

Problem Solving Period

Friday, September 13, 2013

3:00pm–4:50pm in B650

Welcome back! (☺)

1. My speedboat can travel for 4 hours at full throttle on a full tank of gas. At half throttle, it can go for 5 hours. One day, I drove for 1 hour at full throttle to an island. It took me 2 hours to return from this island at half throttle. Back at port, it took 14.75 litres of gas to refill my fuel tank. How much gas can my tank hold?
2. Arie and Jana are standing at opposite points on a circular lake. At the same time, they begin racing around the lake in opposite directions. They meet for the first time after Arie has ran 100 m, and meet again 50 m before Jana has completed her first lap. What is the circumference of the lake?
3. Find positive numbers b and c that differ by 2 such that the roots of $x^2 + bx + c$ also differ by 2. Repeat for both differences being 3. Can you generalize this for when both differences are some positive number d ?
4. In a north/south alley, two ladders with the same length have been positioned so that their bases meet. One ladder leans east against a tall fence and forms a 45° angle with the ground. The other ladder leans west against a tall building, rests at a point 3 m above the ground, and forms a 75° angle with the ground. How wide is the alley?
5. Create an equation involving only exponential forms that is still true when all of the exponents in it are deleted. For example, $5^2 - 2^4 = 3^2$ becomes $5 - 2 = 3$, and $2^3 + 3^2 = 1^3 + 4^2$ becomes $2 + 3 = 1 + 4$.