

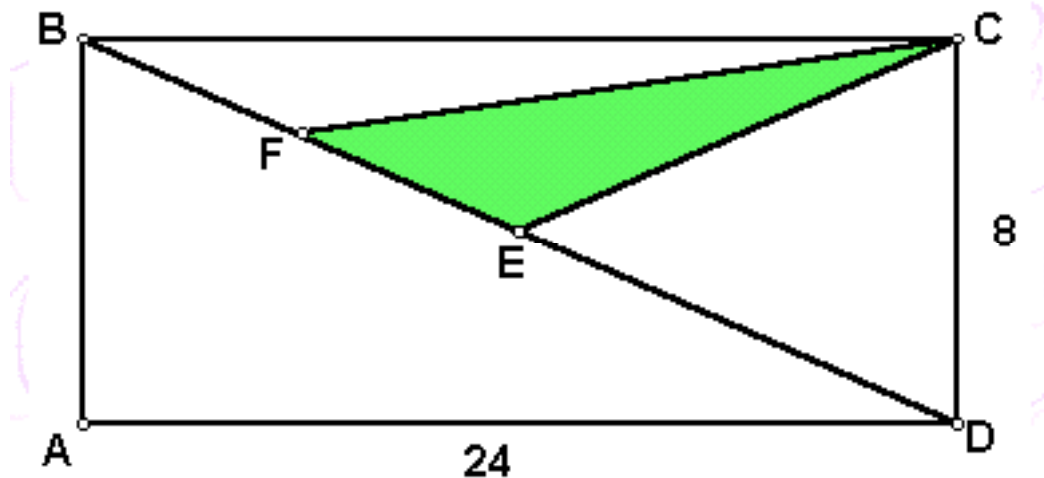
**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Practice Round**

1. A stock loses 10% of its value. What percent increase is necessary for the stock to rise back to its original value? (Approximate your answer to the nearest tenth of a percent.)

Answer: \_\_\_\_\_ %

2. Quadrilateral ABCD is a rectangle. Segment BD is a diagonal of the rectangle. Point E is the midpoint of diagonal BD. Point F is the midpoint of segment BE. Segment CD is 8 units and segment AD is 24 units. Find the area of triangle CEF.



Answer: \_\_\_\_\_ square units

3. Two companies market new batteries targeted at owners of personal music players. DuraTunes claims that its batteries have a mean life of 11 hours with a standard deviation of 2 hours and RockReady claims that its batteries have a mean life of 12 hours with a standard deviation of 1.5 hours. If you are headed to the beach for the weekend and plan to play music for 16 hours which type of battery is more likely to last the 16 hours? Assume the life times of batteries for both companies have normal distribution.



Answer: \_\_\_\_\_

**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 1**

1. The fourth term of a geometric series is 4, and the seventh term is 7. Find the second term of the series. (Write your answer in exact form.)

Answer: \_\_\_\_\_

2. Before the advent of antibiotics, an outbreak of cholera might spread through a city so that the number of cases doubled every 6 days. If twenty-six cases were discovered on July 1, in how many days should hospitals expect to be treating 106,496 cases?



Answer: \_\_\_\_\_ days

3. The distance from the vertex  $V$  to the focus  $F$  in a certain parabola is  $p$ . The line through  $F$  and parallel to the directrix of the parabola intersects the parabola at points  $A$  and  $B$ . Find the area of triangle  $ABV$ .

Answer: \_\_\_\_\_

**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 2**

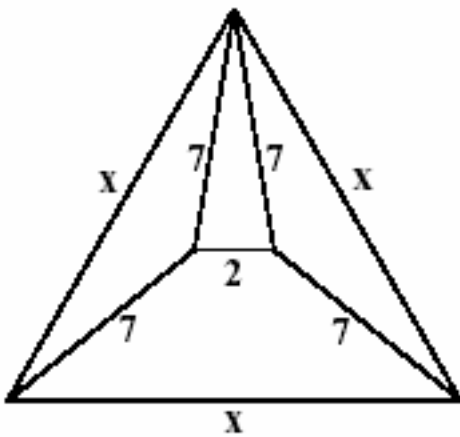
1. An equilateral triangle is inscribed in a circle of radius  $R$ . Find the exact area of the triangle in terms of  $R$ .

Answer: \_\_\_\_\_ square units

2. The parabola with equation  $y = x(r - x)$  is tangent to the parabola with equation  $y = x^2 + 10$  in the first quadrant. What is the exact value of  $r$ ?

Answer: \_\_\_\_\_

3. What is the value of  $x$  in the plane figure below?



Answer: \_\_\_\_\_

**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 3**

1. Jonah has to take a 5-question multiple-choice exam. Each question has 4 possible answers. Jonah picks an answer at random for each question. Find the probability that he selects the correct answer on at least one of the questions. (Express the result as a reduced fraction)

Answer: \_\_\_\_\_

2. Consider the number  $x$  defined by the periodic continued fraction

$$x = \frac{1}{2 + \frac{1}{3 + \frac{1}{2 + \frac{1}{3 + \dots}}}}$$

Find the exact value of  $x$ .

Answer: \_\_\_\_\_

3. The Ford Model A, built from 1928 to 1931, had a single windshield wiper on the driver's side. The total arm and blade was 10 inches long and rotated back and forth through an angle of  $95^\circ$ . If the wiper blade itself was only 7 inches long, what is the area of the windshield that was cleaned? (round your answer to the nearest hundredth)

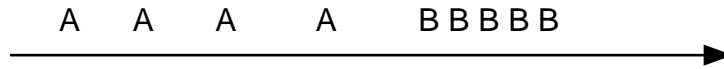


Answer: \_\_\_\_\_ square inches

**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 4**

1. The diagram below shows two sets of data marked A and B on a number line. Which of the following statements is true?



- A) Set A has a larger mean than set B **and** set A has a larger standard deviation than set B.  
B) Set A has a larger mean than set B **and** set A has a smaller standard deviation than set B.  
C) Set A has a smaller mean than set B **and** set A has a smaller standard deviation than set B.  
D) Set A has a smaller mean than set B **and** set A has a larger standard deviation than set B.

Answer: \_\_\_\_\_

2. The Barr triplets have an annoying habit: Whenever a question is asked of the three of them, two tell the truth and the third lies. When I asked them which of them was born last, they replied as follows:

*Mary:* Katie was born last.

*Katie:* I am the youngest.

*Annie:* Mary is the youngest.



*Which of the Barr triplets was born last?*

Answer: \_\_\_\_\_

3. If Noah gets a 102 on his next test, he will have an average test score of 90. If Noah gets a 67 on his next test, he will have an average test score of 85. How many tests has Noah already taken?

Answer: \_\_\_\_\_

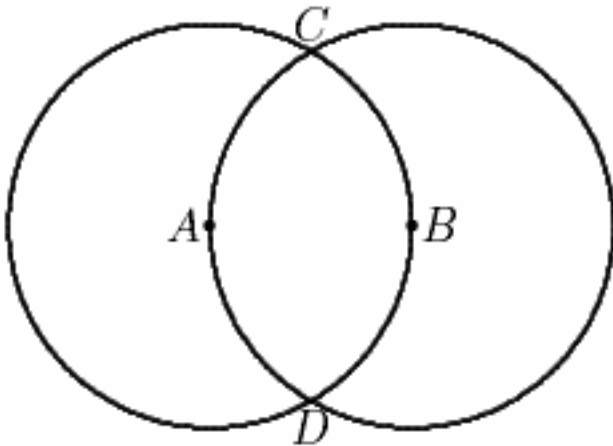
**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 5**

1. Find rational numbers  $x$  and  $y$ ,  $x < y$  such that:  $\sqrt{20 + \sqrt{300}} = \sqrt{x} + \sqrt{y}$

Answer:             $X=$              $Y=$            

2. Let  $A$  and  $B$  be the centers of two circles with radii 1 and assume that  $AB = 1$ . Find the exact area of the region enclosed by arcs  $CAD$  and  $CBD$ .



Answer:            square units

3. James and Jody are running around a circular track of radius 80 feet centered at the origin in an  $xy$ -plane. They are running at the constant rate of 1 revolution every 3 minutes. When they reach the point  $(80, 0)$ , Jody takes off in the direction of the positive  $x$ -axis and keeps running at the same rate, always in the direction of the positive  $x$ -axis, to get a drink of water. James keeps running around the circle at this same rate. How far apart are James and Jody when Jody gets to the water fountain at the point on the  $x$ -axis  $80\pi$  feet from  $(80, 0)$ ?

Answer:            units

**Louis M. Edwards Mathematics Super Bowl**  
**Valencia Community College -- April 27, 2005**

**Round 6**

1. A sequence is defined so that the general term is  $a_k$ , where  $a_k$  is the x-coordinate of the point P on the unit circle such that the line segment from the origin to P makes an angle of  $\frac{k\pi}{6}$  with the positive x-axis, using counter-clockwise rotation. Find the exact sum of the first 100 terms of the sequence, starting when  $k = 1$ .

Answer: \_\_\_\_\_

2. What is the smallest positive integer that  $8!$  can be multiplied by to make a perfect cube?

Answer: \_\_\_\_\_

3. When Kyle drives to work at an average speed of 48 miles per hour, he arrives 9 minutes late. When he drives to work at an average speed of 64 miles per hour, he arrives 9 minutes early. At what average speed should Kyle travel in order to arrive at work exactly on time? (Round your answer to the nearest hundredth)



Answer: \_\_\_\_\_ miles per hour