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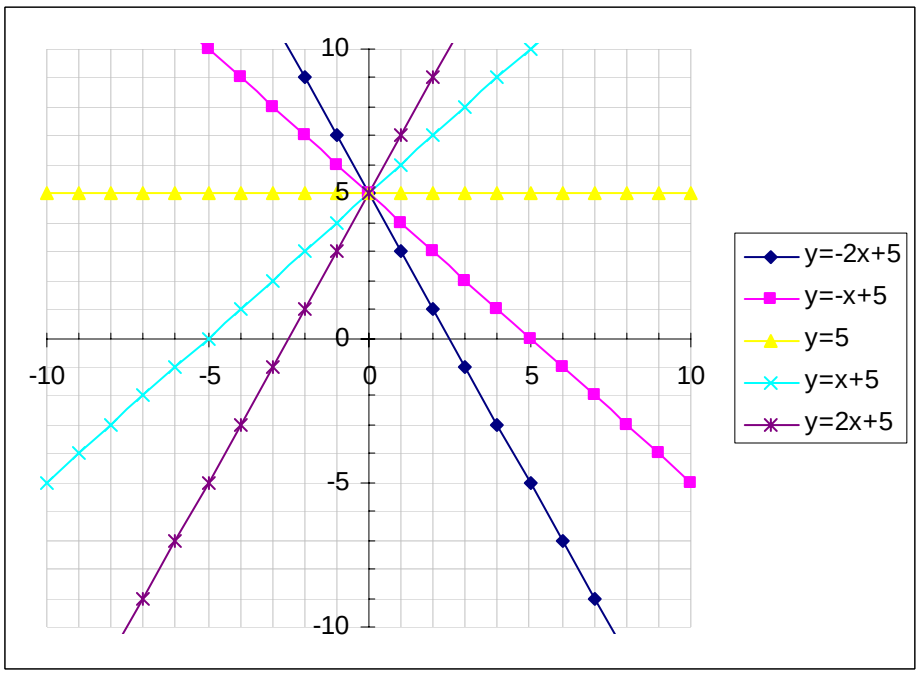
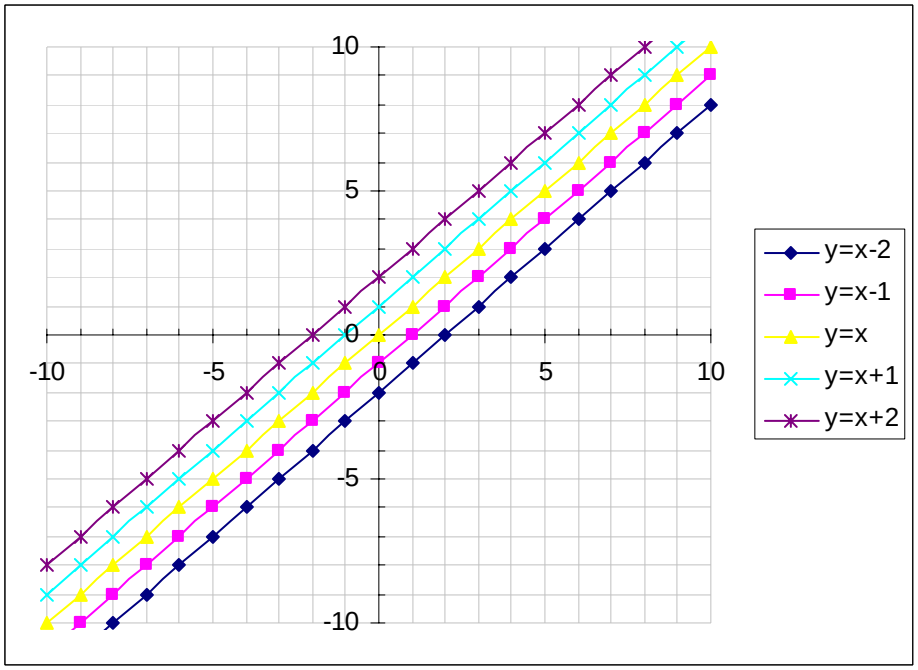
Geog 595 Ecological Modeling
1/23/2007

Lab 1 Numerical Exercises

1. plot y=ax+b with x varies from -10 to 10 using Excel:
   (1) where a=-2, -1, 0, 1, 2 and b=5 all in a single plot.

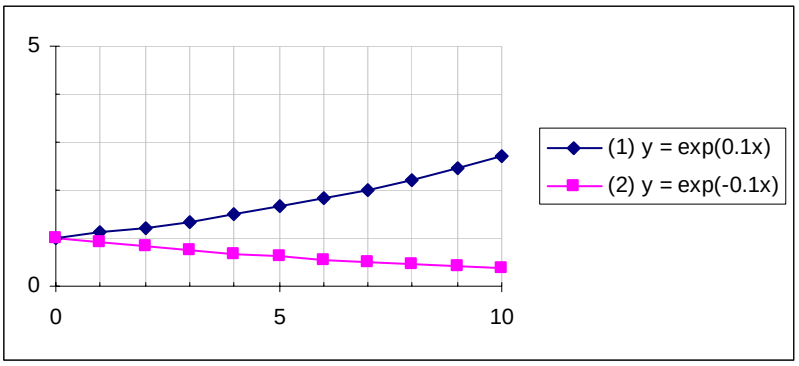


   (2) where a=1, b= -2, -1, 0, 1, 2 all in a single plot.



(3) based on the two plots, describe how "a" and "b" control the line.
a affects the slope of the line, while b affects the y-intercept of the line (raises or lowers the line on the graph without changing its slope).

2. plot y=exp(ax): with x varies from 0 to 10:
   (1) a=0.1
   (2) a=-0.1



(3) based on the two plots, describe how the sign of "a" control the line.
a controls whether the curve rises or falls with increasing x. If a is positive, the curve rises; if a is negative, the curve falls.

3. Solve x from the following quadratic equations:
   (1) $x^2+2x+1=0$
   (2) $5x^2-3x+6=0$
   (3) $5x^2-xx-6=0$
   (4) $ax^2+3mx+3tx^2+2nx+10+c=0$
   (5) $e^{2x^2+x}=10$

4. Evaluate the following expressions without using a calculator unless asked.
   (1) Log(100)
   (2) $\log_{100}(1000000)$
   (3) $\log_5(5)$
   (4) ln(e)
   (5) ln(10)
   (6) log(-1)
   (7) log(1.0)
   (8) log(4)+log(25)
   (9) log(200)-log2
   (10) a^5+a^3
   (11) a^5*a^3
   (12) a^5/a^3
   (13) $(1)^{-1}$
   (14) $(-1)^{2n}$, where n is a positive integer.
   (15) $(-1)^{2n+1}$, where n is a positive integer.
   (16) sin(75)
   (17) sin(120)
   (18) Given sin(x)=0.3, what is cos(x)? Please use a calculator to figure out what the angle of x is in degrees?
   (19) $\left(\frac{2}{3}\right)^2$
   (20) $\left(\frac{2}{3}\right)^{-2}$

5. Convert the following angles from radiances to degrees or degrees to radiances.

degrees	π/6	?	π	?	3π	?	10
radiances	?	90	?	45	?	200	?