Mathematics Contest Practice

UIL Mathematics - Grades 6-8 - 30 minutes

Write answers or mark the requested choices. Use a separate sheet if needed.
Scoring: +5 correct, -2 incorrect, 0 skipped.

1. Ratios and unit rates (Warmup)

A paint mix uses 7 cups of blue paint and 14 cups of white paint. Which ratio compares blue paint to white paint?

A) 14:21

B) 7:21

C) 21:7

D) 21:14

E) 7:14

2. Mixed Order Operations with Exponents (Warmup)

Evaluate: $(\frac{1}{6})^{-2} / 4 - 7^{0}$.

A) 9

B) $-\frac{143}{144}$

C) $8\frac{1}{3}$

D) 8

E) 10

3. Decimal Percent to Common Fraction (Warmup)

$\frac{3}{8}$ is equivalent to what percent?

A) $37\frac{1}{2}$ %

B) $\frac{3}{8}$ %

C) $32\frac{1}{2}$ %

D) $42\frac{1}{2}$ %

E) $3\frac{3}{4}$ %

4. Prime Number Bounds (Warmup)

Find the smallest prime above 40.

A) 40

B) 41

C) 37

D) 42

E) 43

5. Fraction Subtraction Word Problems (Warmup)

Sofia had $\frac{3}{4}$ quart of paint. Sofia used $\frac{7}{10}$ quart of the paint. How many quarts of paint were left?

A) $\frac{1}{20}$

B) $1\frac{9}{20}$

C) $\frac{7}{10}$

D) $\frac{3}{4}$

E) $\frac{1}{5}$

6. Percent Discount Cost Problems (Warmup)

Sofia buys 6 pounds of pears at $1.00 per pound and uses a 20% off coupon. What is the total amount paid?

A) $1.20

B) $7.20

C) $4.00

D) $4.80

E) $6.00

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7. Regrouping Before Summing (Warmup)

Evaluate: $(-9 + -8 + \ldots + -1) + (4 + 8 + 12 + 16 + 20)$.

A) 60
B) -45
C) 15
D) 105
E) -105

8. Decimal Place Value Composition (Warmup)

Nine tenths plus five hundredths plus one thousandth equals what decimal?

A) 0.591
B) 0.15
C) 0.951
D) 0.015
E) 0.95

9. Percent of a Number (Warmup)

If the sales tax rate is $7\frac{1}{2}$ %,what is the total cost of a $180 item including tax?

A) $13.50
B) $193.50
C) $180.00
D) $166.50
E) $207.00

10. Place Value Multiplication Patterns (Warmup)

1001 x 78 =

A) 78,078
B) 78,156
C) 78,780
D) 78,000
E) 7,878

11. Unit Rate Cost Problems (Warmup)

If one dozen oranges cost $20.52, then 4 oranges would cost

A) $6.84
B) $8.21
C) $8.55
D) $6.94
E) $5.13

12. Fraction Multiplication Patterns (Warmup)

$12 \times \frac{15}{18} =$

A) $14\frac{2}{5}$
B) 30
C) 4
D) $2\frac{5}{6}$
E) 10

13. Sequential Fraction Removal Percent (Warmup)

A box starts with 240 counters. One student removes $\frac{1}{5}$ of the counters. Then a partner removes $\frac{1}{4}$ of what remains. What percent of the original counters were removed?

A) 20%
B) 25%
C) 40%
D) 60%
E) 45%

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14. Unique Prime Factor Sums (Standard)

What is the sum of the unique prime factors of 22?

A) 22

B) 11

C) 2

D) 13

E) 15

15. Percent Increase Price Problems (Standard)

A music school raises the price of each lesson by 30% from last year's price. If last year's price was $13.00, what is this year's price?

A) $16.90

B) $3.90

C) $9.10

D) $20.80

E) $13.00

16. Simple Interest (Standard)

What is the simple interest on a loan of $300 at 3%annual interest for 6 months?

A) $9.00

B) $18.00

C) $54.00

D) $16.50

E) $4.50

17. Rectangular Prism Volume (Standard)

A rectangular garden bed is 35 feet long, 13 feet wide, and is filled with 1 foot of soil. What is the volume of soil, in cubic feet?

A) 96 ft^3

B) 49 ft^3

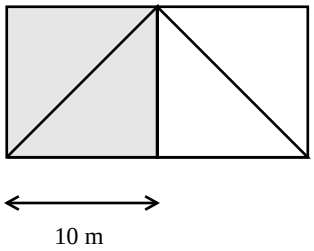
C) 455 ft^3

D) 490 ft^3

E) 442 ft^3

18. Quarter-Circle Square Shaded Area (Standard)

Two congruent squares are placed side by side. Each square has side length 10 meters. The shaded regions are shown below. What is the total shaded area?



Find the total shaded area.

A) 50 m^2

B) 200 m^2

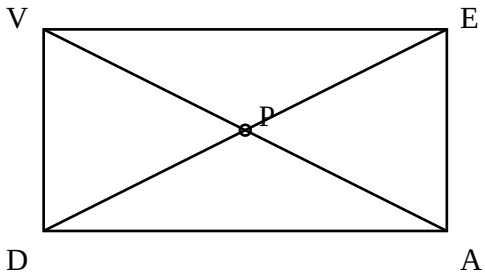
C) 20 m^2

D) 100 m^2

E) 40 m^2

19. Rectangle Diagonal Triangle Congruence (Standard)

A rectangle is divided by its diagonals as shown. Which pair of triangles must be congruent?



A) ▵VEP and ▵VDP

B) ▵VDP and ▵EAP

C) ▵VDA and ▵VDP

D) ▵DAP and ▵DVE

E) ▵VDP and ▵VED

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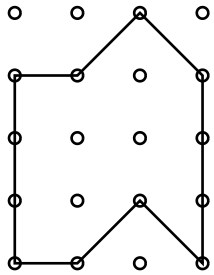
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20. Dot Grid Polygon Area (Standard)

Adjacent grid dots are 1 unit apart both across and up. What area is inside the shaded polygon?



A) 8 units ^{2}

B) 9 units ^{2}

C) 10 units ^{2}

D) 12 units ^{2}

E) 6 units ^{2}

21. Metric Speed Conversions (Standard)

468 kilometers per hour = _____ meters per second (m/s).

A) 234 m/s

B) 936 m/s

C) 135 m/s

D) 468 m/s

E) 130 m/s

22. Metric Area Conversions (Standard)

7.9 square centimeters = _____ square millimeters.

A) 790

B) 7900

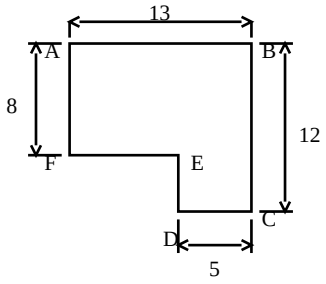
C) 0.79

D) 0.079

E) 79

23. Rectilinear Composite Area (Standard)

What is the area of the rectilinear polygon shown, in square units?



A) 60

B) 32

C) 124

D) 104

E) 156

24. Stack Height Unit Rates (Standard)

A stack of 3600 labels is 6 cm thick. At about the same thickness per label, how many labels would be in a stack 8.4 cm high?

A) 600 labels

B) 3600 labels

C) 5090 labels

D) 5040 labels

E) 151200 labels

25. Calendar Date Intervals (Standard)

A student was born on February 11th. How old, in days, was the student at the end of the day on March 29th of the same year?

A) 46 days

B) 44 days

C) 45 days

D) 48 days

E) 47 days

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26. Regular Polygon Perimeter (Challenging)

What is the perimeter of a regular octagon with side length $2\frac{1}{2}$ meters?

A) 20 meters

B) $22\frac{1}{2}$ meters

C) $17\frac{1}{2}$ meters

D) $10\frac{1}{2}$ meters

E) 28 meters

27. Right Triangle Pythagorean Lengths (Challenging)

A student walks 18 feet due east, then turns due south and walks 24 feet. To the nearest foot, how far is the student from the starting point?

A) 432 feet

B) 6 feet

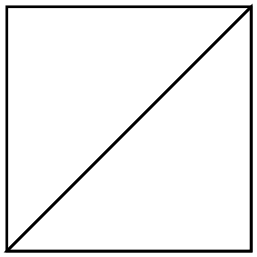
C) 18 feet

D) 42 feet

E) 30 feet

28. Square Area from Diagonal (Challenging)

A square is divided by one diagonal as shown. If the shaded triangular region has area 1352 square centimeters, what is the perimeter of the square?



A) 52 cm

B) 1352 cm

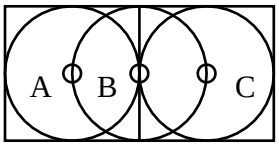
C) 104 cm

D) 2704 cm

E) 208 cm

29. Tangent Circle Rectangle Area (Challenging)

Three congruent circles with centers A, B, and C fit inside the rectangle as shown. The middle circle has diameter 46 and passes through centers A and C. What is the area of the rectangle?



diameter 46

A) 4232

B) 184

C) 2116

D) 16928

E) 8464

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30. Tile Floor Coverage (Challenging)

How many 6-inch by 6-inch square tiles are needed to cover a rectangular floor that measures 12 feet by 8 feet?

A) 96

B) 576

C) 192

D) 2304

E) 384

31. Wind Speed Round Trip (Challenging)

A raft traveled 50 miles with the current in 5 hours. The return trip over the same distance against the current took 8 hours. What was the current speed in miles per hour?

A) $6\frac{1}{4}$ mph

B) $3\frac{3}{4}$ mph

C) 10 mph

D) $1\frac{7}{8}$ mph

E) $2\frac{7}{8}$ mph

32. Linear Cost Models (Challenging)

A music app charges a $4.49 account fee plus $7.25 for each song download. Which equation represents the total cost C for one month when m song downloads are purchased?

A) $C = 7.25m - 4.49$

B) $C = 7.25m + 4.49$

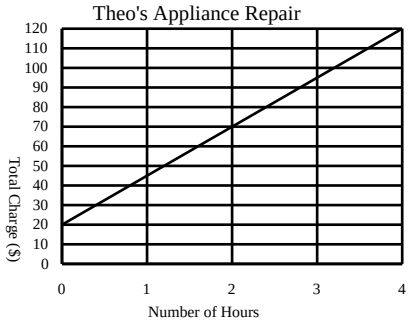
C) $C = \frac{7.25}{m} + 4.49$

D) $C = 4.49C + 7.25m$

E) $C = 4.49m + 7.25$

33. Linear Graph Rate Applications (Challenging)

Theo charges a fixed house-call fee plus an hourly labor charge. The graph below shows the total charge as a function of the time required to repair an appliance. Which amount best represents the hourly labor rate?



A) $120

B) $25

C) $45

D) $30

E) $20

34. Slope from Linear Equations (Challenging)

Find the slope for the line through (-3, -9) and (18, 15).

A) $1\frac{1}{7}$

B) $2\frac{1}{7}$

C) $\frac{8}{15}$

D) $\frac{7}{8}$

E) $-1\frac{1}{7}$

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35. Sum Difference Number Pairs (Challenging)

If two numbers differ by 3 and their sum is 31, what is the larger number?

A) 20

B) 15

C) 14

D) 28

E) 17

36. Sum-Product Square Identities (Challenging)

If $x + y = 11$ and $xy = 30$, then $x^2 + y^2 =$

A) 61

B) 30

C) 60

D) 91

E) 121

37. Combined Work Rates (Challenging)

Leah can pack one order in $1\frac{1}{4}$ hours. Owen can pack one order in 72 minutes. How long will it take them if they work together?

A) $1\frac{1}{5}$ hr.

B) $1\frac{9}{40}$ hr.

C) $\frac{30}{49}$ hr.

D) $1\frac{1}{4}$ hr.

E) $2\frac{9}{20}$ hr.

38. Fibonacci Sequence Terms (Challenging)

What is the 10th term in this Fibonacci-like sequence: 11, 5, 16, 21, ...? Each term after the first two is the sum of the previous two; the first term is 11.

A) 400

B) 554

C) 402

D) 248

E) 401

39. Pairwise Sum Systems (Hard)

Three melons are weighed two at a time. The three pair weights are 21 lb, 24 lb, and 23 lb. How much does the heaviest melon weigh?

A) 10 lb

B) 14 lb

C) 11 lb

D) 12 lb

E) 13 lb

40. Reverse Money Operations (Hard)

A student received some birthday money. The student loaned $10 to a friend and spent half of the remaining money. The next day the student received $13 from a relative. After spending $11, the student had $11 left. How much birthday money did the student receive?

A) $18

B) $28

C) $19

D) $41

E) $45

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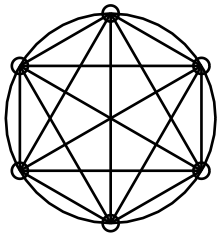
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41. Circle Point Pair Segments (Hard)

Distinct points are placed on a circle, and one segment is drawn between every pair of points. The diagram shows 6 points with 15 segments. If 8 points are placed on a circle, how many segments are drawn?



6 points, 15 segments

A) 36

B) 56

C) 64

D) 28

E) 21

42. Probability from Category Counts (Hard)

There are 11 cards showing the letters E O E H A H J O F O M. If one card is chosen at random, what is the probability that the card does not show a vowel?

A) $\frac{5}{11}$

B) $\frac{4}{11}$

C) $\frac{6}{5}$

D) $\frac{5}{6}$

E) $\frac{6}{11}$

43. Coin Change Combinations (Hard)

How many ways are there to make 75 cents using only pennies and dimes?

A) 8

B) 75

C) 7

D) 9

E) 15

44. Permutations of Distinct Objects (Hard)

Using all the distinct letter cards F, V, C, Q, Y, Z, N, K, U, how many different arrangements are possible?

A) 362880

B) 18

C) 9

D) 729

E) 81

45. Probability Without Replacement (Hard)

A pouch has 9 tiles labeled 2, 3, 4, 5, 6, 7, 8, 9, and 10. If two are selected without replacement, what is the probability that the two labels add to an odd sum?

A) $\frac{4}{9}$

B) $\frac{19}{36}$

C) $\frac{7}{12}$

D) $\frac{5}{18}$

E) $\frac{5}{9}$

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46. Mean of Data Sets (Hard)

A data set has 8 values and mean 9. After removing the value 44, what mean do the remaining values have?

A) 9

B) $5\frac{1}{2}$

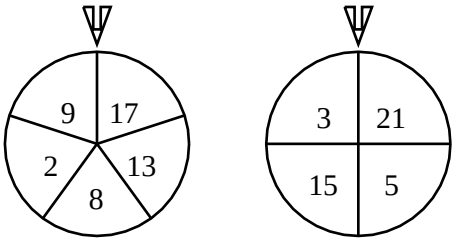
C) 4

D) $3\frac{1}{2}$

E) $10\frac{2}{7}$

47. Spinner Sum Probability (Hard)

Two fair spinners are spun once. What is the probability that the sum of the two selected numbers is a multiple of 4?



A) $\frac{3}{10}$

B) $\frac{1}{4}$

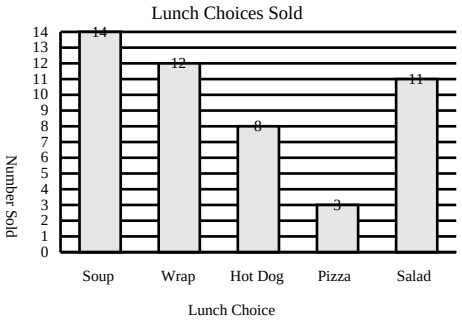
C) $\frac{7}{20}$

D) $\frac{2}{3}$

E) $\frac{7}{10}$

48. Bar Chart Survey Interpretation (Hard)

Use the bar heights as a data set. What is the positive difference between their mean and median?



A) $\frac{2}{5}$

B) 11

C) $2\frac{2}{5}$

D) $1\frac{2}{5}$

E) $9\frac{3}{5}$

49. Probability from Known Category Count (Hard)

A pouch contains only blue and green beads. There are 32 blue beads. If the probability of randomly selecting a blue item is $\frac{8}{9}$, how many green beads are in the pouch?

A) 20

B) 36

C) 4

D) 32

E) 1

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50. Seating Adjacency Guarantees (Hard)

A theater row has 49 seats. If people sit so no two occupied seats are next to each other for as long as possible, how many seats can be occupied before one more person would be forced to sit beside someone?

A) 49

B) 25

C) 16

D) 26

E) 24

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Mathematics Practice Answer Key

UIL Mathematics - Grades 6-8

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

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