**Linear Review and Systems of Application of Problems**

Slope-Intercept Form:

1. A company has developed a new transistors that saves on average 64% depending on the task of the transistor. If the original transistor that was an ALU used 19.94 femtojoules of energy. How much energy will the new device use.   
     
   If you know that the NAND2 went from 21.3 femtojoules to 7.64 femtojoules, what was the percent change?
2. Delay (d) of a transistor is equal to the ratio of the capacitance of the external load (Cout) divided by the input capacitance of the gate (Cin) times the logical effort (g) plus the parasitic delay (p). Write an equation that shows this given relationship.

If you know that the delay is 12 picoseconds, the capacitance of the external load is 3, the capacitance of the gate is 1, and the parasitic delay 3 picoseconds what is the logical effort for this transistor.

Standard Form:

1. A given central processing unit is measured to be 4.572x10-3 meters squared. There are 600,000,000 ALU transistors that measure 7.6x10-12 m2. How many registers can fit on the cpu if they measure 2.5x10-13 m2?
2. Change the type of transistor can save energy for your device, which mean a battery would last longer. What percent of decrease would be calculated if you know that registers make up 72% of the chip and save 25% and the ALU makes up the remainder of the chip and would decrease the energy by 17%.  
     
   A company is looking for a total decrease of at least 22% in power. Will the above new device give them that change?

2x2 Application problems:

1. A company is making two chips one for a new cell phone and one for a new laptop. The cell phone size must be at 987 mm2 and needs to contain 70% registers and 30% ALU units. The laptop is 1024 mm2 and will contain 60% registers and the rest as ALU. How many registers and ALU style transistors will be used on each chip?
2. The Bobcat core is what makes many laptops work. This is made up of a registers and other transistors. The total area for the core is 4.6 mm2. Overall there are 1.5 as many registers as other transistors. What is the area for each the registers and other transistors.
3. A company is making two chips. The first chip will have 2 cores that measure 4.5 square millimeters and registers that measure .0000000052 mm2. The second uses the same measurements but has 4 cores instead of two. If they the company wants the areas to be the same how many registers should they use.

3x3 Application problems:

1. The Jaguar CPU is what makes a PS4 work. This chip is made up of a core, registers and other transistors. The total area for this chip is 27.4 mm2. In the core there are registers and other transistors. Overall there are twice as many registers as other transistors. What is the area for each the core, registers, and other transistors.
2. A company is making three chips one for a new cell phone, one for a new laptop, and a new hand held gaming device. The cell phone size must be at 1024 mm2 and needs to contain 60% registers, 30% ALU units and 10% state elements. The laptop is 992 mm2 and will contain 40% registers, 40% ALU and 20% state element. The hand held game needs 50% registers, 45% ALU, and 5% state element to fulfill their area of 1124 mm2. What values of registers, ALU, and state element would the company need to use if they are the same for each new chip?