1. Calculate the value at t=0.00 of 40 payments of $20 each, made at quarterly intervals beginning at t=0.25, given $i^{(2)}$ equals 6%  
   (10 points)

2. Write an expression for the annuity in the previous problem, using standard actuarial notation.  (4 points)
3. Calculate the value at time 0 of a annuity due which pays $100 every three years if $i^{(4)}$ equals 8% and if twelve payments are made in total. *(10 points)*

4. Give a numerical value for $(Ia)_x$ if the present value of the tenth payment is equal to the present value of the eleventh payment. *(12 points)*
5. If \( \frac{a_4}{a_2} = 1.81873 \), what is \( S^{(12)}_{10} \)? (11 points)
6. Calculate the value at time 0 of an annuity which pays $300 every six months starting at time 1/2 and continuing for 16 payments if \( i^{(12)} \) equals 12\%. (10 points)

7. Write an expression for the annuity in the previous problem, using standard actuarial notation. (4 points)
8. Calculate the value at time 8 of an annuity which pays $100 per month starting at time 0 and continuing for 120 payments if \( i^{(4)} \) equals 5\%. (10 points)
BONUS QUESTION  (up to 6 points; quiz score cannot exceed 100%))

Use the “ratio technique” of chapter section 4.3 to write an expression for the present value of 10 payments which are made every three years beginning immediately, given a nominal rate of interest convertible quarterly. Be sure to define R, n, k, m, i, j, and whatever other variables you use – also, draw a timeline, and make sure your answer is in the \( \frac{a_{n}}{a} \) or \( \frac{a_{n}}{s} \) format!

**** END OF QUIZ ****