What does CDF stand for?

Given the table of the pmf for a random variable. Find F(x)

x	1	2	3	4	5
f(x)	.2	.25	.15	.22	.18
F(x)					

x	F(x)
1	0.1002
2	0.1268
3	0.6468
4	0.7598
5	0.7717
6	0.9001
7	0.9239
8	0.9496
9	0.9743
10	0.9880
11	0.9905
12	1.000

a. $P(X = 4)$

b. $P(X < 9)$

c. $P(X \leq 3)$

d. $P(X \geq 13)$

e. $P(5 < X < 9)$

g. $P(8 \leq X < 12)$

h. $P(7 \leq X \leq 11)$

I. $P(10 < X)$

The CDF of a random variable is given below.

x	1	2	3	4	5	6	7	8
$F(x)$	.08	.15	.26	.43	.78	.82	.88	1.00

Determine a) $P(X < 5)$ b) $P(X \leq 3)$ c) $P(6 \leq X)$

d) $P(2 \leq X)$ e) $P(3 \leq X < 7)$ f) $P(3 < X \leq 7)$ g) $P(X \leq 4.5)$

20. Determine the value(s) of c that makes the table below a CDF.

x	1	2	3	4	5	6	7	8
F(x)	.2	.25	.45	.55	c	.87	.95	1.00

21. Determine the value(s) of c that makes the table below a CDF.

x	1	2	3	4	5	6	7	8
F(x)	.1	.25	.46	c	.71	.72	.86	1.00

Expected Value and Negative Test

1. Suppose that the current positivity rate is 3.5%. That is, 3.5% of those that get tested actually test positive. If we decide to do batches of size 12, what is the probability that a batch of 12 independent individuals will produce a negative test.

2. Suppose that we are doing batch testing with batches of size 16. Suppose that the probability that a batch of size 16 tests negative is 0.835. Determine the expected number (expected value) of tests needed for a group of size 16.

Machine Problem

We currently have 1 machine. The machine is in use for half of the day.

1. How many DNA analyses per day can one machine perform? →
2. We are considering buying a second machine. For each analysis that the machine is in use, we profit $700.

Jobs	0	1	2	3	4	5	6	7 or more
f(x)	.05	.16	.12	.20	.12	.16	.08	.11
X								
F(x)								

a) Expected value per day for the second machine =

b) Expected value per year for the second machine =

Back to Probability

Suppose that we asked 2000 people what their blood type is (O, A, B, or AB) and what ethnic group they belong to (G1, G2 or G3). The results of the survey are listed in the table below.

		Blood	Type		Total
Ethnic Group	O	A	B	AB	
G1	300	150	175	25	650
G2	125	650	15	10	800
G3	165	145	175	65	550
Total	590	945	365	100	2000

a) $P(G1)$ b) $P(A)$ c) $P(A \cup B)$

d) $P[A \cap G2]$ e) $P[G1 \cup G2]$ f) $P[G3 \cap O)$

g) $P[G3 \cup O]$ h) $P[G1 \cup G2 \cup AB]$ i) $P[(G1 \cup G2) \cap AB]$

j) $P(B^C)$ k) $P[(A \cup G3)^C]$ l) $P[(G2 \cap AB)^C]$