

# ALGEBRA III

## WS - MORE APPLICATIONS

NAME \_\_\_\_\_  
PER \_\_\_\_\_ DATE \_\_\_\_\_

- 1) The corner section of a football stadium has 15 seats in the first row and 40 rows in all. Each successive row contains two additional seats. How many seats are in this section?
  - 2) Initially, a pendulum swings through an arc of 18 inches. On each successive swing, the length of the arc is 98% of the previous length. What is the length of arc after 10 swings? When it stops, what total length will the pendulum have swung?
  - 3) As a farmer bales a field of hay, each trip around the field gets shorter. On the first trip around the field, there were 267 bales of hay. On the second trip, there were 253. The number of bales on each succeeding trip decreases arithmetically. The total number of trips is 13. How many bales of hay does the farmer get from the field?
  - 4) A ball is dropped from a height of 30 ft. Each time it strikes the ground, it bounces up to .8 of the previous height. What total distance does the ball travel before it stops bouncing?
- X You are the choreographer of a marching band consisting of 120 members. You plan to have them march onto the field in a pyramid formation. The drum major leads the band alone in the first row, then there are two members in the second row, three in the third row, and so on. How many rows will there be in the pyramid formation?
- 6) A certain bacteria culture initially contains 5000 bacteria and increases by 15% every hour. How many bacteria will there be after 12 hours?
  - 7) The yearly depreciation rate of a certain automobile is 25% of its value at the beginning of the year. The original cost of the car was \$25,000. What is the value of the car after 5 years?
  - 8) How many multiples of 6 are there between 100 and 200?
  - 9) What is the sum of the positive multiples of 3 that are less than 100?
  - 10) Your father wants to make a deal with you. He will give you 5¢ to clean the garage. He will then double the amount daily for each day this month that you keep the garage tidy. Today is August 15. Is it a good idea to accept these conditions? How much will you earn on August 31? What is the total that you will earn?
  - 11) The length of the first loop of a spring is 20 inches. The length of the second loop is  $\frac{9}{10}$  of the first. The length of the third loop is  $\frac{9}{10}$  the length of the second, and so on. Suppose the spring had infinitely many loops. Does it have a finite or infinite length? Explain.

$$\textcircled{1} \quad 15 + 17 + \dots +$$

$$a_{40} = 15 + (40-1)2$$

$$a_{40} = 93$$

$$S_{40} = \frac{(15 + 93)40}{2}$$

$$S_{40} = \boxed{2160 \text{ seats}}$$

$$\textcircled{2} \quad 267 + 253 + \dots$$

$$a_{13} = 267 + (13-1) \div 14$$

$$a_{13} = 99$$

$$S_{13} = \frac{(267 + 99)13}{2}$$

$$S_{13} = \boxed{2379 \text{ bales}}$$

$$\textcircled{11} \quad 20 + 18 + \dots$$

it has a finite length because  $r = \frac{9}{10}$  which

is between  $-1$  and  $1$  so.

$$S_{\infty} = \frac{20}{1 - \frac{9}{10}}$$

$$= \frac{20}{\frac{1}{10}} = 200 \text{ in}$$

$$18 + 17.64 + 17.29 + \dots$$

$$a_{10} = 18(-.98)^9$$

$$\boxed{a_{10} = 15.007 \text{ inches}}$$

$$S_{\infty} = \frac{18}{1 - .98} = \frac{18}{.02} = \boxed{900 \text{ inches}}$$

$$\textcircled{4} \quad \downarrow 30 \quad \uparrow 24 \quad \downarrow 24 \quad \uparrow 19.2 \quad \downarrow 19.2$$

$$\downarrow 30 + 24 + 19.2 \dots$$

$$\frac{30}{1 - .8} = \frac{30}{.2} = 150$$

$$\uparrow 24 + 19.2 + \dots$$

$$\frac{24}{1 - .8} = \frac{24}{.2} = 120$$

$$\boxed{270 \text{ feet}}$$