

2.2 Shh! Please Be Discreet (Discrete)!



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A Solidify Understanding Task

1. The Library of Congress in Washington D.C. is considered the largest library in the world. They often receive boxes of books to be added to their collection. Since books can be quite heavy, they aren't shipped in big boxes. If, on average, each box contains about 8 books, how many books are received by the library in 6 boxes, 10 boxes, or n boxes?
 - a. Use a table, a graph, and an equation to model this situation.
 - b. Identify the domain of the function.
2. Many of the books at the Library of Congress are electronic. If about 13 e-books can be downloaded onto the computer each hour, how many e-books can be added to the library in 3 hours, 5 hours, or n hours (assuming that the computer memory is not limited)?
 - a. Use a table, a graph, and an equation to model this situation.
 - b. Identify the domain of the function.

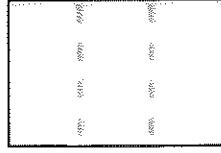
SECONDARY MATH 1 // MODULE 2
LINEAR & EXPONENTIAL FUNCTIONS - 2.2

3. The librarians work to keep the library orderly and put books back into their proper places after they have been used. If a librarian can sort and shelve 3 books in a minute, how many books does that librarian take care of in 3 hours, 5 hours, or n hours? Use a table, a graph, and an equation to model this situation.
4. Would it make sense in any of these situations for there to be a time when 32.5 books had been shipped, downloaded into the computer or placed on the shelf?
5. Which of these situations (in problems 1-3) represent a discrete function and which represent a continuous function? Justify your answer.

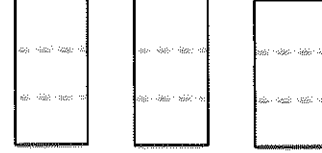
6. A giant piece of paper is cut into three equal pieces and then each of those is cut into three equal pieces and so forth. How many papers will there be after a round of 10 cuts? 20 cuts? n cuts?



Zero Cuts



One Cut



Two Cuts

- Use a table, a graph, and an equation to model this situation.
- Identify the domain of the function.
- Would it make sense to look for the number of pieces of paper at 5.2 cuts? Why?
- Would it make sense to look for the number of cuts it takes to make 53.6 papers? Why?

7. Medicine taken by a patient breaks down in the patient's blood stream and dissipates out of the patient's system. Suppose a dose of 60 milligrams of anti-parasite medicine is given to a dog and the medicine breaks down such that 20% of the medicine becomes ineffective every hour. How much of the 60 milligram dose is still active in the dog's bloodstream after 3 hours, after 4.25 hours, after n hours?
- Use a table, a graph, and an equation to model this situation.
 - Identify the domain of the function.
 - Would it make sense to look for an amount of active medicine at 3.8 hours?
Why?
 - Would it make sense to look for when there is 35 milligrams of medicine?
Why?

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Comparing rates of change in linear situations.

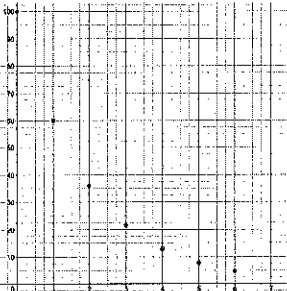
State which situation has the greatest rate of change

1. The amount of stretch in a short bungee cord stretches 6 inches when stretched by a 3 pound weight. A slinky stretches 3 feet when stretched by a 1 pound weight.
2. A sunflower that grows 2 inches every day or an amaryllis that grows 18 inches in one week.
3. Pumping 25 gallons of gas into a truck in 3 minutes or filling a bathtub with 40 gallons of water in 5 minutes.
4. Riding a bike 10 miles in 1 hour or jogging 3 miles in 24 minutes.

SET

Topic: Discrete and continuous relationships

Identify whether the following items best fit with a discrete or a continuous model. Then determine whether it is a linear (arithmetic) or exponential (geometric) relationship that is being described.

5. The freeway construction crew pours 300 ft of concrete in a day.
6. For every hour that passes, the amount of area infected by the bacteria doubles.
7. To meet the demands placed on them the brick layers have started laying 5% more bricks each day.
8. The average person takes 10,000 steps in a day.
9. The city of Buenos Aires has been adding 8% to its population every year.
10. At the headwaters of the Mississippi River the water flows at a surface rate of 1.2 miles per hour.
11. a. $f(n) = f(n - 1) + 3; f(1) = 5$ b.  c. $g(x) = 2^x(7)$

GO

Topic: Solving one-step equations

Solve the following equations. Remember that what you do to one side of the equation must also be done to the other side. (Show your work, even if you can do these in your head.)

Example: Solve for x . $1x + 7 = 23$ Add -7 to both sides of the equation.

$$\begin{array}{r} 1x + 7 = 23 \\ -7 = -7 \\ \hline 1x + 0 = 16 \\ \text{Therefore } 1x = 16 \end{array}$$

Example: Solve for x . $9x = 63$ Multiply both sides of the equation by $\frac{1}{9}$.

$$\begin{array}{r} 9x = 63 \\ \left(\frac{1}{9}\right) 9x = \left(\frac{1}{9}\right) 63 \\ \left(\frac{9}{9}\right) x = \frac{63}{9} \\ 1x = 7 \end{array}$$

Note that multiplying by $\frac{1}{9}$ gives the same result as dividing everything by 9.

11. $1x + 16 = 36$

12. $1x - 13 = 10$

13. $1x - 8 = -3$

14. $8x = 56$

15. $-11x = 88$

16. $425x = 850$

17. $\frac{1}{6}x = 10$

18. $-\frac{4}{7}x = -1$

19. $\frac{3}{4}x = -9$