

2. Compounded monthly $\Rightarrow$ Compound interest

$$A = P \left(1 + \frac{r}{m} \right)^{mt}$$

$$= 300 \left(1 + \frac{.05}{12} \right)^{12(3)} = \boxed{348.44}$$

(3)

COMPOUNDED CONTINUOUSLY
 $\Rightarrow Pe^{rt}$

$$A = Pe^{rt}$$

$$700 = 100 e^{r5}$$

$$7 = e^{r5}$$

$$\ln(7) = \ln e^{5r}$$

$$\ln(7) = 5r \ln(e) \rightarrow 1$$

$$\frac{\ln(7)}{5} = r = .389$$

$$r = \boxed{38.9\%}$$

(4) $PV = 10,000$

$$PV = PMT \frac{1 - (1+i)^{-n}}{i}$$

$$10,000 = PMT \cdot \frac{1 - \left(1 + \frac{.035}{12} \right)^{-240}}{\frac{.035}{12}}$$

$$i = \frac{r}{m} = \frac{.035}{12}$$

$$n = mt = 12(20)$$

$$10,000 = PMT \cdot 172.4$$

$$\boxed{\$58 = PMT}$$

(11) 26 letters & 10 digits, So

$$26^3 \cdot 10^3 = 17,576,000$$

(12) one drink 4 choices

one potato
or onion ring
= 4 choices
 $3 + 1 = 4$

One sandwich 2

One nuggets 2

↓

$$4 \cdot 4 \cdot 2 \cdot 2 = \underline{\underline{64}}$$

(13) 20 songs

$${}_{20}C_{10} = \frac{20!}{(20-10)! \cdot 10!} = \underline{\underline{184,756}}$$

(14)

$${}_{20}P_{10} = \frac{20!}{(20-10)!} = 6.7044 \times 10^{11}$$

(15)

$$n(A) = 100, n(B) = 200, n(A \cup B) = 250$$

$$\begin{aligned} \text{So } n(A \cap B) &= n(A) + n(B) - n(A \cup B) \\ &= 100 + 200 - 250 = \underline{\underline{50}} \end{aligned}$$

OR you
could use
a Venn
Diagram.

(16)

$$(a) n(D^c) = 35 + 55 = 90$$

$$(b) n(M) = 65 + 38 = 103$$

$$(c) n(B) = 35 + 65 = 100$$

$$(d) n(B^c) = 55 + 38 = 93$$

$$(e) n(M^c) = n(D^c) = 90$$

$$(f) n(M \cap B) = 65$$

$$(g) n(D^c \cap B) / n(B) = \frac{35}{100}$$

$$(h) n((M \cap B)) / n(B) = \frac{65}{100}$$

$$(17) (a) S = \{ (1,1), (1,2), (1,3), (1,4), \\ (2,1), (2,2), (2,3), (2,4), \\ (3,1), (3,2), (3,3), (3,4), \\ (4,1), (4,2), (4,3), (4,4) \}$$

$$(b) A = \{ (2,1), (2,2), (2,3), (2,4) \}$$

$$(c) B = \{ (1,1), (2,1), (3,1), (4,1) \}$$

$$(d) C = \{ (1,4), (2,3), (3,2), (4,1) \}$$

$$(e) D = \{ (2,4), (3,3), (4,2) \}$$

$$(18) (a) P(A) = \frac{4}{16} \quad P(B) = \frac{4}{16} \quad P(C) = \frac{4}{16} \quad P(D) = \frac{3}{16}$$

$$(b) P(A \cap C) = \frac{1}{16} \quad A \cap C = \{ (2,3) \}$$

$$P(A \cap B) = \frac{1}{16} \quad A \cap B = \{ (2,1) \}$$

$$P(A \cap D) = \frac{1}{16} \quad A \cap D = \{ (2,4) \}$$

$$(c) P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{1/16}{4/16} = 1/4 \quad P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{1/16}{4/16} = 1/4$$

$$P(A|C) = \frac{P(A \cap C)}{P(C)} = \frac{1}{4} \quad P(A|D) = \frac{P(A \cap D)}{P(D)} = \frac{1}{3}$$

$$(d) P(A|B) = \frac{1}{4} = P(A) \Rightarrow \text{So } A \perp B \quad \text{"}\perp\text{" means independent}$$

$$P(A|C) = P(A) \Rightarrow A \perp C$$

$$P(A|D) \neq P(A) \Rightarrow A \not\perp C \quad \text{NOT INDEP.}$$

$$(e) P(B|D) \neq P(B) \Rightarrow \text{NOT INDEPENDENT!} \quad P(B|D) = \frac{P(B \cap D)}{P(D)} = \frac{0}{3/16} = 0$$