



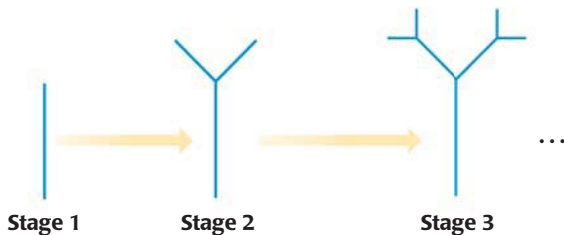
## Lessons 12.4–12.5

### MULTIPLE CHOICE

1. **TOTAL DISTANCE** A ball is dropped from a height of 12 feet. Each time the ball hits the ground, it bounces to 70% of its previous height. What is the total distance traveled by the ball, including the distance traveled before the first bounce? **TEKS a.1**

- (A) 28 feet                      (B) 40 feet  
(C) 56 feet                      (D) 68 feet

2. **FRACTAL TREE** A fractal tree starts with a single branch (the trunk) and “grows” as shown. What is a recursive rule for the number of new branches in each stage? **TEKS a.5**



- (F)  $a_1 = 1, a_n = 2a_{n-1}$   
(G)  $a_n = 2^{n-1}$   
(H)  $a_1 = 1, a_n = (a_{n-1})^2$   
(J)  $a_1 = 1, a_n = 2 + a_{n-1}$

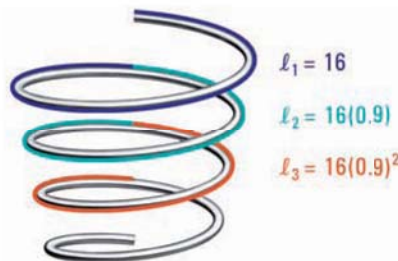
3. **TREE FARM** A tree farm currently has 8000 trees. Each year 10% of the trees are harvested and 500 seedlings are planted. After an extended period of time, how many trees exist on the farm? **TEKS a.1**

- (A) 500 trees                      (B) 1250 trees  
(C) 2500 trees                      (D) 5000 trees

4. **FISH TANK** Paul owns a 40 gallon fish tank that leaks 5% of its water every day. Paul replaces 1 gallon each day to make up for the loss. To the nearest hundredth of a gallon, how much water is in the tank 4 days after it was completely full? **TEKS a.5**

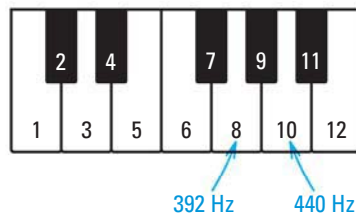
- (F) 1.05 gallons  
(G) 36.29 gallons  
(H) 37.15 gallons  
(J) 38.75 gallons

5. **SPRINGS** The length  $l_1$  of the first loop of a spring is 16 inches. The length  $l_2$  of the second loop is 0.9 times the length of the first loop. The length  $l_3$  of the third loop is 0.9 times the length of the second loop, and so on. If the spring could have infinitely many loops, what would be its total length? **TEKS a.1**



- (A) 17.8 inches                      (B) 80 inches  
(C) 150 inches                      (D) 160 inches

6. **MUSIC** The frequencies (in hertz) of the notes on a piano form a geometric sequence. The frequencies of G (labeled “8”) and A (labeled “10”) are shown in the diagram. What is the approximate frequency of E flat (labeled “4”)? **TEKS a.1**



- (F) 247 Hz  
(G) 311 Hz  
(H) 330 Hz  
(J) 554 Hz

### GRIDDED ANSWER

7. **LOAN PAYMENTS** A five year loan of \$10,000 is used to buy a car. The loan has an annual interest rate of 6.5% compounded monthly. Each month a payment of \$196 is made (except for the last month when a payment of only \$165 is made). To the nearest dollar, what is the balance owed on the loan after 12 months? **TEKS a.1**