

Seventh Grade Test - Excellence in Mathematics Contest – 2013

1. How many of these five fractions are between 1.5 and 2?

$$\frac{7}{8} \quad \frac{7}{4} \quad \frac{7}{5} \quad \frac{4}{3} \quad \frac{23}{15}$$

- A. 1 B. 2 C. 3 D. 4 E. 5
2. Of 162 Eighth graders, 80% of the 90 girls and 75% of the boys are taking Algebra I. How many of these Eighth graders are taking Algebra I?
- A. 121 B. 126 C. 130 D. 132 E. 135
3. The product of two natural numbers is 72. The difference of these two numbers is 14. What is the sum of these two numbers?
- A. 17 B. 18 C. 22 D. 24 E. 27
4. The perimeter of a rectangle is 40 cm. If its width is 6 cm, what is the area of the rectangle?
- A. 84 cm^2 B. 100 cm^2 C. 102 cm^2 D. 168 cm^2 E. 204 cm^2
5. On this calendar for March, 2013, what is the sum of all of the shaded dates?

MARCH, 2013						
SUN	MON	TUE	WED	THUR	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

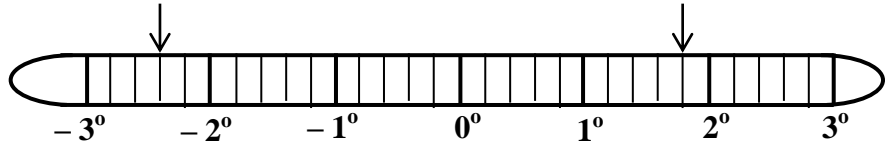
- A. 240 B. 255 C. 270 D. 285 E. 300
6. The first three numbers in an arithmetic sequence are: **97; 82; 67;.....**
What is the tenth number in this sequence?
- A. -53 B. -52 C. -38 D. -37 E. -32
7. One new oil well in North Dakota required 10,560 feet of steel pipe. Each segment of the pipe was 32 feet long and weighed $\frac{1}{4}$ of a ton. (1 ton = 2000 pounds)
How many pounds of steel were used for this one oil well?
- A. 84,480 B. 124,000 C. 165,000 D. 660,000 E. 2,640,000
8. What is the sum of the least and the greatest of these five numbers: **0 ; 0.2 ; -0.3 ; -0.04 ; 0.08**
- A. 0.16 B. 0.08 C. 0.04 D. 0.2 E. -0.1
9. Given 5 nickels and 3 pennies, how many different amounts of money can be formed using one or more of these 8 coins?
- A. 16 B. 18 C. 20 D. 23 E. 24

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10. Follow this set of directions:
1. Select any three different natural numbers between 0 and 10 to use as digits.
 2. Write all six 3-digit numbers that can be written with your three digits.
 3. Add those six numbers.
 4. Divide the sum in Part 3 by the sum of the three digits you originally chose in Part 1.
- What is your result?

- A. 111 B. 222 C. 333 D. 444 E. 555

11. The marks on this thermometer are equally spaced.



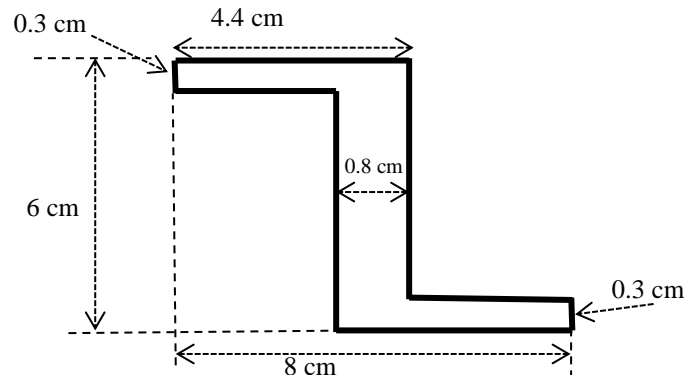
What is the positive difference in temperature between the two marks?

- A. 2.7° B. 3.6° C. 4.2° D. 4.7° E. 5.4°
12. It cost 7.5 cents to make one color copy. How many color copies can you make for \$18.00?
- A. 24 B. 135 C. 240 D. 1350 E. 2400
13. On this calendar for March, 2013, 16 numbers have been shaded. Circle any four of those 16 numbers so that exactly one number from each row and exactly one number from each column have been circled.

MARCH, 2013						
SUN	MON	TUE	WED	THUR	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

What is the largest possible sum of any four numbers you could circle?

- A. 72 B. 76 C. 80 D. 104 E. 114
14. A draftsman has made and recorded these measurements. The arrows and dashed lines indicate exactly what lengths and widths are being measured.

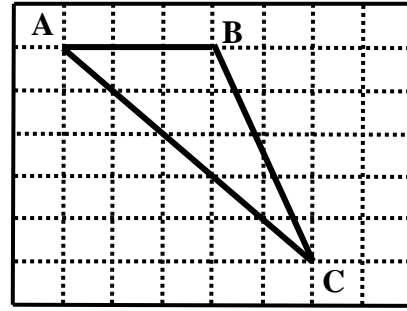


What is the area in square centimeters of this region?

- A. 6.72 B. 6.96 C. 7.14
- D. 7.2 E. 7.44
15. In Fairbanks Alaska, the number of hours of daylight increases rapidly each February. On February 1, sunrise was at 9:37 AM and sunset was at 4:33 pm. On February 28, sunrise was at 8:02 AM and sunset was at 6:08 pm. How many more minutes of daylight were there on February 28 than on February 1?
- A. 166 B. 172 C. 178 D. 184 E. 190

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16. This grid is divided into 1 cm by 1 cm squares. In square centimeters, what is the area of triangle ABC?

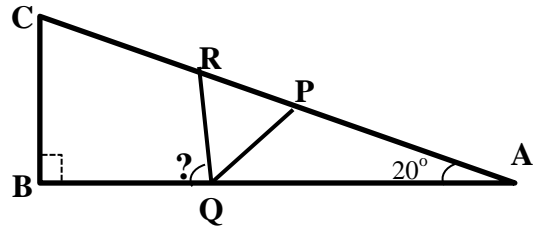


- A. 7 B. 7.25 C. 7.5
D. 7.75 E. 8

17. After their first five games, the Arizona Wildcats men’s basketball team was averaging 85.2 points per game. After their sixth game, their average dropped to 81.5 points per game. How many points did they score in their sixth game?

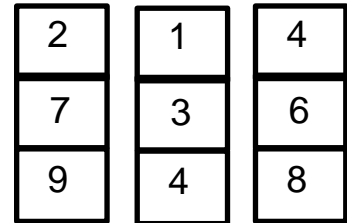
- A. 63 B. 66 C. 74 D. 77 E. 78

18. Triangle PQR is an equilateral triangle inscribed in right triangle ABC. If the measure of angle PAQ is 20° , what is the measure of angle BQR?



- A. 60° B. 70° C. 75°
D. 80° E. 90°

19. Form a 3-digit whole number by selecting one digit from each column, in the order given. For example, you can form 718 or 214.



How many different 3-digit multiples of 9 are possible?

- A. 1 B. 2 C. 3
D. 4 E. 5

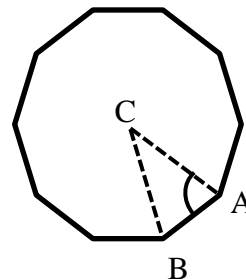
20. The stronger Goldbach conjecture states that any even number greater than 7 can be written as the sum of two different prime numbers. In how many ways can 30 be written as the sum of two different prime numbers?

- A. 1 B. 2 C. 3 D. 4 E. 5

21. *Nine thousand* can be factored in the form: $2^a * 3^b * 5^c$. What is $a+b+c$?

- A. 6 B. 7 C. 8 D. 12 E. 14

22. Point C is the center of this regular decagon, What is the measure of angle CAB?



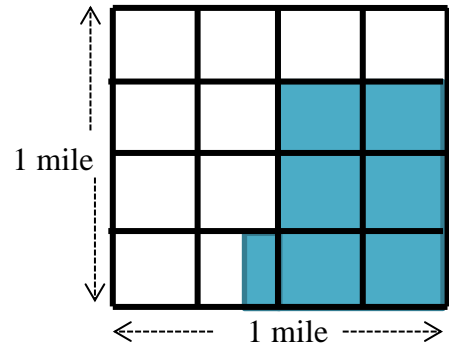
- A. 36° B. 45° C. 54°
D. 72° E. 90°

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23. A stack of 5 quarters is 1 cm tall. A stack of 4 dimes is the same height as a stack of 3 quarters. What is the total value of a 20 cm stack of quarters and a 30 cm stack of dimes?

- A. \$45.00 B. \$48.00 C. \$50.50 D. \$54.40 E. \$60.50

24. In the 19th Century, surveyors divided Missouri into 1 mile by 1 mile squares. Each square mile contained 640 acres of land. Each square mile was further divided into 16 equal-sized smaller squares. If Mr. Moses Austin owned the land that is shaded, how many acres of land did Moses Austin own?



- A. 200 B. 220 C. 240
D. 260 E. 280

25. The Baltimore Ravens beat the San Francisco 49er's on February 3, 2013, in Super Bowl XLVII. The LA Rams beat the Washington Redskins in Super Bowl XVIII. In January of what year was Super Bowl XVIII? (There has always been one Super Bowl per year.)

- A. 1964 B. 1984 C. 1985 D. 1995 E. 1996

26. A Wallymart parking lot has space for 1200 cars. 15% of the spaces are reserved for compact cars. On Tuesday evening, the lot was $\frac{3}{4}$ full. 760 of the parked cars were not in the spaces reserved for compact cars. How many spaces reserved for compact cars were still available?

- A. 10 B. 30 C. 20 D. 40 E. 50

27. If 12 woodchucks could chuck 6 cords of wood in 4 hours, in one hour *how much wood could a woodchuck chuck if a woodchuck could chuck wood?*



- A. 1/8 cord B. 1/4 cord C. 1/2 cord D. 3/4 cord E. 1 cord

28. Along the Mississippi River, the distance from Hannibal, Missouri, to the Gulf of Mexico is about 1500 miles. To estimate the speed of his raft, Tom Sawyer measures that it drifts 65 feet in 20 seconds. If this rate stays constant and Tom drifts 12 hours each day, which is the best estimate of the number of days it would take Tom to drift from Hannibal to the Gulf of Mexico? (1 mile = 5280 feet)

- A. 28 B. 56 C. 96 D. 112 E. 192

29. In square ABCD, P is the midpoint of AB and Q is the midpoint of BC. If the length of PQ is 8 cm, what is the area of ABCD?

- A. 64 cm² B. 128 cm² C. 256 cm² D. 64√2 cm² E. 128√2 cm²

30. In January, Rick and Fran drove 680 miles on I-55 from St. Louis to New Orleans. Along the way, in order, they passed Cape Girardeau MO, Memphis TN, and Jackson MS. It is 115 miles from St. Louis to Cape Girardeau; 380 miles from Cape Girardeau to Jackson; and 395 miles from Memphis to New Orleans. How far is it from Cape Girardeau to Memphis?

- A. 165 miles B. 170 miles C. 180 miles D. 185 miles E. 210 miles

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31. What is the positive difference between the area of a square with perimeter 120 m and the area of a rectangle with perimeter 120 m if the length of the rectangle is three times its width?

- A. 0 m^2 B. 100 m^2 C. 225 m^2 D. 400 m^2 E. 900 m^2

32. A, B, and C are negative integers such that: $A < B < C < 0$
How many of the following five expressions MUST represent a positive number?

$A - B$; $A + B * C$; $A * B * C$; $B(A + C)$; $B - C - A$

- A. 0 B. 1 C. 2 D. 3 E. 4

33. How many zeroes are at the end of the product of 25 billion times 80 trillion?

- A. 17 B. 18 C. 22 D. 23 E. 24

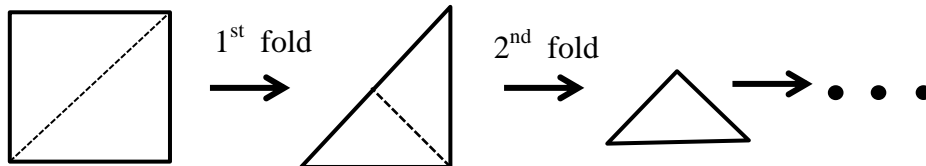
34. In November, 2013, Rick’s daughter Zan will be one billion seconds old. In what year was she born?

- A. 1976 B. 1979 C. 1982 D. 1985 E. 1987

35. The length and the width of a rectangle are each a whole number of centimeters.
If the area of the rectangle is 2013 square centimeters, how many different rectangles are possible?

- A. 2 B. 4 C. 5 D. 6 E. 8

36. A 40 cm by 40 cm square piece of paper is first folded in half along a diagonal.
Then that right triangle is folded in half three times to form smaller and smaller right triangles.
After these four folds, what is the perimeter of the final triangle? Round your answer to the nearest tenth of a centimeter.



- A. 30.0 cm B. 34.1 cm C. 48.3 cm D. 60.0 cm E. 68.3 cm

37. How many 4-digit numbers are there with four different digits and with a thousand’s digit two larger than its unit’s digit? (For example, 7405 is one such number.)

- A. 336 B. 448 C. 504 D. 648 E. 2688

38. Assume that the wheel on the TV game show **The Price is Right** has 20 slots labeled 5; 10; 15; ... 90; 95; 100.
When the wheel is spun, its arrow is equally likely to stop in each of these 20 slots.

The first person, Bo, spins a “70” and stops. The second person, Pesky, can win either

- by spinning more than 70 on his first spin and stopping OR
- by spinning a sum of more than 70 and less than or equal to 100 on his first two spins.

What is the probability that Pesky wins by beating Bo?

- A. 30% B. 45% C. 50% D. 51% E. 60%

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In Problems #39 and #40, you need to complete two Ken-Ken Puzzles.

RULES: In any correctly completed 4x4 Ken-Ken Puzzle:

- Use only the numbers 1, 2, 3, 4
- Each row must contain 1, 2, 3, 4
- Each column must contain 1, 2, 3, 4
- Also, the numbers in each region with a **heavy border** must make the calculation true. For example:
 - $2 \div$ means that the quotient of the two numbers must be 2
 - $1 -$ means that the difference of the two numbers must be 1
 - $12x$ means that the product of the two or more numbers must be 12
 - $9+$ means that the sum of the two or more numbers must be 9

SAMPLE →

$4+$ 1	$1 -$ 4	3	$16x$ 2
3	$2 \div$ 1	2	4
$9+$ 4	2	1	$12x$ 3
2	3	4	1

A correctly completed puzzle is to the right.

39. Using only 1, 2, 3, and 4, complete this 4x4 Ken-Ken Puzzle.

What is the sum of the four numbers in the boxes labeled A, B, C, and D?

- A. 8 B. 9 C. 10
D. 11 E. 12

$24x$	$8+$		
A	B		
C	$3+$ D	$6x$	
		$5+$	$2 \div$
$2 -$			

40. Using only 1, 2, 3, 4, 5, 6, and 7, complete this 7x7 Ken-Ken Puzzle.

What is the sum of the four numbers in the four boxes labeled A, B, C, and D?

- A. 14 B. 15
C. 16 D. 17
E. 18

$13 +$		$12 +$		$3 -$	$12x$	
$14 +$	$5 +$		A	B	$2 -$	
			$36x$ C	$13 +$ D		$12x$
$20x$		$2 -$				
	$6 -$			$120x$		
$9 +$		$2 -$	$6 -$	$3 \div$		
				$105x$		