

Practice Regents problems #12

AII-F.BF.6 Represent and evaluate the sum of a finite arithmetic or finite geometric series, using summation (sigma) notation. For geometric series:

$$\sum_{k=1}^n a_k = a_1 + a_2 + \dots + a_n = a_1 \left(\frac{1-r^n}{1-r} \right)$$

1. Given the sequence $12\frac{1}{4}, 21\frac{3}{4}, 31\frac{1}{4}, 40\frac{3}{4}, \dots$

- (a) Determine whether the sequence is arithmetic or geometric, then find the common difference d or the common ratio r . *Arithmetic*

$$d = 21\frac{3}{4} - 12\frac{1}{4} = 9\frac{1}{2}$$
$$31\frac{1}{4} - 21\frac{3}{4} = 9\frac{1}{2} \text{ etc.}$$

- (b) Write a recursive formula for the sequence.

$$a_1 = 12\frac{1}{4}$$
$$a_n = a_{n-1} + 9\frac{1}{2}$$

- (c) Write an explicit formula for the sequence.

$$a_n = 12\frac{1}{4} + (9\frac{1}{2})(n-1)$$

- (d) Find the fifth term the sequence.

$$40\frac{3}{4} + 9\frac{1}{2} = 50\frac{1}{4}$$

2. Express each of the following in simplest radical form.

(a) $(27x^2)^{\frac{1}{3}}$

$$= 3x^{\frac{2}{3}}$$
$$= 3\sqrt[3]{x^2}$$

(b) $(4x^4)^{\frac{3}{2}}$

$$(4^{\frac{3}{2}})(x^{4 \cdot \frac{3}{2}})$$
$$= 8x^6$$