

Team Name: _____

Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition #1

Solve for x

$$\frac{\sqrt{x+4} + \sqrt{x-4}}{\sqrt{x+4} - \sqrt{x-4}} = 2$$

Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
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Team Competition #2

While three watchmen were guarding an orchard, a thief slipped in and stole some apples. On his way out of the orchard, the thief met the three watchmen, one after another, and to each in turn he gave one half of the apples he had plus three in addition to that. In this way, he managed to escape with four apples. How many apples had the thief originally stolen?

Answer:

Time On Clock:

Team Name: _____

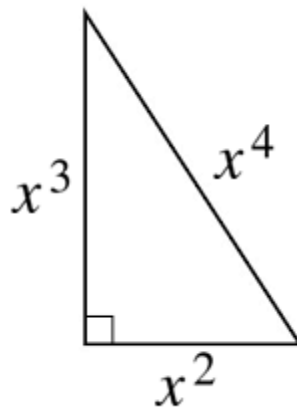
Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition #3

Given the sides of the right triangle, solve for x . Give an exact solution.



Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition #4

If $x + y + xy = 76$ and x and y are positive integers, find $x + y$.

Answer:

Time On Clock:

Team Name: _____

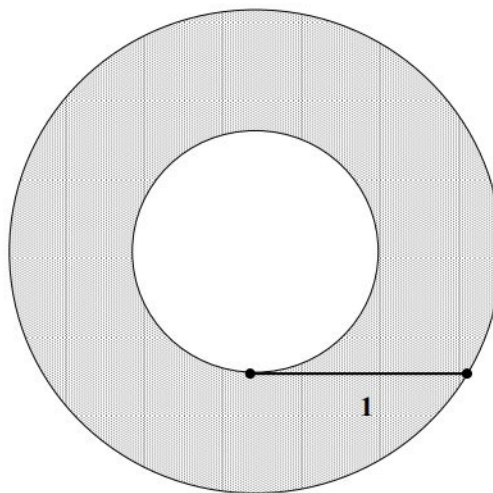
Division: _____



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Team Competition #5

What is the area of the shaded region in the figure below?



Answer:

Time On Clock:

Team Name: _____

Division: _____



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Team Competition #6

In a room of 100 people, 99% are math teachers. How many math teachers have to leave the room to bring that percentage down to 98%?

Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Double Angle Identities

$$\sin(2\theta) = 2 \sin\theta \cos\theta$$

$$\cos(2\theta) = \cos^2\theta - \sin^2\theta$$

$$\cos(2\theta) = 2 \cos^2\theta - 1$$

$$\cos(2\theta) = 1 - 2 \sin^2\theta$$

$$\tan(2\theta) = \frac{2 \tan\theta}{1 - \tan^2\theta}$$

Team Competition #7

Suppose $3 \cos(2x) + 17 \cos(x) = 0$. Find $\tan^2(x)$.

Half Angle Identities

$$\sin^2\theta = \frac{1 - \cos(2\theta)}{2}$$

$$\cos^2\theta = \frac{1 + \cos(2\theta)}{2}$$

$$\tan^2\theta = \frac{1 - \cos(2\theta)}{1 + \cos(2\theta)}$$

Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition #8

Solve for x.

$$x^{\log(y)} = 2x - 5$$

$$y^{\log(x)} = x + 12$$

Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition #9

Suppose the coefficients of the x^3 term and the x^4 term of the polynomial $(x + a)^5$ are the same for some value of $a > 0$. Find the value of a .

Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
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Team Competition #10

If $a, b, c > 0$, solve the system below.

$$a + b = abc$$

$$b + c = abc$$

$$c + a = abc$$

Answer:

Time On Clock:

Team Name: _____

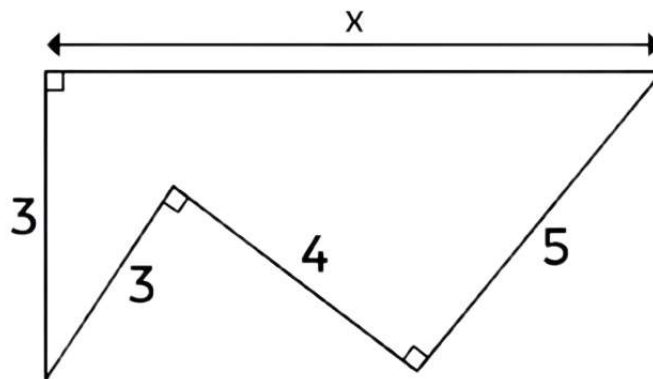
Division: _____



The **Alabama**
Mathematical Association of Two Year Colleges

Team Competition Tie Breaker #1

Find x . Give an exact answer.



Answer:

Time On Clock:

Team Name: _____

Division: _____



The **Alabama**
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Team Competition Tie Breaker #2

The cubic equation $x^3 - 5x^2 + 7x + 13$ has two solutions, x_1 and x_2 , which are not real.

Find the sum of these two complex solutions.

Answer:

Time On Clock: