1-25-10 3 pm.

1-5. Events A, B are said to have P(A) = 0.7, P(B) = 0.4.

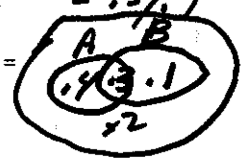
1. If P(B | if A) = 0.2 then P(A $\cap_{and}$ B) = $.7 \cdot .2 = .14$
a) 0.28 b) 1.1 c) 0.14 d) 0.96 e) 0.4

2. If A, B are independent then P(B | if A) = $P(B) = 0.4$
a) 0.14 b) 0.28 c) 0.96 d) 0.4 e) 1.1

3. If P(A $\cap_{and}$ B) = 0.2 then P(A $\cup_{or}$ B) = $P(A)+P(B)-P(A\cap B)$ ADD^N RULE
a) 1.1 b) 0.28 c) 0.4 d) 0.96 e) 0.9 $.7+.4-.2=.9$

4. If P(A $\cap_{and}$ B) = 0.3 then P(B | if A) = $P(A\cap B)/P(A)$ $= .3/.7$
a) 0.43 b) 0.4 c) 0.14 d) 0.96 e) 0.28

5. If P(A $\cap_{and}$ B) = 0.3 then P(A $\cap_{and}$ B^C) =
a) 0.2 b) 0.1 c) 0.4 d) 0.7 e) 0.6



6-10. Given the following:

OIL 0.1
+ 0.7
−

OIL^C
+ 0.2
−

6. P(+ | if OIL) =
a) 0.7 b) 0.28 c) 0.25 d) 0.07 e) 0.01 GIVEN AS 0.7

7. P(OIL $\cap_{and}$ +) =
a) 0.7 b) 0.28 c) 0.25 d) 0.07 e) 0.01 $.1 \cdot .7 = .07$

8. P(+) = $P(OIL+) + P(OIL^c+) = .1 \cdot .7 + .9 \cdot .2 = .25$
a) 0.7 b) 0.28 c) 0.25 d) 0.07 e) 0.01

9. P(OIL | if +) = $P(OIL+)/P(+) = \frac{.1 \cdot .7}{.25} = \frac{.07}{.25} = .28$
a) 0.7 b) 0.28 c) 0.25 d) 0.07 e) 0.01

10. Suppose that: Cost to test is 50.
Cost to drill is 100.
Gross return from drilling for oil, when it is present is 1200.

For the contingency **OIL−** determine the **NET** return from the policy:
"test, but only drill if the test is +"
a) -150 b) 1150 c) -50 d) -250 e) 950 $-50 - 0 + 0$
TEST DRILL OIL

11-13. A random variable X has the following probability distribution:

x	p(x)
0	0.5
1	0.4
4	0.1

11. P(X < 2) = $p(0)+p(1) = .9$
a) 0.95 b) 0.5 c) 0.1 d) 0.6 e) 0.9

12. E X =
a) 2.5 b) 0.9 c) 2.2 d) 0.8 e) 1.67

$\sum_x x\,p(x) = 0 \cdot .5 + 1 \cdot .4 + 4 \cdot .1 = .8$

13. Variance X = E X^2 - (E X)^2 = $2 - .8^2 = 1.36$
a) 1 b) 1.6 c) 1.4 d) 2 e) 3
CLOSEST

$\sum_x x^2 p(x) = 0^2 \cdot .5 + 1^2 \cdot .4 + 4^2 \cdot .1 = 2$

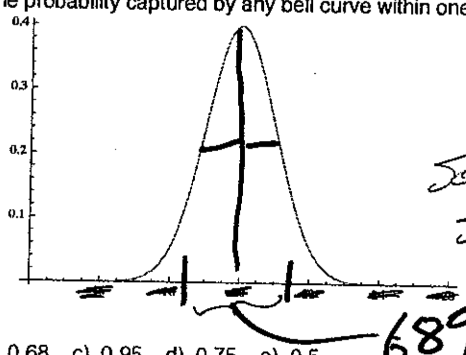
14-16. One play of a lottery has random return Y with:
E Y = 3.
Variance Y = 4 (so standard deviation = 2).

14. Determine the expected total return from 100 independent plays.
a) 400 b) 20 c) 0.03 d) 200 e) 300 $100\,EY = 300$

15. Determine the Variance of the total return from 100 independent plays.
a) 400 b) 20 c) 0.03 d) 200 e) 300 100 VARIANCE Y = 400

16. The probability distribution of the total return from 100 independent plays is approximated by a bell curve. What are the mean and **standard deviation (not variance)** of this bell curve?
a) (300, 20) b) (400, 200) c) (0.03, 20) d) (300, 200) e) none of the others $SD = \sqrt{400} = 20$

17. (unrelated to above) Here is a sketch of a bell curve with mean 20 and standard deviation 4. What is the approximate probability of the interval [20-4, 20+4]? Use the rule of thumb given in lecture for the probability captured by any bell curve within one standard deviation of its mean.



SORRY, PICTURE SCALE IS INCORRECT
~68% FOR MEAN ± 1 SD.
~95% " MEAN ± 2 SD.

a) 0.46 b) 0.68 c) 0.95 d) 0.75 e) 0.5 68%