

**Assignment: Day 3 Linear vs. Exponential**

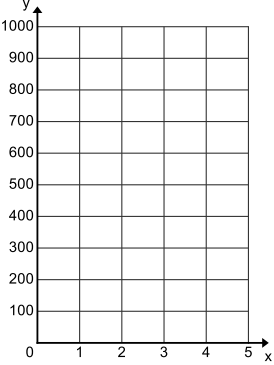
Decide if the situation represents a linear increasing function, a linear decreasing function, an exponential growth function, or an exponential decay function. Then write the equation that represents the situation.

1. A geologist discovers a radioactive material that starts with 1,200 particles and has a half-life of one day.
2. A marathon runner starts by running 3 miles and then adds an additional 4 miles per week to his workout schedule.
3. The value of a car starts at \$15,000 and drops \$1000 per year it is owned.
4. Madden started a rumor and the number of students who heard the rumor doubled every hour.
5. An investor gains \$500 per year on his \$10,000 investment.
6. A clearance item was \$200, but is marked down 50% per day for an entire week.

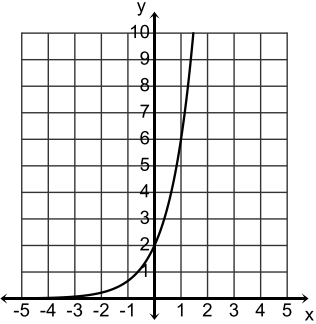
Fill in the correct rows for each function.

7. $f(x) = 7 \cdot 1.5^x$	Linear	Increasing	$m =$	$b =$
		Decreasing		
	Exponential	Growth	$a =$	$b =$
		Decay		
8. $f(x) = \frac{3}{2}x + 1$	Linear	Increasing	$m =$	$b =$
		Decreasing		
	Exponential	Growth	$a =$	$b =$
		Decay		
9. $f(x) = \left(\frac{2}{3}\right)^x$	Linear	Increasing	$m =$	$b =$
		Decreasing		
	Exponential	Growth	$a =$	$b =$
		Decay		

10.

<p><u>Context</u></p> <p>There are 800 downloads of a new song the day it is released. Each day after the release date, there are half as many downloads of the song.</p>	<p><u>Table</u></p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Day</th> <th style="padding: 5px;">Downloads</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">4</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;"></td></tr> </tbody> </table>	Day	Downloads	0		1		2		3		4		5	
Day	Downloads														
0															
1															
2															
3															
4															
5															
<p><u>Graph</u></p> 	<p><u>Decay Factor (b):</u></p> <p><u>Start Point (a):</u></p> <p><u>Equation:</u></p>														

11. For each box below, decide if each equation, context, table, or graph is linear or exponential. **Explain your answer and identify the y-intercept and the rate of change or factor of change.** If it is linear, state if it is increasing or decreasing. If it is exponential, state if it is growth or decay.

<p>a)</p> $f(x) = 3x$	<p>b)</p> 												
<p>c)</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">x</th> <th style="padding: 5px;">f(x)</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">-1</td><td style="padding: 5px;">100</td></tr> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;">50</td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;">25</td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;">12.5</td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;">6.25</td></tr> </tbody> </table>	x	f(x)	-1	100	0	50	1	25	2	12.5	3	6.25	<p>d)</p> <p>Rachel writes 2 notes per class period to give to her friends.</p>
x	f(x)												
-1	100												
0	50												
1	25												
2	12.5												
3	6.25												