B	C	D	E	48.	A	B	C	D	E
24.	A	B	C	D	E	49.	A	B	C	D	E
25.	A	B	C	D	E	50.	A	B	C	D	E

INVITATIONAL 2018-2019

A+ ACADEMICS
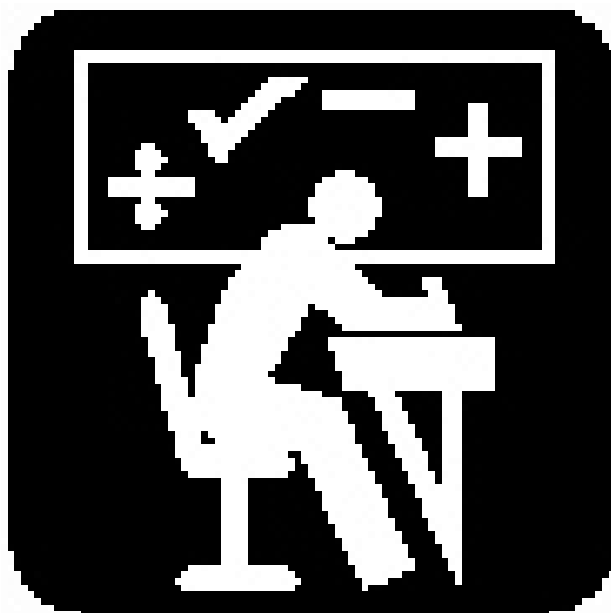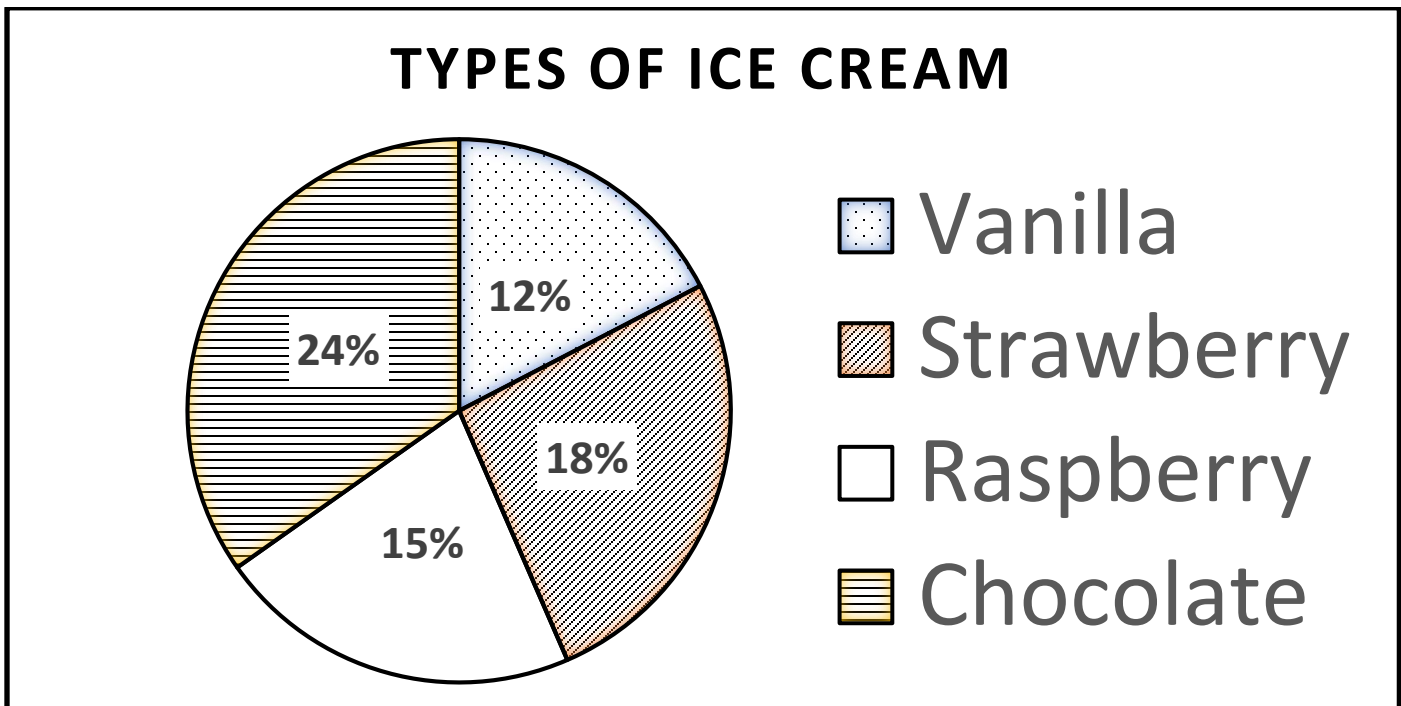
University Interscholastic League

Mathematics

DO NOT OPEN TEST
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2018 – 2019 University Interscholastic League JH/MS Mathematics Contest A

(1) Evaluate: $2^0 + 3^0 - 0.25^{-1}$

A) $-\dfrac{1}{4}$ B) -2   C) $3\dfrac{1}{4}$ D) $1\dfrac{3}{4}$ E) $4\dfrac{1}{4}$

(2) $2\dfrac{2}{3}$ yards + 3 feet – 24 inches = _____

A) 9 ft.   B) 13 ft.   C) $3\dfrac{2}{3}$ ft.   D) $3\dfrac{1}{3}$ E) None of these

(3) $17 \times \dfrac{18}{19} = $ _____

A) $17\dfrac{1}{19}$ B) $16\dfrac{17}{19}$ C) $18\dfrac{1}{19}$ D) $17\dfrac{2}{19}$ E) $16\dfrac{2}{19}$

(4) $12 - 3 \times 4^0 = $ _____
A) 12   B) 36   C) 0   D) 9   E) 5

(5) $1230104 \div 11$ has a remainder of _____
A) 4   B) 6   C) 7   D) 9   E) 10

(6) What is the area of an isosceles triangle with congruent sides 5 cm and other side 8 cm?
A) 20 cm^2 B) 24 cm^2 C) 6 cm^2 D) 12 cm^2 E) 15 cm^2

(7) If the length of the shadow for a yardstick is 24 inches while Noah's shadow is 20 inches long. How tall is Noah?
A) 36 in.   B) 34 in.   C) 32 in.   D) 30 in.   E) 28 in.

(8) What is the sum of the prime numbers less than ten?
A) 17   B) 26   C) 15   D) 18   E) 27

(9) One-sixteenth is equivalent to what percent?

A) 16   B) $6\dfrac{1}{4}$ C) $8\dfrac{1}{3}$ D) $8\dfrac{2}{3}$ E) $16\dfrac{2}{3}$

(10) If a circle's diameter is increased by 25%, then its area is

A) 25% larger.   B) 125% larger.   C) $\dfrac{5}{4}$ larger.   D) 625% larger.   E) $\dfrac{25}{16}$ larger.

(11) $9\dfrac{1}{2}$ percent of 24 is the same as 19% of _____

A) 6   B) 48   C) 12   D) 18   E) 16

(12) Mackenzie's class has 10 boys and 14 girls. If her teacher randomly chooses a student to hand out papers, what is the probability that a girl will be chosen?

A) $\dfrac{5}{7}$ B) $\dfrac{7}{10}$ C) $\dfrac{7}{5}$ D) $\dfrac{7}{12}$ E) $\dfrac{5}{12}$

(13) A pizza was cut into 12 equal slices. Eduardo ate one-third of the slices and gave one-half of the remaining slices to friends. How many slices were left?
    A) 8   B) 6   C) 5   D) 4   E) 2

(14) 35 base 6 equals _____ base 10?
    A) 8   B) 64   C) 11   D) 18   E) 23

For Questions 15 – 18 please use the chart below.

TYPES OF ICE CREAM

☐ Vanilla
▨ Strawberry
☐ Raspberry
▤ Chocolate

12% 24% 18% 15%

(15) 200 Students answered a survey at Eagle View Elementary on what type of ice cream was their favorite. Using the above chart, how many students liked Strawberry ice cream the best?
    A) 18   B) 180   C) 36   D) 72   E) 40

(16) 200 Students answered a survey at Eagle View Elementary on what type of ice cream was their favorite. Using the above chart, how many students liked Raspberry or Vanilla ice creams the best?
    A) 54   B) 27   C) 24   D) 30   E) 120

(17) 200 Students answered a survey at Eagle View Elementary on what type of ice cream was their favorite. Using the above chart, how many students did not choose Vanilla ice cream as their favorite?
    A) 88   B) 176   C) 98   D) 60   E) 84

(18) 200 Students answered a survey at Eagle View Elementary on what type of ice cream was their favorite. Using the above chart, if the average amount of ice cream eaten that day by each student was 2 ounces, how much chocolate ice cream was eaten?
    A) 88 oz.   B) 24 oz.   C) 48 oz.   D) 60 oz.   E) 96 oz.

(19) 28.4 decimeters = _____ centimeters (cm).
    A) 0.284 cm   B) 0.00284 cm   C) 2.84 cm   D) 284 cm   E) 2840 cm

(20) Lisha puts dots that are equally spaced apart on a sheet of paper. The dots are 1-inch apart. If there are 13 dots in each of 17 rows, what is the distance from the first dot in the 1st row to the last dot in the 17th row?

    A) 400 in.   B) 30 in.   C) $17\sqrt{13}$ in.   D) 28 in.   E) 20 in.

(21) Genny draws a single card from a standard deck of 52 playing cards. What is the probability that she draws a red queen?

    A) $\dfrac{1}{4}$ B) $\dfrac{1}{26}$ C) $\dfrac{1}{52}$ D) $\dfrac{1}{2}$ E) $\dfrac{1}{13}$

(22) $9\dfrac{1}{3} \times 9\dfrac{2}{3} =$ _____

    A) $81\dfrac{2}{3}$ B) $90\dfrac{2}{3}$ C) $81\dfrac{2}{9}$ D) $90\dfrac{1}{9}$ E) None of these

(23) If the area of circle is 36π, what is its circumference?

    A) 12π B) 18π C) 6π D) 12   E) 9π

(24) Matt placed 20 bricks on the ground next to each other. He then placed 19 bricks on top of that row. He then placed 18 bricks on the next row above and continued to do so until there was only one brick to the top-most row. How many bricks total did Matt place?

    A) 420   B) 400   C) 380   D) 210   E) 200

(25) If $2x - y = 24$ and $x + y = 30$, then $y =$ _____

    A) 18   B) 12   C) -18   D) -12   E) -6

(26) If $f(x) = x^2 + 4.6x + 5.29$, then $f(-2) =$ _____

    A) 4   B) 18.49   C) 0.09   D) 9.2   E) 0.9

(27) If the shaded area in the figure to the right is 200 square centimeters, what is the perimeter of the square?

    A) 20 cm   D) 40 cm

    B) 400 cm   E) 80 cm

    C) 1200 cm
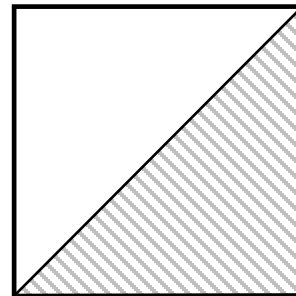
(28) Set A = {P, R, I, M, E}, B = {N, U, M, B, E, R} and C = {U, I, L}. What is the number of unique elements in $A \cup C \cap B$?

    A) 4   B) 6   C) 3   D) 5   E) None of these

(29) How many whole numbers will evenly divide into 24?

    A) 24   B) 36   C) 8   D) 48   E) 12

(30) $42 \div 16 - 10 \div 16 =$

    A) 32   B) 2   C) 8   D) 4   E) 24

(31)   0.06666 . . . = _____common fraction.

A) $\dfrac{1}{30}$ B) $\dfrac{1}{6}$ C) $\dfrac{2}{15}$ D) $\dfrac{1}{15}$ E) $\dfrac{2}{33}$

(32)   Five identical squares, each with area of 36 square inches, are placed so that they each touch each other on a side, forming a rectangle. What is the perimeter of the rectangle?
A) 180 in.   B) 120 in.   C) 72 in.   D) 60 in.   E) 36 in.

(33) $(26 \times 17 + 74) \div 9$ has a remainder of _____
A) 1   B) 3   C) 4   D) 6   E) 8

(34)   If you roll a single fair die, what are the odds that the number of dots showing on top is greater than 4?

A) $\dfrac{1}{2}$ B) $\dfrac{1}{6}$ C) $\dfrac{1}{3}$ D) $\dfrac{2}{3}$ E) $\dfrac{2}{1}$

(35)   Wes can peel a bushel of potatoes in $1\dfrac{1}{2}$ hours, while Noah can peel a bushel of potatoes in 45 minutes. If the brothers work together, how long would it take them to peel a bushel of potatoes?

A) $2\dfrac{1}{2}$ hrs.   B) $2\dfrac{1}{4}$ hrs.   C) $\dfrac{1}{2}$ hr.   D) $\dfrac{4}{9}$ hr.   E) $1\dfrac{1}{3}$ hrs.

(36)   What is the least common multiple of 24, 18 and 21?
A) 3   B) 72   C) 84   D) 122   E) 504

(37)   The time difference, ignoring daylight savings time, between Austin, Texas and Vatican City, Italy is such that Vatican City is seven hours ahead. Los Angeles, California is 2 hours behind Austin. If it is 1:00 PM in Los Angeles, what time is it in the Vatican City?
A) 3:00 AM   B) 9:00 AM   C) 7:00 PM   D) 10:00 PM   E) 11:00 PM

(38)   If R_1 and R_2 represents the two answers for the equation $2x^2 - 6x + 15 = 0$, what is $R_1 + R_2$?

A) $7\dfrac{1}{2}$ B) $\dfrac{2}{15}$ C) 3   D) $\dfrac{1}{3}$ E) -3

(39)   What is the area of a rhombus with diagonals $12\dfrac{1}{3}$ cm and 6 cm?

A) 37 cm^2 B) 42 cm^2 C) 68 cm^2 D) 74 cm^2 E) 108 cm^2

(40)   What is the tenth term in the Fibonacci sequence 1, 1, 2, 3, 5, …?
A) 21   B) 29   C) 34   D) 38   E) 55

(41)   A rectangular garden 50 feet long and 10 feet wide is enclosed by a fence. To make the garden larger, while using the same fence, its shape is changed to a square. By how many square feet does this enlarge the garden?
A) 100 feet^2 B) 200 feet^2 C) 300 feet^2 D) 400 feet^2 E) 500 feet^2

(42) $(6 \heartsuit 3) + 4 - (2 - 1) = 5$ if $\heartsuit$ is which math operation?
A) +   B) −   C) ×   D) ÷   E) $\sqrt{\ }$

(43)   The third exit on a highway is located at milepost 40 and the tenth exit is at milepost 160. There is a service center on the highway located three-fourths of the way from the third exit to the tenth exit. At what milepost would you expect to find this service center?
A) 90   B) 100   C) 110   D) 120   E) 130

(44)   Three flower beds overlap as shown to the right. Bed A has 500 plants, bed B has 450 plants, and bed C has 350 plants. Beds A and B share 50 plants, while beds A and C share 100. What is the total number of plants?
A) 850   D) 1300
B) 1000   E) 1450
C) 1150
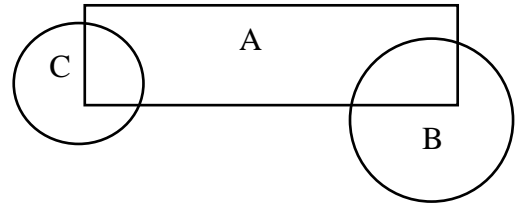
(45)   The average age of the 40 members of a computer science camp is 17 years. There are 20 girls, 15 boys, and 5 adults. If the average age of the girls is 15 and the average age of the boys is 16, what is the average age of the adults?
A) 26   B) 27   C) 28   D) 29   E) 30

(46)   Soda is sold in packs of 6, 12 and 24 cans. What is the minimum number of packs needed to buy exactly 90 cans of soda?
A) 4   B) 5   C) 6   D) 8   E) 15

(47) 2019^{2020} divided by 5 has a remainder of_____.
A) 0   B) 1   C) 2   D) 3   E) 4

(48)   An ape at the Fort Worth Zoo ate 100 bananas from May 1st through May 5th. Each day she ate six more bananas than on the previous day. How many bananas did the ape eat on May 5th?
A) 20   B) 22   C) 30   D) 32   E) 34

(49)   How many distinct triangles can be drawn using three of the dots shown to the right as vertices?
A) 9   D) 20
B) 12   E) 24
C) 18
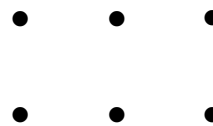
(50)   Albert's empty swimming pool will hold 24,000 gallons of water when full. The pool will be filled by 4 hoses, each of which supplies 2.5 gallons of water per minute. How many hours will it take to fill the pool?
A) 40   B) 42   C) 44   D) 46   E) 48

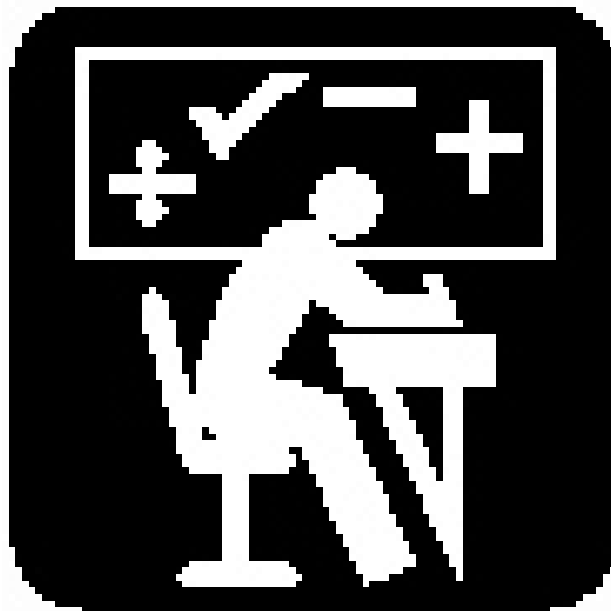# 2018 – 2019 University Interscholastic League JH/MS Mathematics Contest A – Key

(1)	B		(26)	C
(2)	A		(27)	E
(3)	E		(28)	A
(4)	D		(29)	C
(5)	C		(30)	B
(6)	D		(31)	D
(7)	D		(32)	C
(8)	A		(33)	B
(9)	B		(34)	A
(10)	E		(35)	C
(11)	C		(36)	E
(12)	D		(37)	D
(13)	D		(38)	C
(14)	E		(39)	A
(15)	C		(40)	E
(16)	A		(41)	D
(17)	B		(42)	D
(18)	E		(43)	E
(19)	D		(44)	C
(20)	E		(45)	C
(21)	B		(46)	B
(22)	E (90 2/9)		(47)	B
(23)	A		(48)	D
(24)	D		(49)	C
(25)	B		(50)	A

FALL/WINTER DISTRICT 2018-2019

A+ ACADEMICS

University Interscholastic League


Mathematics

DO NOT OPEN TEST
UNTIL TOLD TO DO SO

2018 – 2019 University Interscholastic League JH/MS Mathematics Contest B

(1)   Evaluate: $\left(\dfrac{1}{4}\right)^{-2} \div 2 - 4^0$

    A) 7   B) 8   C) $\dfrac{1}{32}$ D) $\dfrac{1}{8}$ E) -8

(2)   Forty-eight nickels plus nine quarters = _____.

    A) \$2.40   B) \$2.25   C) 46 dimes   D) \$4.56   E) $46\dfrac{1}{2}$ dimes

(3) $9 \times \dfrac{10}{11} =$ _____.

    A) $9\dfrac{2}{11}$ B) $8\dfrac{2}{11}$ C) $\dfrac{9}{11}$ D) $10\dfrac{8}{11}$ E) $9\dfrac{8}{11}$

(4) $44\dfrac{4}{9}\% =$ _____.

    A) $\dfrac{4}{11}$ B) $\dfrac{8}{9}$ C) $\dfrac{4}{9}$ D) $\dfrac{9}{11}$ E) $\dfrac{9}{44}$

(5)   88 feet/second = _____ miles per hour (mph).

    A) $129\dfrac{1}{3}$ mph   B) 44 mph   C) 120 mph   D) 60 mph   E) 132 mph

(6)   If $1°C = \dfrac{5}{9}\left(1°F - 32\right)$, then $60°C =$ _____.

    A) 140°F   B) $15\dfrac{5}{9}$°F   C) 92°F   D) $50\dfrac{2}{5}$°F   E) None of these

(7) $\dfrac{3}{16} =$ _____%

    A) $18\dfrac{1}{4}$ B) $18\dfrac{3}{4}$ C) $53\dfrac{1}{4}$ D) $53\dfrac{1}{3}$ E) $6\dfrac{3}{4}$

(8)   2.2 is what percent of 20?

    A) 110   B) 1.1   C) 11   D) $9\dfrac{1}{11}$ E) $9\dfrac{1}{9}$

(9)   If four pencils cost \$1.20, then six pencils cost _____.
    A) \$1.80   B) 90¢   C) \$2.08   D) \$1.50   E) \$1.60

(10) What is the arithmetic mean of 36, 22, 34 and 20?
    A) 27   B) 28   C) 29   D) 26   E) 25

(11) Which of those listed below is a triangular number?
    A) 16   B) 18   C) 21   D) 27   E) 33

(12)   If $48^2 - 42^2 = 12k$, then k is equal to what value?
     A) 45   B) 6   C) 12   C) 64   E) 90

(13)   If $A > 1$ and $A^k \div A^2 \times A = A^4$, then k has what value?
     A) 9   B) 8   C) 7   D) 6   E) None of these

(14)   If $y = 19$ and $x = 13$, then what does $x^2 - 2xy + y^2$ equal?
     A) 6   B) -36   C) 18   D) 6   E) 36

For questions 15 – 18, please use the graph below.
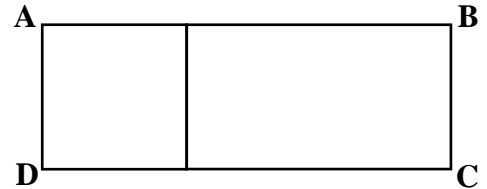
Fundraiser Tickets Sold

Days of Week
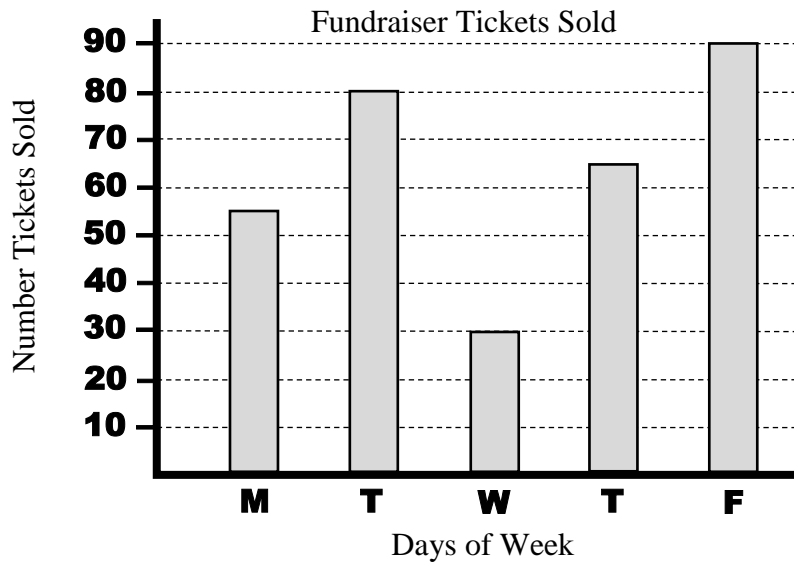
(15)   If tickets were $2 each, how much more money was made in ticket sales for the most daily ticket sales compared to the least daily ticket sales?
     A) $90   B) $60   C) $120   D) $50   E) $70

(16)   What is the range for the number of tickets sold over the five-day period?
     A) 60 tickets   B) 64 tickets   C) 65 tickets   D) 320 tickets   E) 160 tickets

(17)   If ticket were $2 each, how much money was made in ticket sales for the five-day period?
     A) $320   B) $160   C) $128   D) $130   E) $640

(18)   What is the positive difference in the arithmetic mean and median for the total number of tickets sold over the five-day period?
     A) 65 tickets   B) 64 tickets   C) 139 tickets   D) 1 ticket   E) zero tickets

(19)   Find n, so that $917n$ is the largest four-digit number divisible by six.
     A) 2   B) 4   C) 6   D) 8   E) 0

(20) $24 \div 0.08333 \ldots = $ _____.
     A) 1   B) 144   C) 288   D) 48   E) 2

(21) $\sqrt{29 \times 31 + 1} =$ _____.
  A) 31   B) 32   C) 33   D) 34   E) None of these

(22) How much does it cost to drive a car 90 miles at twenty-five cents per mile?
  A) $22.50   B) $36   C) $29.25   D) $225   E) $27.78

(23) What is the simple interest on $120 at 6% annual for three months?
  A) $18   B) $7.20   C) $3.60   D) $1.80   E) None of these

(24) Four cups equal _____ liquid ounces.
  A) 16   B) 32   C) 36   D) 48   E) 96

(25) If the sum of three consecutive even integers is 132, what is the largest integer?
  A) 42   B) 44   C) 46   D) 48   E) 52

(26) A black bag contains 2 blue marbles, 1 red marble, 4 green marbles, 5 yellow marbles and 3 black
      marbles. All marbles are of identical size and weight. If Mackenzie reaches in and picks a single
      marble that is not blue, what is the probability that on the next try she pulls out a blue marble?
  A) $\dfrac{2}{15}$ B) $\dfrac{1}{5}$ C) $\dfrac{1}{3}$ D) $\dfrac{4}{15}$ E) $\dfrac{1}{7}$

(27) Noah opens his bible to a random location and notices the product of the two page-numbers is 380.
      What is the sum of the two page-numbers that Noah turned to?
  A) 39   B) 40   C) 37   D) 38   E) 48

(28) What is the slope of the straight line passing through the points (-2, 6) and (4, -10)?
  A) $\dfrac{8}{3}$ B) $\dfrac{3}{8}$ C) $\dfrac{2}{1}$ D) $-\dfrac{1}{2}$ E) $-\dfrac{8}{3}$

(29) If $x + y = 6$ and $xy = 8$, then $x^2 + y^2 =$ _____.
  A) 36   B) 28   C) 14   D) 20   E) 24

(30) At one ticket window 9 adult tickets and 8 child tickets were sold for a total of $69. At another ticket
      window, 4 adult and 12 child tickets were sold for a total of $56. If two parents and their one child
      bought tickets, how much would they pay total?
  A) $13   B) $11   C) $16   D) $18   E) $9

(31) Two sides of a triangle measure 18 cm and 36 cm. What is the smallest possible integral length of the
      third side of the triangle?
  A) 18 cm   B) 19 cm   C) 17 cm   D) 54 cm   E) 55 cm

(32) How many positive integral divisors does the number 40 have?
  A) 40   B) 200   C) 16   D) 8   E) 4

(33) Genny walked 12 feet due West and then stopped. She then turned North and walked 16 feet and
      stopped. To the nearest foot, how far away was Genny from her starting point?
  A) 28 feet   B) 4 feet   C) 112 feet   D) 400 feet   E) 20 feet

(34)   When it is midnight in Vatican City, Italy, it is 6:00 PM the previous day in Fairfax, Virginia; 3:00 PM in San Francisco, California; and 5:00 PM in Houston Texas. If it is 8:00 AM in San Francisco, California, what time is it in the Fairfax, Virginia?
A) 5:00 AM same day
B) 1:00 AM same day
C) 3:00 PM same day
D) 3:00 AM same day
E) 11:00 AM same day

(35)   In the figure to the right, the square has an area of 64 cm^2 and is one-third the area of rectangle ABCD. What is the perimeter of rectangle ABCD?
A) 192 cm
B) 96 cm
C) 80 cm
D) 64 cm
E) 32 cm

(36)   Genny can vacuum four rooms of the home in 30 minutes. Andy takes 45 minutes to vacuum the same four rooms. If they work together, how long would it take them to vacuum the four rooms?
A) 16 minutes   B) 18 minutes   C) 24 minutes   D) 28 minutes   E) 36 minutes

(37)   What is the x-intercept of the graph of the linear function: $f(x) = \dfrac{3}{8}x - 24$?

A) $(-\dfrac{1}{24}, 0)$ B) (24, 0)   C) (64, 0)   D) (-9, 0)   E) (9, 0)

(38)   Thirty-three minutes is what percent of an hour?

A) 33   B) $33\dfrac{1}{3}$ C) 55   D) 45   E) $30\dfrac{1}{3}$

(39)   If set A = {D, E, L, R, I, O}, set B = {T, E, X, A, S} and set C = {R, I, O, G, R, A, N, D, E}, then A∪B∩C has how many unique elements?
A) 3   B) 4   C) 5   D) 6   E) 8

(40)   Noah, who is 2 feet 6 inches tall casts a shadow that is 4 feet long when Mackenzie casts a shadow that is 6 feet long. How tall is Mackenzie?
A) 3 ft 8 in.   B) 3 ft. 9 in.   C) 4 ft. 3 in.   D) 4 ft. 8 in.   E) 4 ft. 9 in.

(41)   If the angles of a triangle are in the ratio 2, 4, 6, what is the sum of the measures of the two largest angles?
A) 30°   B) 60°   C) 72°   D) 90°   E) 150°

(42)   How many ways are there to make change for a quarter using only pennies and/or nickels?
A) 4   B) 6   C) 10   D) 15   E) 25

(43)   Wesley's school has 1400 students. If the teacher-student ratio is 1:35, how many additional teachers will have to be hired to change the ratio to 1:20?
A) 30   B) 40   C) 55   D) 70   E) 110

(44)   If A ♥ B = B^A, then 2♥3 = ___.
A) 6   B) 9   C) 8   D) 12   E) 24

(45) Using all the letters in the word, TEXAS, how many arrangements are possible?
    A) 1   B) 5   C) 20   D) 24   E) 120

(46) How many people can be seated at 12 square tables lined up end to end if each table used individually seats four persons?
    A) 24   B) 26   C) 28   D) 36   E) 48

(47) What is the product of the least common multiple and greatest common divisor of 24 and 18?
    A) 42   B) 72   C) 84   D) 432   E) 540

(48) What is the volume of a right cylinder with diameter 8 centimeters (cm) and length 10 cm?
    A) 80π cm^3 B) 160π cm^3 C) 180π cm^3 D) 200π cm^3 E) 640π cm^3

(49) The figure shown to the right is made of two squares, labeled A and B, and two congruent rectangles, labeled R. The area of square A is 9 square units and the area of square B is 16 square units. What is the sum of the areas of the two rectangles?
    A) 24 square units
    B) 25 square units
    C) 28 square units
    D) 49 square units
    E) 50 square units

B	R
R	A

(50) Mike received a birthday gift of money. He loaned $5 to his friend Dan and spent half of the remaining money. The next day he received $10 from his uncle. After spending $9 at the movies, he still had $11.00 left. How much money did Mike receive for his birthday?
    A) $15   B) $16   C) $20   D) $25   E) $35
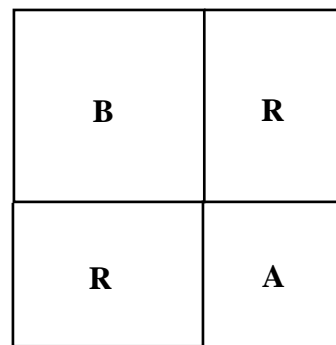
2018 – 2019 University Interscholastic League JH/MS Mathematics Contest B – Key

(1)	A		(26)	E
(2)	E		(27)	A
(3)	B		(28)	E
(4)	C		(29)	D
(5)	D		(30)	A
(6)	A		(31)	B
(7)	B		(32)	D
(8)	C		(33)	E
(9)	A		(34)	E
(10)	B		(35)	D
(11)	C		(36)	B
(12)	A		(37)	C
(13)	E (5)		(38)	C
(14)	E		(39)	D
(15)	C		(40)	B
(16)	A		(41)	E
(17)	E		(42)	B
(18)	D		(43)	A
(19)	B		(44)	B
(20)	C		(45)	E
(21)	E (30)		(46)	B
(22)	A		(47)	D
(23)	D		(48)	B
(24)	B		(49)	A
(25)	C		(50)	D

SPRING DISTRICT 2018-2019

A+ ACADEMICS

University Interscholastic League

Mathematics

DO NOT OPEN TEST
UNTIL TOLD TO DO SO

2018 – 2019 University Interscholastic League JH/MS Mathematics Contest C

(1) Evaluate: $\left(\dfrac{1}{3}\right)^{-2} \div 3 - 3^0$

    A) 2   B) 3   C) $\dfrac{1}{27}$ D) $\dfrac{26}{27}$ E) -3

(2) Forty-four nickels plus eight quarters = _____.

    A) \$2.20   B) \$2.00   C) 42 dimes   D) \$4.02   E) $42\dfrac{1}{5}$ dimes

(3) $8 \times \dfrac{10}{12} =$ _____.

    A) $9\dfrac{2}{3}$ B) $8\dfrac{5}{6}$ C) $\dfrac{2}{3}$ D) $7\dfrac{5}{6}$ E) $6\dfrac{2}{3}$

(4) $63\dfrac{7}{11}\% =$ _____.

    A) $\dfrac{6}{11}$ B) $\dfrac{63}{11}$ C) $\dfrac{7}{11}$ D) $\dfrac{11}{63}$ E) $\dfrac{7}{9}$

(5) 22 feet/second = _____ miles per hour (mph).

    A) $32\dfrac{4}{15}$ mph   B) 15 mph   C) 32 mph   D) 66 mph   E) 132 mph

(6) If $1°C = \dfrac{5}{9}\left(1°F - 32\right)$, then $40°C =$ _____.

    A) 104°F   B) $44\dfrac{4}{9}$ °F   C) 140°F   D) $40\dfrac{4}{9}$ °F   E) None of these

(7) $\dfrac{5}{16} =$ _____%

    A) $31\dfrac{1}{5}$ B) $31\dfrac{3}{4}$ C) $3\dfrac{1}{5}$ D) $3\dfrac{1}{8}$ E) $31\dfrac{1}{4}$

(8) 3.2 is what percent of 20?

    A) 64   B) 1.6   C) 16   D) $6\dfrac{1}{4}$ E) $9\dfrac{16}{25}$

(9) If four pens cost \$3.20, then six pencils cost _____.
    A) \$6.80   B) 80¢   C) \$5.33   D) \$4.80   E) \$1.92

(10) What is the arithmetic mean of 16, 22, 34 and 20?
    A) 21   B) 22   C) 23   D) 24   E) 25

(11) Which of those listed below is a triangular number?
    A) 15   B) 16   C) 18   D) 20   E) 33

(12) If $48^2 – 42^2 = 3k$, then k is equal to what value?
    A) 180   B) 36   C) 360   C) 60   E) 90

(13) If $A > 1$ and $A^k \div A^2 \times A = A^5$, then k has what value?
    A) 9   B) 8   C) 7   D) 6   E) None of these

(14) If $y = 18$ and $x = 12$, then what does $x^2 – 2xy + y^2$ equal?
    A) 6   B) -36   C) 18   D) -6   E) 36

**For questions 15 – 18, please use the graph below.**

Fundraiser Tickets Sold
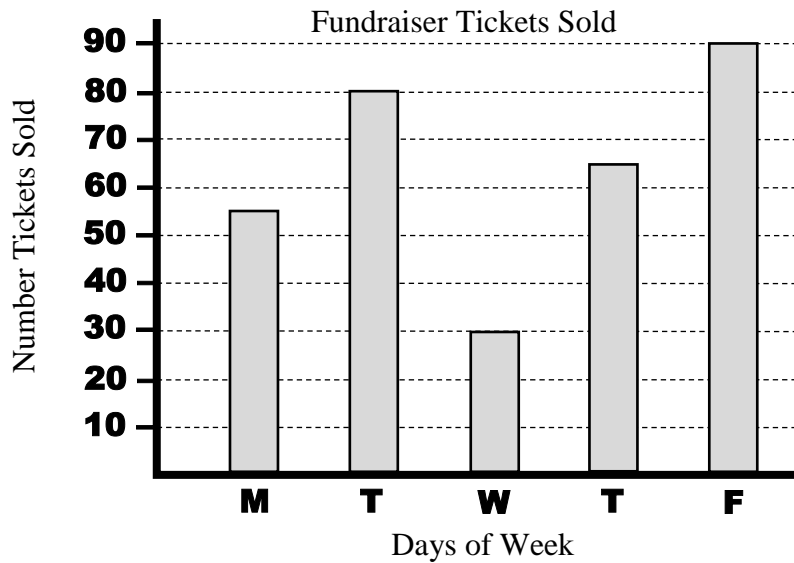
(15) If tickets were $3 each, how much more money was made in ticket sales for the most daily ticket sales compared to the least daily ticket sales?
    A) $180   B) $60   C) $120   D) $90   E) $70

(16) What is the range for the number of tickets sold over the five-day period?
    A) 60 tickets   B) 64 tickets   C) 65 tickets   D) 320 tickets   E) 160 tickets

(17) If tickets were $3 each, how much money was made in ticket sales for the five-day period?
    A) $320   B) $960   C) $160   D) $480   E) $640

(18) What is the positive difference in the arithmetic mean and median for the total number of tickets sold over the five-day period?
    A) 65 tickets   B) 64 tickets   C) 139 tickets   D) 1 ticket   E) zero tickets

(19) Find n, so that $832n$ is the largest four-digit number divisible by six.
    A) 2   B) 4   C) 6   D) 8   E) 0

(20) $36 \div 0.08333 \ldots = $ _____.
    A) 3   B) 30   C) 288   D) 24   E) 432

(21) $\sqrt{28 \times 32 + 4} =$ _____.

A) 31 B) 32 C) 33 D) 34 E) None of these

(22) How much does it cost to drive a car 120 miles at twenty-five cents per mile?

A) $48 B) $36 C) $30 D) $300 E) $480

(23) What is the annual simple interest on $120 at 6% for four months?

A) $2.40 B) $7.20 C) $3.60 D) $1.80 E) None of these

(24) Six cups equal _____ liquid ounces.

A) 16 B) 32 C) 36 D) 48 E) 96

(25) If the sum of three consecutive even integers is 102, what is the largest integer?

A) 32 B) 34 C) 36 D) 38 E) 42

(26) A black bag contains 2 blue marbles, 1 red marble, 4 green marbles, 5 yellow marbles and 3 black marbles. All marbles are of identical size and weight. If Mackenzie reaches in and picks a single marble that is not green, what is the probability that on the next try she pulls out a green marble?

A) $\dfrac{4}{5}$ B) $\dfrac{1}{5}$ C) $\dfrac{1}{3}$ D) $\dfrac{4}{15}$ E) $\dfrac{2}{7}$

(27) Noah opens his bible to a random location and notices the product of the two page-numbers is 702. What is the sum of the two page-numbers that Noah turned to?

A) 54 B) 53 C) 51 D) 49 E) 48

(28) What is the slope of the straight line passing through the points (0, 6) and (6, -10)?

A) $\dfrac{8}{3}$ B) $\dfrac{3}{8}$ C) $\dfrac{2}{1}$ D) $-\dfrac{1}{2}$ E) $-\dfrac{8}{3}$

(29) If $x + y = 7$ and $xy = 12$, then $x^2 + y^2 =$ _____.

A) 50 B) 25 C) 24 D) 20 E) 18

(30) At one ticket window, 10 adult tickets and 8 child tickets were sold for a total of $92. At another ticket window, 5 adult and 12 child tickets were sold for a total of $78. If two parents and their one child bought tickets, how much would they pay total?

A) $13 B) $11 C) $16 D) $18 E) $9

(31) Two sides of a triangle measure 20 cm and 36 cm. What is the smallest possible integral length of the third side of the triangle?

A) 17 cm B) 18 cm C) 19 cm D) 54 cm E) 56 cm

(32) How many positive integral divisors does the number 36 have?

A) 36 B) 1296 C) 9 D) 18 E) 24

(33) Genny walked 24 feet due West and then stopped. She then turned North and walked 10 feet and stopped. To the nearest foot, how far away was Genny from her starting point?

A) 34 feet B) 26 feet C) 240 feet D) 676 feet E) 25 feet

(34) When it is midnight in Vatican City, Italy, it is 6:00 PM the previous day in Fairfax, Virginia; 3:00 PM in San Francisco, California; and 5:00 PM in Houston Texas. If it is 9:00 AM in San Francisco, California, what time is it in the Fairfax, Virginia?
- A) 5:00 AM same day
- B) 12:00 AM same day
- C) 3:00 PM same day
- D) 3:00 AM same day
- E) 12:00 PM same day

(35) In the figure to the right, the square has an area of 81 cm^2 and is one-third the area of rectangle ABCD. What is the perimeter of rectangle ABCD?
- A) 90 cm
- B) 72 cm
- C) 63 cm
- D) 54 cm
- E) 27 cm
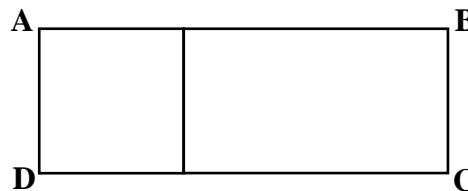
(36) Genny can vacuum four rooms of the home in 24 minutes. Andy takes 48 minutes to vacuum the same four rooms. If they work together, how long would it take them to vacuum the four rooms?
- A) 16 minutes
- B) 18 minutes
- C) 24 minutes
- D) 28 minutes
- E) 36 minutes

(37) What is the x-intercept of the graph of the linear function: $f(x) = \dfrac{3}{8}x - 18$?
- A) $(-\dfrac{1}{24}, 0)$
- B) (24, 0)
- C) (64, 0)
- D) (48, 0)
- E) (6, 0)

(38) Twenty-seven minutes is what percent of an hour?
- A) 9
- B) $33\dfrac{1}{3}$
- C) 48
- D) 45
- E) $22\dfrac{2}{9}$

(39) If set A = {A, U, S, T, I, N}, set B = {T, E, X, A, S} and set C = {T, R, A, V, I, S}, then A∪B∩C has how many unique elements?
- A) 3
- B) 4
- C) 5
- D) 6
- E) 8

(40) Noah, who is 2 feet 6 inches tall casts a shadow that is 6 feet long when Mackenzie casts a shadow that is 10 feet long. How tall is Mackenzie?
- A) 5 ft 8 in.
- B) 5 ft. 2 in.
- C) 4 ft. 8 in.
- D) 4 ft. 4 in.
- E) 4 ft. 2 in.

(41) If the angles of a triangle are in the ratio 2:3:5, what is the sum of the measures of the two largest angles?
- A) 90°
- B) 120°
- C) 126°
- D) 144°
- E) 154°

(42) How many ways are there to make change for a quarter using only dimes and or pennies?
- A) 4
- B) 3
- C) 10
- D) 15
- E) 25

(43) Wesley's school has 1400 students. If the teacher-student ratio is 1:35, how many additional teachers will have to be hired to change the ratio to 1:25?
- A) 56
- B) 40
- C) 26
- D) 20
- E) 16

(44) If A ♥ B = B^A, then 3♥4 = ___.
- A) 64
- B) 12
- C) 81
- D) 27
- E) 24

(45)   Using all the letters in the word, AUSTIN, how many arrangements are possible?
       A) 1   B) 6   C) 36   D) 360   E) 720

(46)   How many people can be seated at 16 square tables lined up end to end if each table used individually
       seats four persons?
       A) 34   B) 36   C) 56   D) 64   E) 128

(47)   What is the product of the least common multiple and greatest common divisor of 16 and 24?
       A) 384   B) 192   C) 96   D) 90   E) 54

(48)   What is the volume of a right cylinder with diameter 12 centimeters (cm) and length 10 cm?
       A) 90π cm^3 B) 24π cm^3 C) 144π cm^3 D) 360π cm^3 E) 480π cm^3

(49)   The figure shown to the right is made of two squares,
       labeled A and B, and two congruent rectangles,
       labeled R. The area of square A is 16 square units and
       the area of square B is 25 square units. What is the
       sum of the areas of the two rectangles?
       A) 20 square units
       B) 16 square units
       C) 25 square units
       D) 40 square units
       E) 54 square units
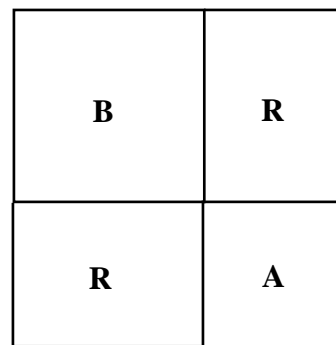
B	R
R	A

(50)   Mike received a birthday gift of money. He loaned $5 to his friend Dan and spent half of the remaining
       money. The next day he received $10 from his uncle. After spending $9 at the movies, he still had
       $16.00 left. How much money did Mike receive for his birthday?
       A) $15   B) $16   C) $20   D) $25   E) $35

2018 – 2019 University Interscholastic League JH/MS Mathematics Contest C – Key

(1)	A	(26)	E
(2)	C	(27)	B
(3)	E	(28)	E
(4)	C	(29)	B
(5)	B	(30)	C
(6)	A	(31)	A
(7)	E	(32)	C
(8)	C	(33)	B
(9)	D	(34)	E
(10)	C	(35)	B
(11)	A	(36)	A
(12)	A	(37)	D
(13)	D	(38)	D
(14)	E	(39)	B
(15)	A	(40)	E
(16)	A	(41)	D
(17)	B	(42)	B
(18)	D	(43)	E
(19)	D	(44)	A
(20)	E	(45)	E
(21)	E (30)	(46)	A
(22)	C	(47)	A
(23)	A	(48)	D
(24)	D	(49)	D
(25)	C	(50)	E