Problems from old Quizzes to practice for summative assessment:

1. Examine the following pattern of numbers. The last row shown is the 4th row. The middle term of the nth (when n is an odd number) row can be found by the formula $M(n) = 2n^2 + 5$.

7

11 15

19 23 27

31 35 39 43

a) Write in the 5th row of the triangle.

b) What is the first term of the 8th row? Show how you arrived at your answer.

c) Find an expression for the first term of the nth row.

2. Fill in the blanks.

a) $F_{25} = \_\_\_ F_{21} + \_\_\_ F_{20}$

b) $F_{232} = F_{233} - F\_\_\_\_$

c) $F_{17} + 2F_{18} + F_{19} + F_{20} = F\_\_\_$

3. Simplify each. Write your answer as a single term or binomial coefficient (choose number)

a) $\binom{47}{4}+2\binom{47}{5}+\binom{47}{6}=$

b) $\binom{61}{61}+\binom{62}{61}+\binom{63}{61}+\ldots+\binom{77}{61}=$

c) $\binom{86}{0}-\binom{86}{1}+\binom{86}{2}-\binom{86}{3}+\ldots+\binom{86}{86}=$

4. Use mathematical induction to prove that $1\cdot 2+2\cdot 3+3\cdot 4+\ldots..+n(n+1)=\frac{n(n+1)(n+2)}{3}$

5. Algebraically show that if $6^{2n}-1$ is a multiple of 35 then $6^{2(n+1)}-1$ is also a multiple of 35. Include a conclusion statement showing why you know you are right. Note this is not a "full" induction proof.

6. a) The stream of numbers -50, -45, -40, -35 …… is mathematically known as an: _____ _____ (hint: adjective noun)

   b) Calculate -50 + -45 + -40 + -35 ……+ 495 + 500 (no need to simplify)

7. Write without factorials and simplify. $\dfrac{n!(n-2)!(n+2)!}{(n-3)!(n+3)!(n+1)!}$ [3]

8. To the right are the first two terms of a geometric series. $2-\dfrac{3}{5}$

   a) Write the next two terms: $2-\dfrac{3}{5}+$ _____ + _____

   b) Write the formula for the sum of the first 18 terms (don't evaluate!!)

   c) As you add more and more terms together the sum will approach the number _____