Binomial Distribution Problems **Name:_____**

(1) A company owns 400 laptops. Each laptop has an 8% probability of not working. You randomly select 20 laptops for your salespeople. (a) What is the likelihood that 5 will be broken? (b) What is the likelihood that they will all work? (c) What is the likelihood that they will all be broken?

(1) (a) 20**C**5 $(.08)^5$ $(.92)^{15}$ = .0145 (b) 20C0 $(.08)^0(.92)^{20}$ = .1887

(c) 20**C**20 $(.08)^{20}(.92)^0$ = .00000000000000000001 (note ^{22} means move the decimal 22 places to the left)

(2) A study indicates that 4% of American teenagers have tattoos. You randomly sample 30 teenagers. What is the likelihood that exactly 3 will have a tattoo?

(2) 30**C**3 $(.04)^3$ $(.96)^{27}$ = .0863

(3) An XYZ cell phone is made from 55 components. Each component has a .002 probability of being defective. What is the probability that an XYZ cell phone will not work perfectly?

(3) Probability that it will work (0 defective components) 55**C**0 $(.002)^0$ $(.998)^{55}$ = .896
Probability that it will not work perfectly is 1 .896 = .104 or 10.4%

(4) The ABC Company manufactures toy robots. About 1 toy robot per 100 does not work. You purchase 35 ABC toy robots. What is the probability that exactly 4 do not work?

(4) $35\mathbf{C}4\ (.01)^4\ (.99)^{31} = .00038$

(5) The LMB Company manufactures tires. They claim that only .007 of LMB tires are defective. What is the probability of finding 2 defective tires in a random sample of 50 LMB tires?

(5) $50\mathbf{C}2\ (.007)^2\ (.993)^{48} = .0428$

(6) An HDTV is made from 100 components. Each component has a .005 probability of being defective. What is the probability that an HDTV will not work perfectly?

(6) Probability that it will work (0 defective components) $100\mathbf{C}0\ (.005)^0\ (.995)^{100}$ = .606 Probability that it will not work perfectly is 1 .606 = .394 or 39.40%