Problems of the Month
February 2018

General Problem:

A salaried employee works a job that pays $40,000 per year and provides 8 weeks of vacation. He is considering taking an new job that pays $44,000 but only has 2 weeks of vacation.

Which job pays more per hour, and by how much?

Calculus Problem:

It is known that the function $y = f(x)$ is increasing on the interval $(0,5)$. An approximation to $\int_0^5 f(x)dx$ will be calculated by using a right Riemann sum using 17 rectangles. Is this approximation going to be an overestimate, or an underestimate?

Challenge Problem:

Suppose a jar contains R red marbles and B blue marbles, where $R > B$. The marbles are well mixed, then removed from the jar by selecting one marble at a time, at random, without replacement, until all the marbles are removed. What is the probability that the total number of Red marbles removed will always be *strictly* greater than the total number of Blue marbles removed *after every selection*? Remember ties are not allowed.