MATH 34A LINES AND LOG APPLICATIONS

I. Lines

What determines a line?

- Slope-intercept form

- Point-slope form

Examples.

1. Find the equation of the line that goes through the point $(1, 3)$ and has slope 2.

2. Find the equation of the line that has x-intercept 4 and is parallel to the line $y = 2x + 1$.

3. Find the equation of the line that has y-intercept -2 and is perpendicular to the line $2x - 5y = 8$.

-Parametric form

Examples.

1. Mary's house is located at the point $(1, 0)$ on the plane (the units for x and y are both miles). Her school is 2 miles north and 3 miles east of her house. If it takes her 10 minutes to drive to school along a straight line path, parametrize her location on the plane in terms of time t (in minutes).

2. Write the line $y = 3x + 1$ in parametric form (there are infinitely many possibilities).

3. Write the line $x = -5t + 3, y = 2t - 1$ in slope-intercept form. What is the slope?

-Finding intersections

1. Where do the lines $2y + 3x = 1$ and $y - 3 = 2(x - 1)$ intersect?

2. Where do the lines $x = -2t, y = 3t + 1$ and $y - 3 = 2(x - 1)$ intersect?

II. Applications of Logarithms

A. Half life

$A(t)$ =amount of substance left after t units
A_0 =initial amount when $t = 0$
K =half life.

Examples.

1. The half-life of element X is 40 years. If there are 60g initially,

a) How much is there after 40 years? 80 years? 120 years?

b) How much is there after 75 years?

c) How much is there after t years?

d) When will 25g remain?

2. The half-life of substance X is 2 hours. How long does it take for the subtance to decay until only 20% remains?

B. Doubling time

C. Compound interest (Next time)

n =the number of compounding periods
$M(n)$ =amount of money after n periods
P_0 =initial amount of money
$i = \dfrac{\text{annual interest rate}}{\text{number of compoundings per year}}$