Name: _____ Per: _____ Date: _____

Serafino • Algebra 2E

Sum of first n terms in infinite geometric series

$$S_n = \frac{a_1(1-r^n)}{1-r}$$

8D1 Finite Geometric Series

Homework

March Madness is upon us!
Round 1 has 32 games, round 2 has 16, round 3 has 8, etc.

a) Write the geometric sequence that represents how many games are taking place in each round

.

b) Write the geometric series that represents how many total games are taking place in the tournaments.

c. Express the sum in Sigma Notation

d. Use the partial sum formula (above) to evaluate.

Write in sigma notation and evaluate, using the finite sum formula:

1) 2, 12, 72, 432

2) −1, 5, −25, 125

3) −2, 6, −18, 54, −162

4) −2, −12, −72, −432, −2592

Evaluate:

5) $\sum_{k=1}^{7} 4^{k-1}$

6) $\sum_{i=1}^{8} (-6)^{i-1}$

★ Trickier than it looks!

7) $\sum_{i=1}^{9} 2^{i-1}$

8) $\sum_{m=1}^{9} -2^{m-1}$

Find the sum of the finite geometric series:

9) $\sum_{n=1}^{8} 2 \cdot (-2)^{n-1}$

10) $\sum_{n=1}^{9} 4 \cdot 3^{n-1}$

11) $\sum_{n=1}^{10} 4 \cdot (-3)^{n-1}$

12) $\sum_{n=1}^{9} (-2)^{n-1}$

13) $1 + 2 + 4 + 8..., \ n = 6$

14) $2 - 10 + 50 - 250..., \ n = 8$

15) $1 - 4 + 16 - 64..., \ n = 9$

16) $-2 - 6 - 18 - 54..., \ n = 9$

17) $1 - 5 + 25 - 125..., \ n = 7$

18) $-3 - 6 - 12 - 24..., \ n = 9$

19) $a_1 = 4,\ a_n = 1024,\ r = -2$

20) $a_1 = 4,\ a_n = 8748,\ r = 3$

Find the number of terms in each series.. Remember you may need to temporarily ignore the negative sign on the "r" if you solve with like bases or log both sides…

21) $a_1 = -2,\ r = 5,\ S_n = -62$

22) $a_1 = 3,\ r = -3,\ S_n = -60$

23) $a_1 = -3,\ r = 4,\ S_n = -4095$

24) $a_1 = -3,\ r = -2,\ S_n = 63$

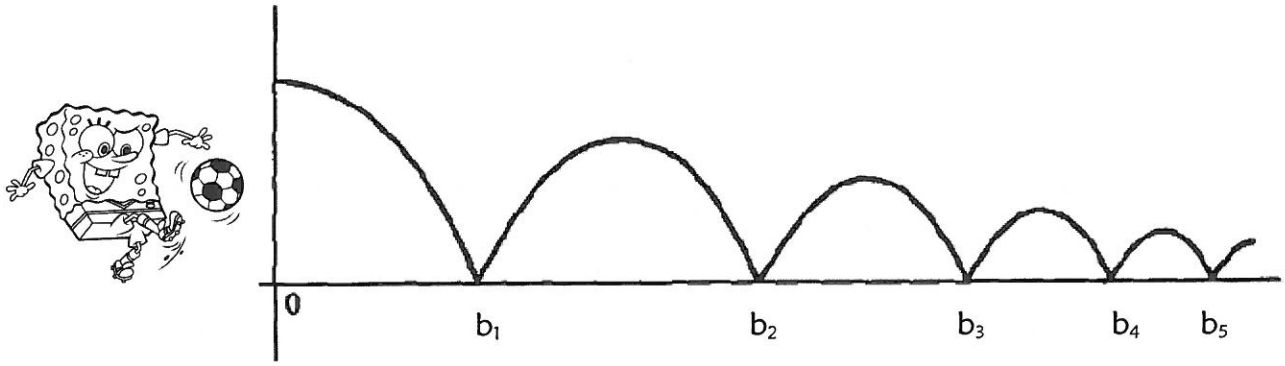
25) $-4 + 16 - 64 + 256\ldots,\ S_n = 52428$

26) $\sum_{m=1}^{n} -2 \cdot 4^{m-1} = -42$

Spongebob kicks a soccer ball out of a gym window. It lands 20 feet from the building. Each bounce, it travels 75% of its previous bounce's distance.

a. Write the explicit formula for the distance traveled by each bounce.

b. In between each bounce, write the distance the ball travels in between each bounce...



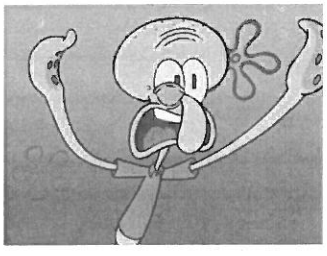
c. What is the distance covered between the 1st and 2nd bounce? What about between the 4th and 5th?

d. How <u>far is the ball from the building (total distance)</u> at the 4th bounce?

c. Between which two bounces is the ball 70 feet away from the building? Which bounce is it closer to?

d. How far will it be in 20 bounces? 40 bounces? 500 bounces?

What is going on???



... Stay tuned to find out ☺