Grade 10

Extra Challenges - Set I

1. Given that $m<0$ and $n>0$ are the roots of the equation $18x^2-7x-1=0$. What is the numerical value of $\left(m+\frac{1}{3}\right)\left(n+\frac{1}{3}\right)$?

2. To get to the arena Sidney has to take city streets and the highway. He travels at an average speed of 50 km/h on the city streets and an average speed of 100 km/h on the highway. The distance to the arena is 40 km and he made it there in 30 minutes. How long was he on the highway?

3. A new passenger airplane is flying from Vancouver heading overseas to Asia. The wind is blowing from the west at 90 km/h. The airplane is flying at a speed of 950 km/h and must stay on a heading of south 60° west.
   a) What heading should the pilot take to compensate for the wind?
   b) What is the speed of the airplane relative to the ground?

Did You Know?

The Nazca Lines are a series of drawings on the ground in the Nazca Desert of Peru. They are a UNESCO World Heritage Site. The largest figures are more than 200 metres long and are thought to have been created by the Nazca culture between 200 BCE and 700 CE. Due to the extreme dryness and lack of wind the figures have been almost perfectly preserved!

4. Show that the sum of the squares of any three consecutive integers plus one is always divisible by 3.

5. What is the sum of all values of x that satisfy the equation $\left(x^2-5x+5\right)^{x^2+4x-60}=1$? Hint: There are three cases to consider.

Don't forget to try these past contests! Go to www.wiredmath.ca for the link.

TRY THIS!

Past Cayley and Galois Contests

http://www.cemc.uwaterloo.ca/contests/past_contests.html