

NCAA Exponential Decay

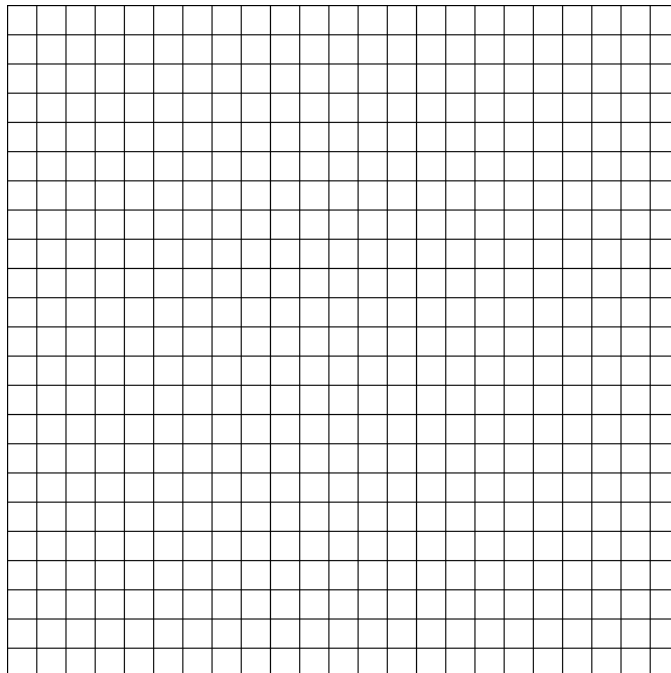
Name: _____

Directions: March is the time for madness! Every year, college basketball teams fight for a spot in the popular 64-team tournament that crowns a national champion. It is a single elimination tournament. If a team loses, they are immediately eliminated from the tournament. Knowing this and the number of teams in Round 1 answer the following questions.

1. Fill in the rest of the table below that shows the round number and its respective number of teams and games.

Round	No. of Teams	No. of Games
1	64	
2		
3		
4		
5		
6		
7	1	National Champion

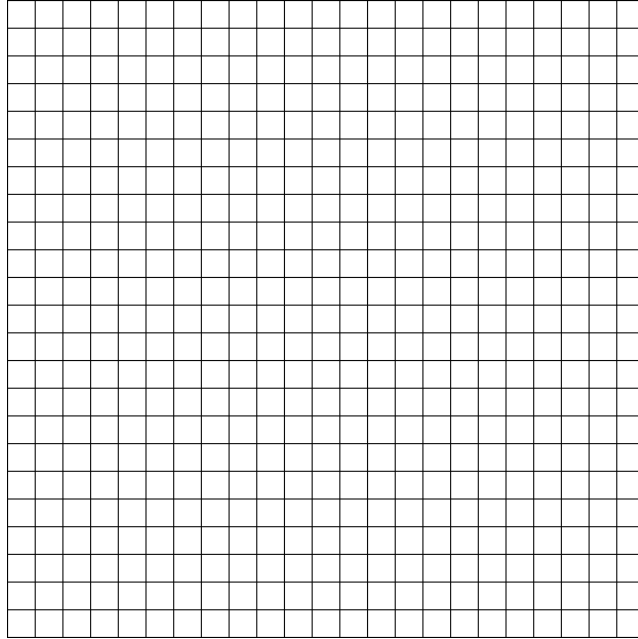
2. Graph the data to show the relationship between:
 - a. Round vs. No. of Teams



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b. Round vs. No. of Games



3. Write an equation that represents the number of teams N after r rounds.

Initial Value _____ Growth/Decay Rate _____

a. What does each term mean in the equation above?

b. By what percentage does the number of teams decrease by each round?

c. Domain _____ Range _____ Asymptote _____

End Behavior _____ Continuous or Discrete

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4. How many rounds of basketball would there need to be to crown a champion if 256 teams were in Round 1? 1024 teams?

- a. How will the equation change if there were 256 teams? 1024 teams?

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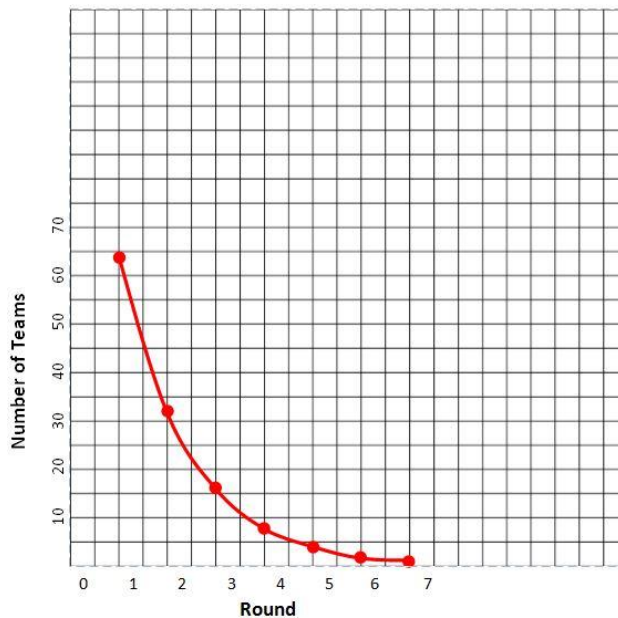
Directions: March is the time for madness! Every year, college basketball teams fight for a spot in the popular 64-team tournament that crowns a national champion. It is a single elimination tournament. If a team loses, they are immediately eliminated from the tournament. Knowing this and the number of teams in Round 1 answer the following questions.

- A. Fill in the rest of the table below that shows the round number and its respective number of teams and games.

Round	No. of Teams	No. of Games
1	64	32
2	32	16
3	16	8
4	8	4
5	4	2
6	2	1
7	1	National Champion

- B. Graph the data to show the relationship between:

- a. Round vs. No. of Teams

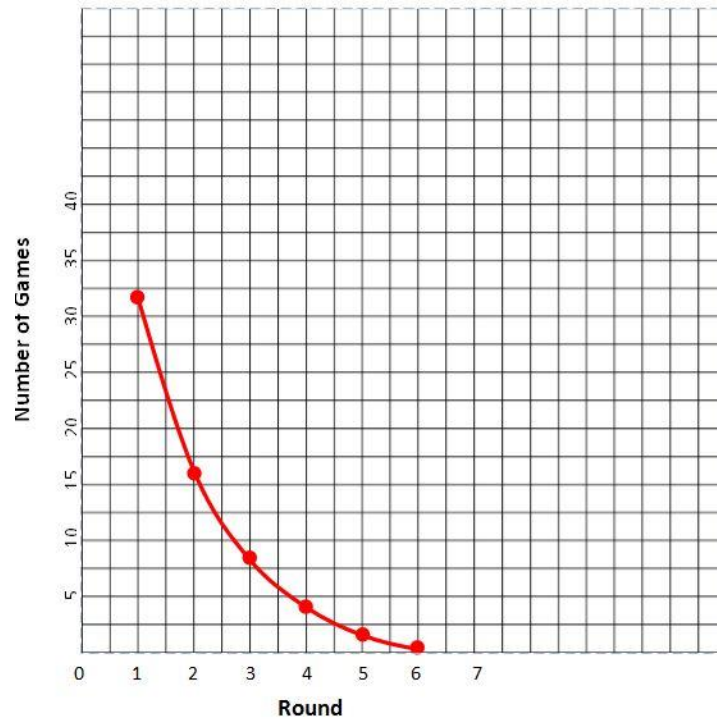


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b. Round vs. No. of Games



c. Write an equation that represents the number of teams N after r rounds.

$$N = 64 * \frac{1^{r-1}}{2}$$

a. What does each term mean in the equation above?

N = number of teams

r = number of rounds

64 = starting point, initial number of teams

$\frac{1}{2}$ = decay factor

b. By what percentage does the number of teams decrease by each round?

50%

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- D. How many rounds of basketball would there need to be to crown a champion if 256 teams were in Round 1? 1024 teams?

$$8 \text{ rounds} = 64 * 2 = 128 \text{ teams}$$

$$\underline{9 \text{ rounds} = 128 * 2 = 256 \text{ teams}}$$

$$10 \text{ rounds} = 256 * 2 = 512 \text{ teams}$$

$$\underline{11 \text{ rounds} = 512 * 2 = 1024 \text{ teams}}$$

- a. How will the equation change if there were 256 many teams? 1024 teams?

The starting point would change to either 256 or 1024, but the decay factor would stay the same.

$$N = 256 * \frac{1^{r-1}}{2}$$

$$N = 1024 * \frac{1^{r-1}}{2}$$