

**C of C Math Meet 2003 / Junior Varsity Team Elimination / Round 1**

***Question 1:***

A tree casts a shadow 45 meters long. At the same time, the shadow cast by a vertical 2 meter stick is 3 meters long. Find the height of the tree.

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***Question 1:***

A tree casts a shadow 45 meters long. At the same time, the shadow cast by a vertical 2 meter stick is 3 meters long. Find the height of the tree.

***Answer:*** 30 meters

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***Question 2:***

A square is inscribed in a circle of radius 4 in. What is the perimeter of the inscribed square?

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A square is inscribed in a circle of radius 4 in. What is the perimeter of the inscribed square?

***Answer:***  $16\sqrt{2}$  in

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### ***Question 3:***

In a low-country ecosystem, there were 100 individuals of a given species of frog. Three years later, there are 240. During the three year period the number of males has doubled and the number of females has tripled. How many females and males were there originally?

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### **Question 3:**

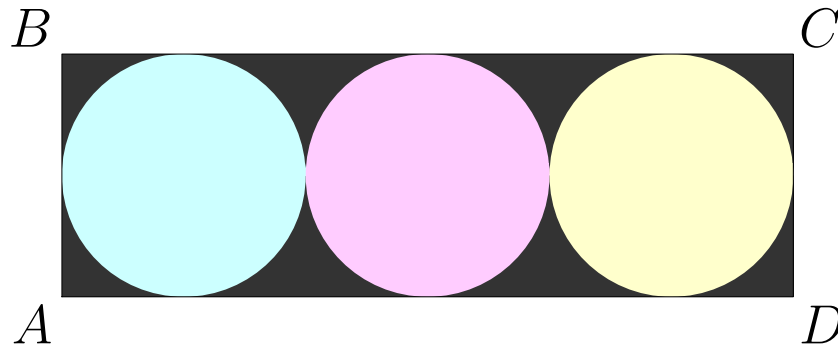
In a low-country ecosystem, there were 100 individuals of a given species of frog. Three years later, there are 240. During the three year period the number of males has doubled and the number of females has tripled. How many females and males were there originally?

**Answer:** The number of males was originally 60 and the number of females 40.

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**Question 4:**

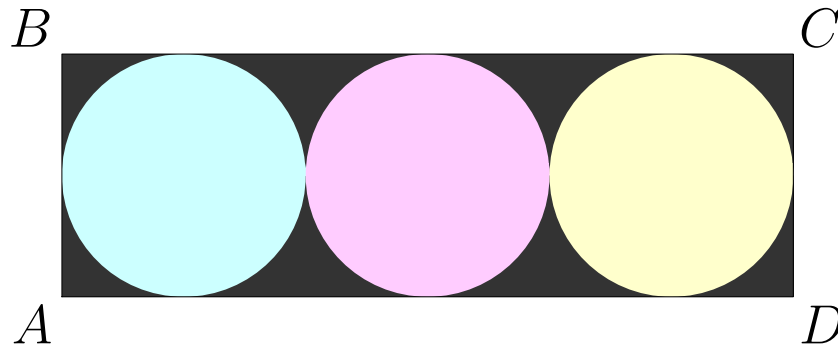
Three circles of the same radius are inscribed in a rectangle as shown below. Given  $BC = 5$ , find the length of  $AB$ . Give your answer as a fully simplified fraction.



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**Question 4:**

Three circles of the same radius are inscribed in a rectangle as shown below. Given  $BC = 5$ , find the length of  $AB$ . Give your answer as a fully simplified fraction.



**Answer:**  $\frac{5}{3}$



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***Question 5:***

Find  $b$  such that  $f(x) = -3x^2 + bx - 1$  has a maximum value of 2.

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***Question 5:***

Find  $b$  such that  $f(x) = -3x^2 + bx - 1$  has a maximum value of 2.

***Answer:*** 6, or -6

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### ***Question 6:***

Twenty Math Meet Participants put a slip of paper with their student ID numbers on them into a hat. They then randomly draw slips from the hat. What is the probability that exactly nineteen of them will draw *their own* number from the hat?

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### **Question 6:**

Twenty Math Meet Participants put a slip of paper with their student ID numbers on them into a hat. They then randomly draw slips from the hat. What is the probability that exactly nineteen of them will draw *their own* number from the hat?

**Answer:** 0

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***Question 7:***

Find the slope of the line passing through the points

$$A\left(-\frac{1}{3}, \frac{2}{3}\right) \quad \text{and} \quad B\left(\frac{1}{3}, \frac{5}{6}\right).$$

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**Question 7:**

Find the slope of the line passing through the points

$$A\left(-\frac{1}{3}, \frac{2}{3}\right) \quad \text{and} \quad B\left(\frac{1}{3}, \frac{5}{6}\right).$$

**Answer:**  $\frac{1}{4}$

**or:** 0.25

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***Question 8:***

Solve the equation

$$(\log_2(x))^2 + \log_2(x) + 1 = \frac{7}{\log_2(.5x)}$$

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***Question 8:***

Solve the equation

$$(\log_2(x))^2 + \log_2(x) + 1 = \frac{7}{\log_2(.5x)}$$

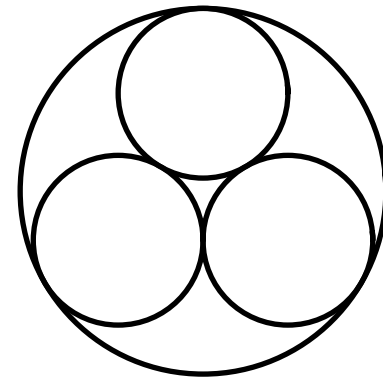
***Answer:*** 4



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***Question 9:***

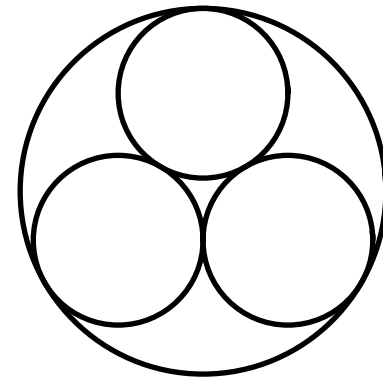
Three circles of radius  $r$  are inscribed in a circle of radius  $2 + \sqrt{3}$ . Find  $r$ .



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**Question 9:**

Three circles of radius  $r$  are inscribed in a circle of radius  $2 + \sqrt{3}$ . Find  $r$ .



**Answer:**  $\sqrt{3}$

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***Question 10:***

A rectangular window has a length that is 18 inches more than its width. If its perimeter is 180 inches, find its dimensions.

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***Question 10:***

A rectangular window has a length that is 18 inches more than its width. If its perimeter is 180 inches, find its dimensions.

***Answer:*** 36 inches by 54 inches

[See Answer](#) ..... [See Next Question](#) ..... [Skip Next Question](#) .....