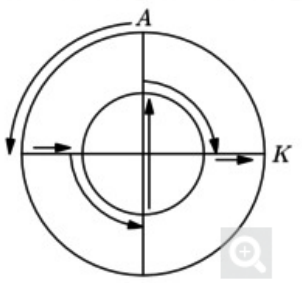
2021 BCCTM Math Competition: Grade 8/EMF 6 Solutions

Two circles that share the same center have radii 10 meters and 20 meters. An aardvark runs along the path shown, starting at A and ending at K. How many meters does the aardvark run?

- ○ 10π + 20
- ○ 10π + 40
- ○ 20π + 20
- ○ 20π + 40
- ○ None of these



Answer: 20pi + 40

ABCD and MNOP are squares. M, N, O, and P are located at the midpoint of the four sides of square ABCD. If MN is 8 inches, find the area of square ABCD and the area of triangle AMP.

- ○ 72 sq. in; 12 sq. in
- ○ 164 sq. in; 32 sq. in
- ○ 64 sq. in; 24 sq. in
- ○ 128 sq. in; 16 sq. in
- ○ None of these

Answer: 128 sq. in; 16 sq. in

A cube with 3-inch edges is made using 27 cubes with 1-inch edges. Nineteen of the smaller cubes are white and eight are black. If the eight black cubes are placed at the corners of the larger cube, what fraction of the surface area of the larger cube is white?

Answer: 5/9

Find the product:

$\frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \ldots \times \frac{2006}{2005}$

- 1
- 1002
- 2005
- 2006
- None of these

Answer: None of these

Soma the dog runs along a railroad. A train that is 270 meters long passes her in 18 seconds. The speed of the train is 20 meters per second. What is Soma's speed?

- 19 m/s
- 14 m/s
- 10 m/s
- 18 m/s
- None of these

Answer: 10 m/s

The length of a rectangle is increased by 10% and the width is decreased by 10%. What percent of the old area is the new area?

- 90
- 99
- 100
- 101
- None of these

Answer: 99

Cassie leaves Escanaba at 8:30 AM heading for Marquette on her bike. She bikes at a uniform rate of 12 miles per hour. Brian leaves Marquette at 9:00 AM heading for Escanaba on his bike. He bikes at a uniform rate of 16 miles per hour. They both bike on the same 62-mile route between Escanaba and Marquette. At what time in the morning do they meet?

- ○ 10:00
- ○ 10:15
- ○ 10:30
- ○ 11:00
- ○ None of these

Answer: 11:00

Today is Friday. What day of the week is it 80 days from today?

- ○ Monday
- ○ Tuesday
- ○ Wednesday
- ○ Thursday
- ○ None of these

Answer: Monday

A sequence of numbers starts with 1, 2, and 3. The fourth number of the sequence is the sum of the previous three numbers in the sequence: 1 + 2 + 3 = 6. In the same way, every number after the fourth is the sum of the previous three numbers. What is the eighth number in the sequence?

- ○ 11
- ○ 20
- ○ 37
- ○ 68
- ○ None of these

Answer: 68

In the multiplication problem, A, B, C, and D are different digits. What is A + B ?

- 9
- 3
- 2
- 1
- None of these

$$\begin{array}{cccc} & A & B & A \\ \times & & C & D \\ \hline C & D & C & D \end{array}$$

Answer: 1

An aquarium has a rectangular base that measures 100 cm by 40 cm and has a height of 50 cm. The aquarium is filled with water to a depth of 37 cm. A rock with volume 1000 cubic cm is then placed in the aquarium and completely submerged. By how many centimeters does the water level rise?

- 0.25
- 0.5
- 1
- 1.25
- None of these

Answer: 0.25

A complete cycle of a traffic light takes 60 seconds. During each cycle the light is green for 25 seconds, yellow for 5 seconds, and red for 30 seconds. At a randomly chosen time, what is the probability that the light will NOT be green?

- 1/4
- 1/3
- 5/12
- 1/2
- None of these

Answer: None of these

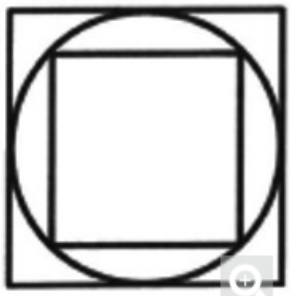
Ten tiles numbered 1 through 10 are turned face down. One tile is turned up at random, and a die is rolled. What is the probability that the product of the numbers on the tile and on the die will be a perfect square?

- 1/10
- 1/6
- 11/60
- 7/30
- None of these

Answer: 11/60

The small square is 100 square cm. What is the area of the large square?

- 230 sq. cm
- 200 sq. cm
- 175 sq. cm
- 150 sq. cm
- None of these



Answer: 200 sq. cm

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?

- 100
- 110
- 120
- 130
- None of these

Answer: 130

A recipe that makes 5 servings of hot chocolate requires 2 squares of chocolate, ¼ cup sugar, 1 cup water and 4 cups milk. Jordan has 5 squares of chocolate, 2 cups of sugar, lots of water and 7 cups of milk. If she maintains the same ratio of ingredients, what is the greatest number of servings of hot chocolate she can make?

- ○ 8-3/4
- ○ 9-7/8
- ○ 5-1/8
- ○ 6-1/4
- ○ None of these

Answer: 8-3/4

The positive integers x and y are the two smallest positive integers for which the product of 360 and x is a square and the product of 360 and y is a cube. What is the sum of x and y?

- ○ 80
- ○ 85
- ○ 115
- ○ 610
- ○ None of these

Answer: 85

(6 ? 3) + 4 – (2 - 1) = 5 To make this statement true, the question mark between the 6 and the 3 should be replaced by

- ○ /
- ○ x
- ○ +
- ○ -
- ○ None of these

Answer: / (represents division)

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?

- ○ 26
- ○ 27
- ○ 28
- ○ 29
- ○ None of these

Answer: 28

In the figure, what is the ratio of the area of the gray squares to the area of the white squares?

- ○ 3:5
- ○ 3:7
- ○ 3:8
- ○ 3:10
- ○ None of these

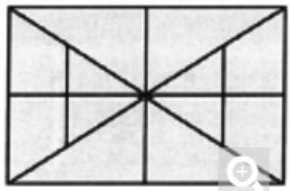
Answer: 3:5

Given the following: A = the y-intercept of 4x - 5y = -25 B = the slope of 4x - 5y = -25 C = the slope of any line parallel to 4x - 5y = -25 D = the slope of any line perpendicular to 4x - 5y = -25 Find AB - CD.

- ○ 4/5
- ○ 3
- ○ 4
- ○ 5
- ○ None of these

Answer: 5

How many triangles are there?



- 22
- 20
- 16
- 12
- None of these

Answer: 22

Given m<C is four times m<A and m<A is twice m<R. If <C and <R are supplementary angles, find the measure of <A.

- 20
- 40
- 90
- 160

Answer: 40

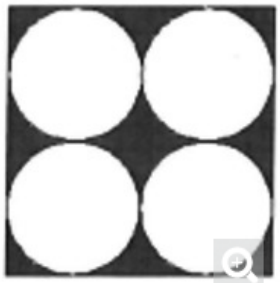
A ball is dropped from a height of 3 meters. On its first bounce it rises to a height of 2 meters. It keeps falling and bouncing to 2/3 of the height it reached in the previous bounce. On which bounce will it rise to a height less than 0.5 meters?

- 4
- 5
- 6
- 7
- None of these

Answer: 5

The diameter of each of the congruent circles is 2 centimeters. Using 3.14 for pi, calculate the area of the shaded region. Assume that the circles are tangent to each other and to the square.

- ○ 3.44 sq. cm
- ○ 8 sq. cm
- ○ 16.62 sq. cm
- ○ 32.64 sq. cm
- ○ None of these



Answer: 3.44 sq. cm