Name _____ Due Date _____ Period _____

9.3 Comparing Linear and Exponential

1) Fill in the tables below using the given functions: $f(x) = \frac{15}{4}x + 1$ and $g(x) = 2^x$.

x	*f(x)*
0	
1	
2	
3	
4	
5	

x	*g(x)*
0	
1	
2	
3	
4	
5	

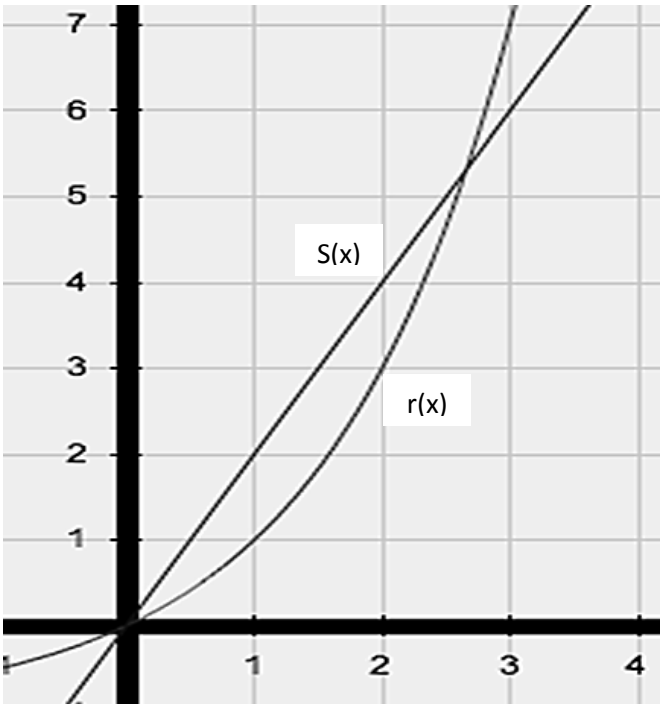
Use Inequalities to describe when $g(x)$ is greater than $f(x)$.

Use the graph to answer the following:

2) List at least two characteristics you could use to describe $s(x)$ and two characteristics that you could use to describe $r(x)$.

3) Examine the functions to the right on the interval [0,1]. Which function has greater values?

4) Examine the functions to the right on the interval [3,4]. Which function has greater values?



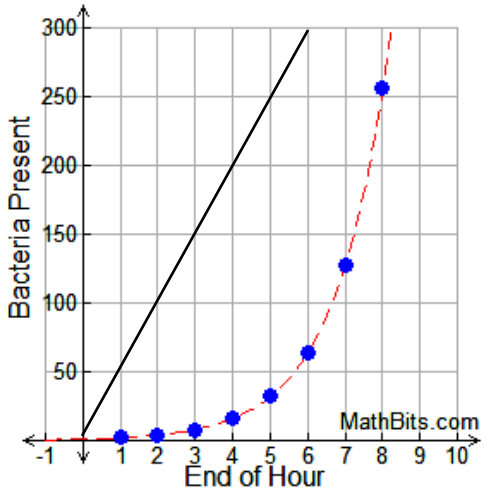
Change your calculator window to [-5,5] x [0,10]. Graph the functions on a calculator using Y1 and Y2. Use the graph or tables to identify the intervals where the specified function is greater.

5) $f(x) = 4^x$ and $g(x) = \frac{7}{3}x + 1$. When is the value of $g(x)$ greater than $f(x)$?

6) $f(x) = 2^x$ and $g(x) = \frac{1}{2}x + 3$. On the interval $x \geq 0$, when is the value of $f(x)$ greater than $g(x)$?

7) Saccharibacter has the ability to multiply at an alarming rate, where each bacteria splits into two new cells, doubling the number of bacteria present. This growth can be represented by the equation $y = 2^x$, where y represents the amount of bacteria and x represents the number of hours.

Deinobacteria on the other hand grows at a rate of $y = 50x$, where y represents the amount of bacteria and x represents the number of hours.

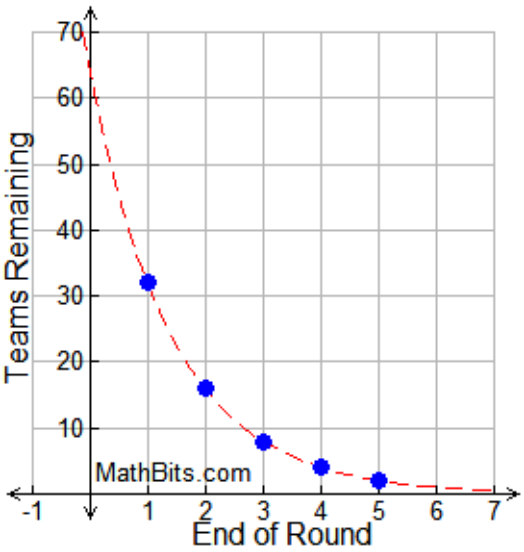


a) Label the two lines as s(x) for saccharibacter and d(x) for deinobacteria.

b) After 5 hours which bacteria has a greater amount?

c) Which bacteria would you expect to have a greater amount your $x \to \infty$ go to infinity?

8) At each round in the NCAA Basketball Championship (also known as March Madness), the total 64 teams play against one another with only the winning teams progressing to the next round. In other words, the number of teams playing at each round is half of the number of teams playing in the previous round. This situation can be represented by the equation $y = 64 \cdot \left(\frac{1}{2}\right)^x$, where y represents the number of teams and x represents the number of rounds played. FIBA Eurobasket starts with 30 teams and eliminates 5 teams every 1 round. This situation can be represented by the equation $y = 30 - 5x$, where y represents the number of teams and x represents the number of rounds played.



a) The graph for the NCAA championship n(x) is provided to left. On the same graph, sketch the graph for the FIBA Eurobasket f(x).

b) Which championship starts with more teams?

c) After two rounds, which championship has more teams in it?

d) Over what interval is $n(x)$ greater than $g(x)$? Use inequality notation.

e) Examine the end behavior as $x \to \infty$ for both equations. (Extra Credit)

$x \to \infty,\ n(x) \to$ _____

$x \to \infty,\ f(x) \to$ _____

What does this mean in context of the problem? Is it reasonable?