

# **$\pi$ -Rates Competition Sample Problems**

**Presented by the Board of  $\pi$ -Rates**

# Slideshow Contents

- Sample Competition Problems
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## Problem 01

Evaluate

$$(38-39-80)-(38-39-80)$$

## Problem 02

Solve for x

$$3x + 4x + 5x = 12$$

## Problem 03

Evaluate

$$\frac{37 - 37}{923 \times 289}$$

## Problem 04

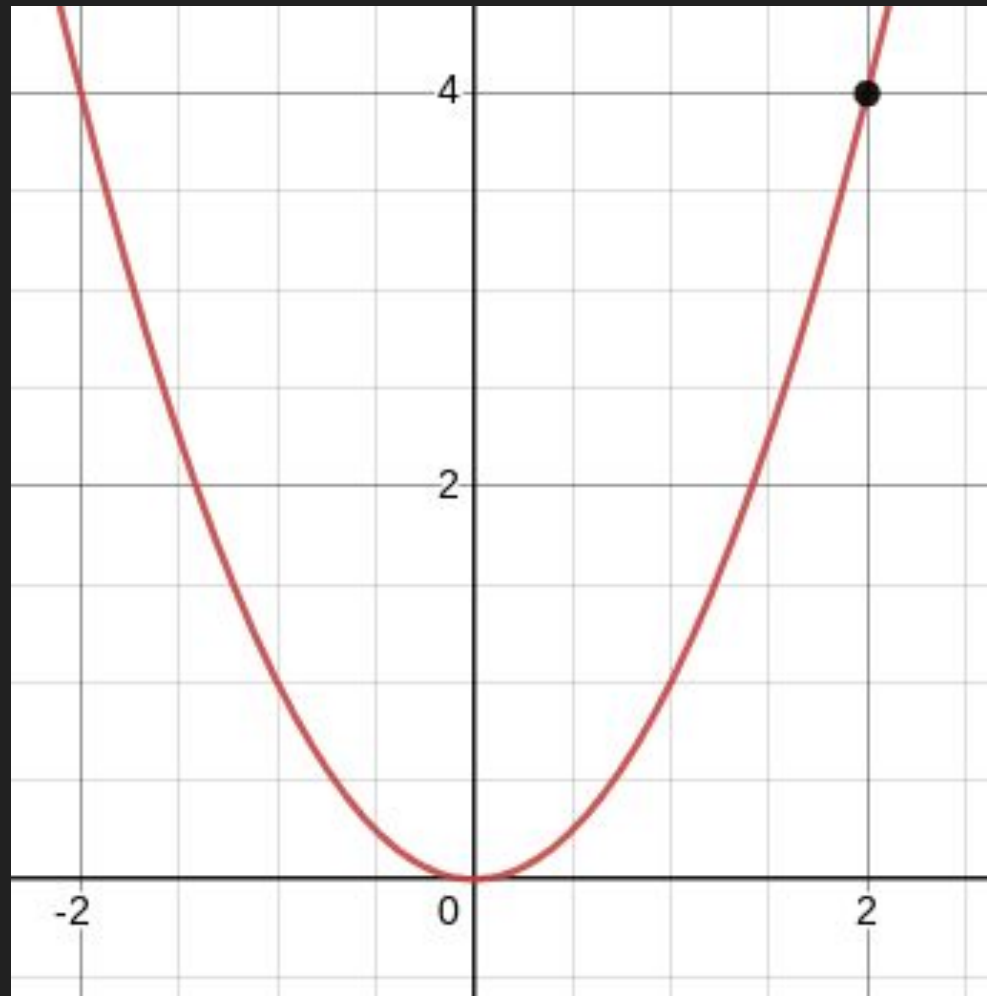
Solve for the area of the  
shape, given the  
following formula:



$$\text{Area of Triangle} = \left(\frac{1}{2}\right) \times \text{base} \times \text{height}$$

## Problem 05

What is the value of  $y$  at  $x = 2$  in this graph?



## Problem 06

If I take a number, multiply it by 9, and add 12, I get 84. What was my original number?



## Solutions (Explanations on the following slides)

Problem 01: 0

Problem 02:  $x = 1$

Problem 03: 0

Problem 04: 24

Problem 05:  $y = 4$

Problem 06: 8

## Problem 01 Solution

To evaluate the expression  $(38-39-80)-(38-39-80)$ , notice that the first part,  $(38-39-80)$ , is exactly the same as the second part. So if we have some number minus another number, like  $3-3$ ,  $10-10$ , or  $x-x$ , it will equal 0

## Problem 02 Solution

To solve for  $x$  in the equation  $3x + 4x + 5x = 12$ , combine the like terms, which are the “ $x$ ” terms. That will give you  $12x = 12$ . Then divide both sides by 12, and the solution will be  $x = 1$

## Problem 03 Solution

$$\underline{37 - 38 + 1}$$

To evaluate  $923 \times 289$  notice that the top is just  $37-37$ , which is 0.

Meanwhile, the bottom is some very large number, so it will be 0 over some large number, so perhaps

$$\text{something like } \frac{0}{229833}$$

0 divided by any number (except 0) is just 0

## Problem 04 Solution



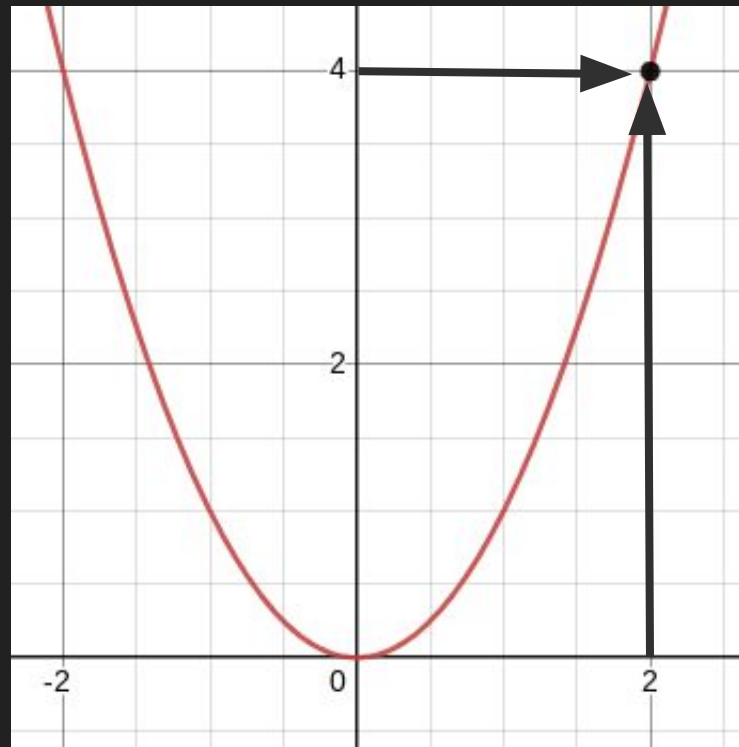
Area of Triangle =  $(\frac{1}{2}) \times \text{base} \times \text{height}$

To solve for the area of the triangle, plug the numbers from the triangle into the formula and multiply them out

$$\text{Area of Triangle} = (\frac{1}{2}) \times 6 \times 8 = \underline{24}$$

## Problem 05 Solution

To find the value of  $y$  at  $x = 2$ , go to 2 on the  $x$ -axis, then look for where the graph is at that  $x$ -value. In this case, at  $x = 2$ ,  $y = 4$



## Problem 06 Solution

To solve for the original number, go backwards using the given information. The last modification to the number was adding 12, so subtract 12 ( $84 - 12 = 72$ ). Before that, 9 was multiplied by the original number to get 72, so now divide 72 by 9, which gives you 8

# Tips

- Review basic algebra concepts - Potential problem topics include equations, expressions, exponents, graphs, and shapes
- Look for patterns - Very few of our problems are long with complex calculations; If you notice the right patterns, most of our problems can be solved just by looking at them and we will provide formulas or other forms of guidance for longer or tougher problems
- Relax - It can be hard to do in the heat of a competition, but trying to relax will help you calculate better
- Have fun - Enjoy the competition!