

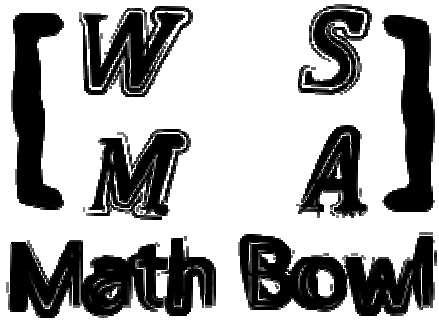
Elimination Tournament

Round 1

3rd Annual WSMA Math Bowl

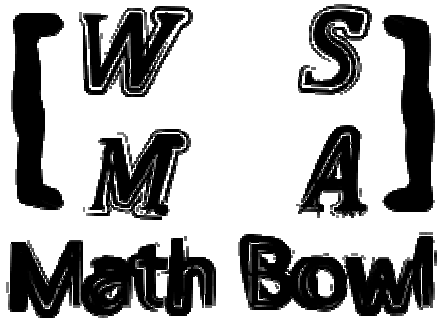
March 2, 2013

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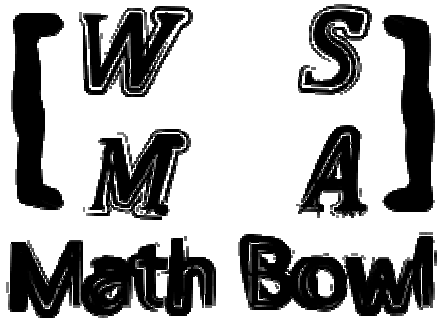
Problem 1

A video rental store has two rental plans. Plan A has a yearly payment of \$30 and each video can be rented for \$2.50. Plan B has a yearly payment of \$25 and each video can be rented for \$3.50. If you intend on renting 40 videos over the next two years, which plan will be cheaper?



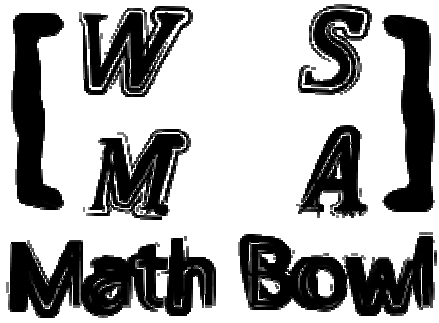
Problem 2

You have a standard deck of 52 playing cards. What is the probability of drawing a royal card (J, Q, K) that is not a spade? Simplify your answer as a fraction.



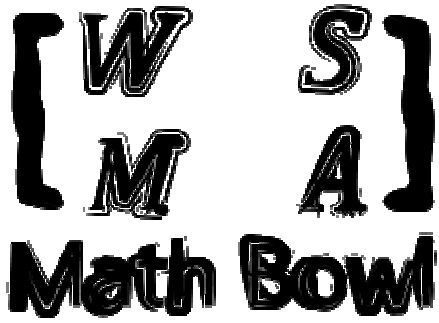
Problem 3

Find the 7th term of the following geometric sequence: 1, -3 , 9



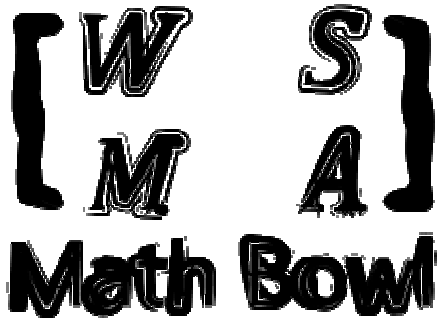
Problem 4

Find the sum of the prime factors of 2013.



Problem 5

Find the area of a triangle whose vertices in the Cartesian coordinate plane are $(1, 2)$, $(3, 12)$, and $(6, 12)$.

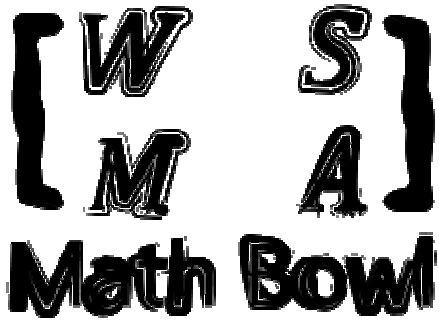


Problem 6

$F(x) = x^3$ is transformed into a new function, $G(x)$, through the following transformations:

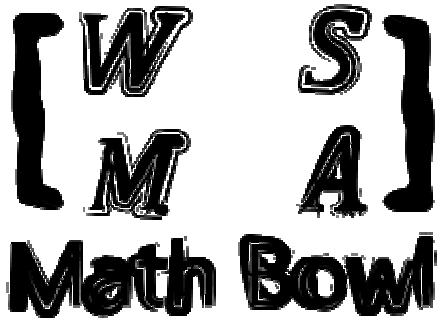
- horizontal dilation by a factor of five,
- vertical dilation by a factor of 3,
- translation 7 units along the positive x -axis,
- translation 8 units along the negative y -axis.

Find $G(x)$.



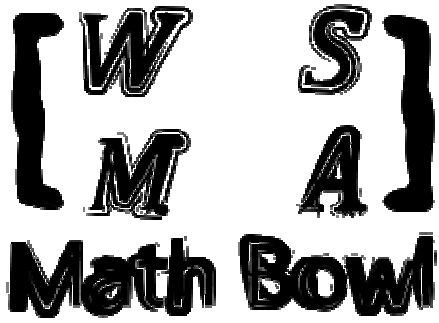
Problem 7

A farmer has 40 feet of fencing. If he can only create a rectangle with integer side lengths, what is the difference between the maximum and minimum areas the farmer could enclose?



Problem 8

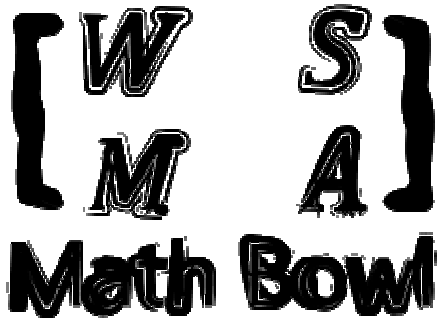
Angle A of triangle ABC is divided by an angle bisector that intersects with side BC at point D . If $AB=13$, $BD=10$, $DC=2.3$, and $AC=2$, find the length of AD .



Problem 9

Solve the following equation:

$$\sqrt{x + 3} - \sqrt{x - 3} = 1$$



Extra Question

Triangle OAB is positioned on a Cartesian plane where $O(0,0)$, $A(2,4)$, and $B(3,1)$. If the line $y=kx$ passes through point O and intersects with AB so that the area of triangle OAB is split into two triangles with equal areas, find the value of k.