



**Central
Arizona
College**

2019 Pinal County High School Math Competition

Level II

A digital watch displays hours and minutes with AM and PM. What is the largest possible sum of the digits in the display?

a.) 17

d.) 23

b.) 19

e.) None of the above.

c.) 21

What is $(-1)^1 + (-1)^2 + \cdots + (-1)^{2006}$?

a.) -266

b.) -1

c.) 0

d.) 1

e.) None of the above.

Two integers have a sum of 26. When two more integers are added to the first two integers the sum is 41. Finally, when two more integers are added to the sum of the previous four integers the sum is 57. What is the minimum number of odd integers among the 6 integers?

a.) 1

d.) 4

b.) 2

e.) None of the above.

c.) 3

Cagney can frost a cupcake every 20 seconds and Lacey can frost a cupcake every 30 seconds. Working together, how many cupcakes can they frost in 5 minutes?

a.) 10

d.) 25

b.) 15

e.) None of the above.

c.) 20

The product of two positive numbers is 9. The reciprocal of one of these numbers is 4 times the reciprocal of the other number. What is the sum of the two numbers?

a.) $\frac{10}{3}$

d.) $\frac{15}{2}$

b.) $\frac{20}{3}$

e.) None of the above.

c.) 7

For a science project, Sammy observed a chipmunk and a squirrel stashing acorns in holes. The chipmunk hid 3 acorns in each of the holes it dug. The squirrel hid 4 acorns in each of the holes it dug. They each hid the same number of acorns, although the squirrel needed 4 fewer holes. How many acorns did the chipmunk hide?

a.) 30

d.) 48

b.) 36

e.) None of the above.

c.) 42

Three circles with radius 2 are mutually tangent. What is the total area of the circles and the region bounded by them, as shown in the figure?

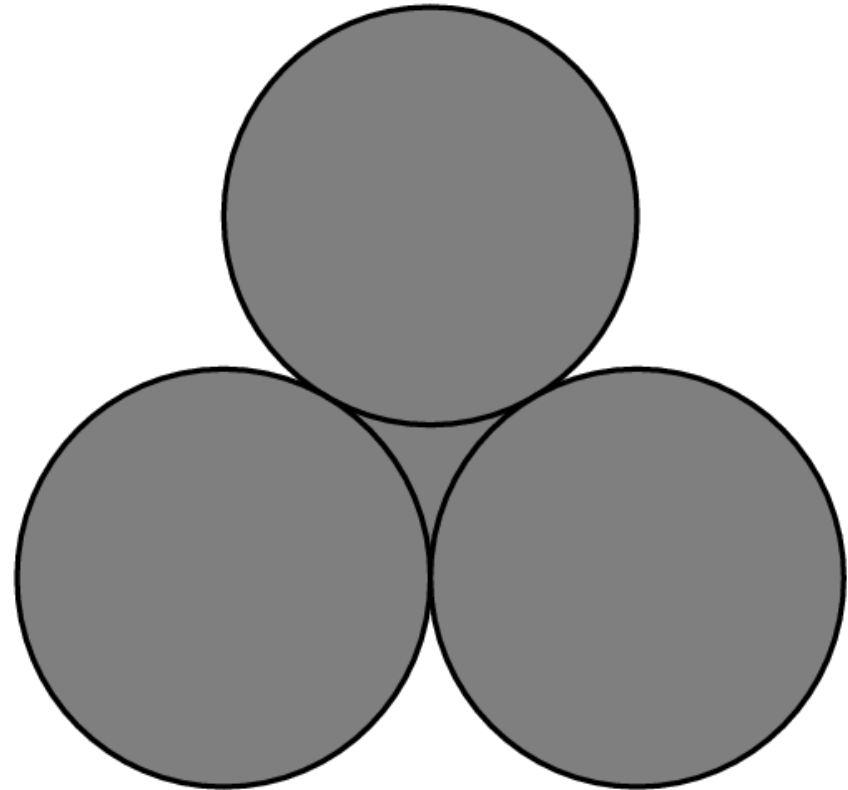
a.) $10\pi + 4\sqrt{3}$

b.) $13\pi - \sqrt{3}$

c.) $12\pi + \sqrt{3}$

d.) $10\pi + 9$

e.) None of the above.



Point B is due east of point A. Point C is due north of point B. The distance between points A and C is $10\sqrt{2}$, and $\angle BAC = 45^\circ$. Point D is 20 meters due north of point C. The Distance AD is between which two integers?

a.) 30 and 31

d.) 33 and 34

b.) 31 and 32

e.) None of the above.

c.) 32 and 33

The sums of three whole numbers taken in pairs are 12, 17, and 19. What is the middle number?

a.) 4

d.) 7

b.) 5

e.) None of the above.

c.) 6

Define $x \otimes y = x^3 - y$. What is $h \otimes (h \otimes h)$?

a.) $-h$

b.) 0

c.) h

d.) $2h$

e.) None of the above.

A parabola with equation $y = x^2 + bx + c$ passes through the points $(2,3)$ and $(4,3)$. What is c ?

a.) 2

d.) 11

b.) 5

e.) None of the above.

c.) 7

What non-zero real value for x satisfies $(7x)^{14} = (14x)^7$

a.) $\frac{1}{7}$

d.) 7

b.) $\frac{2}{7}$

e.) None of the above.

c.) 1

Which of the following describes the graph of the equation

$$(x + y)^2 = x^2 + y^2 ?$$

a.) The entire plane.

d.) a circle

b.) one-point

e.) None of the above.

c.) two-lines

Real numbers a and b satisfy the equations $3^a = 81^{b+2}$ and $125^b = 5^{a-3}$. What is ab ?

a.) -60

d.) 60

b.) -17

e.) None of the above.

c.) 12

Three unit squares and two line segments connecting two pairs of vertices are shown. What is the area of $\triangle ABC$?

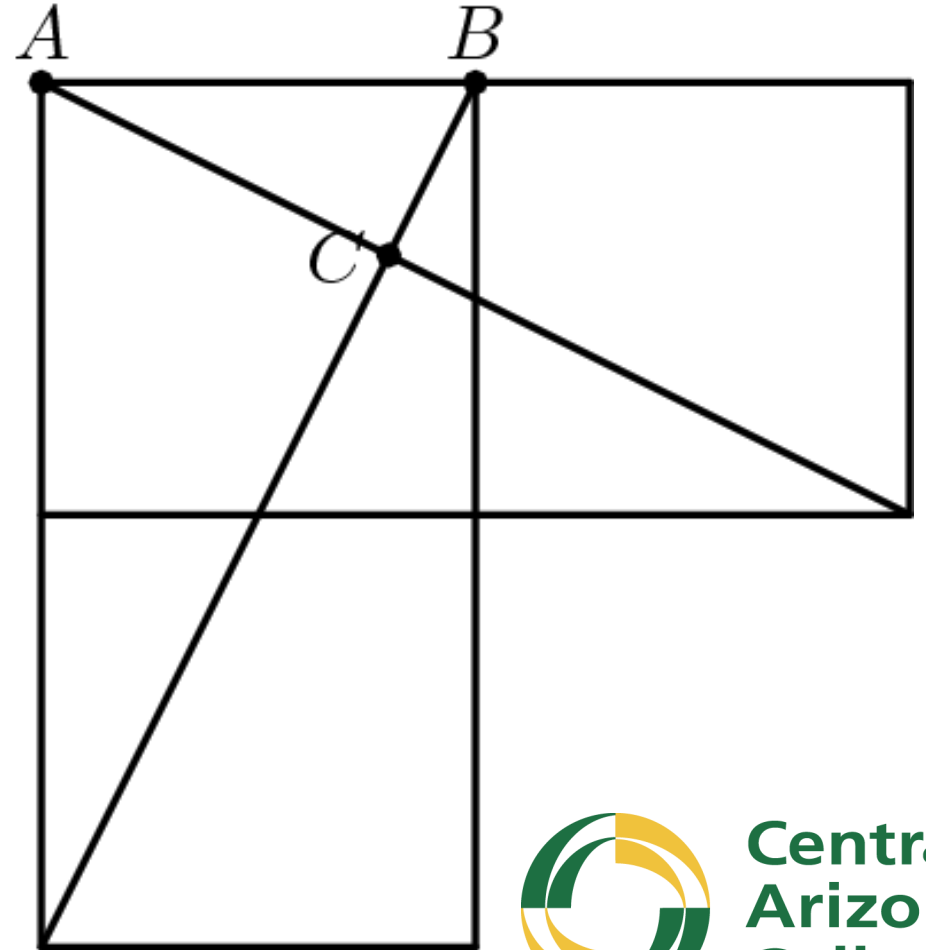
a.) $\frac{1}{6}$

d.) $\frac{1}{3}$

b.) $\frac{1}{5}$

e.) None of the above.

c.) $\frac{2}{9}$



Question 15

What is the sum of all integer solutions to $1 < (x - 2)^2 < 25$?

a.) 10

b.) 12

c.) 15

d.) 19

e.) None of the above.

Four identical squares and one rectangle are placed together to form one large square as shown. The length of the rectangle is how many times as large as its width?

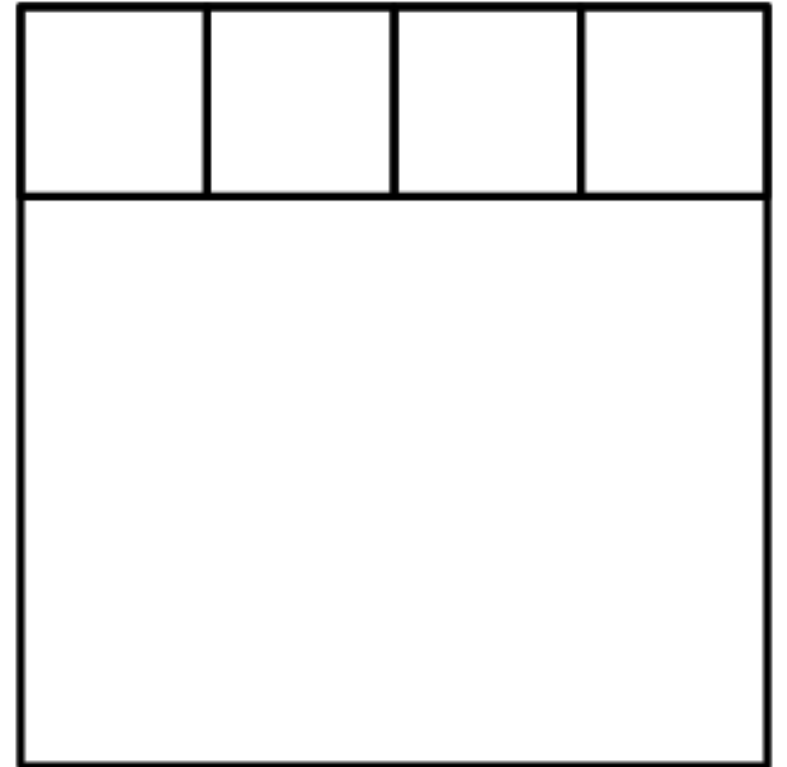
a.) $\frac{5}{4}$

d.) 2

b.) $\frac{4}{3}$

e.) None of the above.

c.) $\frac{3}{2}$



How many ordered pairs of positive integers (M, N) satisfy the following equation?

$$\frac{M}{6} = \frac{6}{N}$$

a.) 6

d.) 9

b.) 7

e.) None of the above.

c.) 8

In rectangle $ABCD$, $AB = 6$, $AD = 30$, and G is the midpoint of \overline{AD} . Segment AB is extended 2 units beyond B to point E , and F is the intersection of \overline{ED} and \overline{BC} . What is the area of $BFDG$?

a.) $\frac{133}{2}$

d.) 68

b.) 67

e.) None of the above.

c.) $\frac{135}{2}$

The point in the xy -plane with coordinates $(1000, 2012)$ is reflected across the line $y = 2000$. What are the coordinates of the reflected point?

a.) $(998, 2012)$

d.) $(1000, 4012)$

b.) $(1000, 1998)$

e.) None of the above.

c.) $(1000, 2024)$