(34) $(x_1, y_1) = (5, 6.25)$ and $(x_2, y_2) = (1, 9.25)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{9.25 - 6.25}{1 - 5}$$

$$= \frac{3}{-4}$$

$$= -\frac{3}{4}$$

$$y = mx + b$$

$$\boxed{y = \frac{-3}{4}x + b}$$

Sub $y = 9.25$, $x = 1$: $9.25 = \frac{-3}{4} + b$

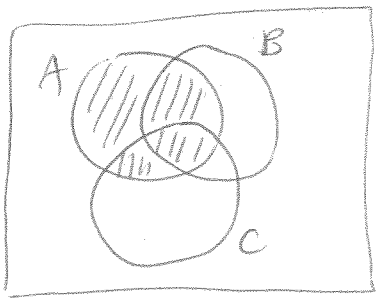
Multiply by 4: $37 = -3 + 4b$

$40 = 4b$

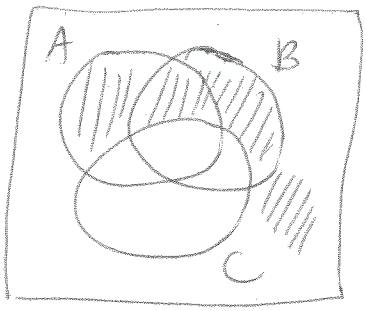
$10 = b$

$$\boxed{y = \frac{-3}{4}x + 10}$$

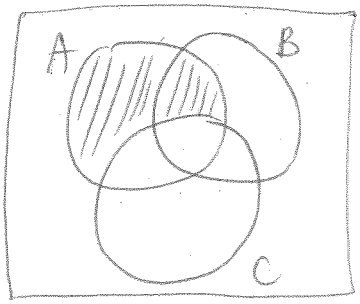
35



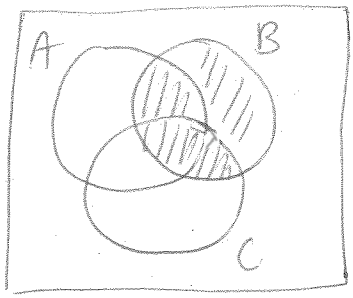
A



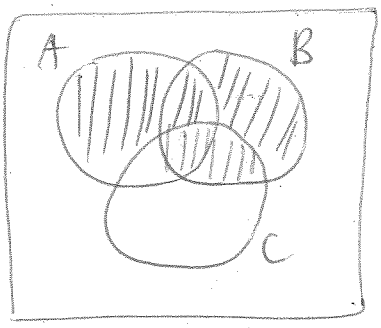
C'



$A \cap C'$



B



$B \cup (A \cap C')$

(36) B: businessperson
C: Coder

6	5
B	C

$6C2 \times 5C2$ + $6C1 \times 5C3$ + $5C4$

Choose 2B and 2C OR Choose 1B and 3C OR Choose 4C

$= 15 \times 10 + 6 \times 10 + 5$

$= 215$

(37) Consider the novels to be one object: $N_1N_2N_3N_4$

$6!$ $\times$ $4!$

Arrange 6 objects: $B_1, B_2, B_3, B_4, B_5, N_1N_2N_3N_4$ AND Arrange the 4 novels

$= 720 \times 24$

$= 17,280$

(38) E: at least 2 companies pick the same date

E': all companies pick different dates

$n(E') = 31 \times 30 \times 29 \times 28$

31: date for company #1; 30: comp. #2; 29: comp. #3; 28: comp. #4

$= 755,160$

$n(S) = 31 \times 31 \times 31 \times 31$

31: date for company #1; comp. #2; comp. #3; comp. #4

$= 923,521$

$P(E') = \frac{755,160}{923,521} \approx 0.82$

$P(E) \approx 1 - 0.82$

≈ 0.18

(39) a) $P(FY' \mid C)$ ← given

$$= \frac{n(FY' \cap C)}{n(C)}$$

$$= \frac{28}{36} \leftarrow \boxed{13+15}$$

$$\approx 0.78$$

b) $P(C) \times P(TY) = P(C \cap TY)$?

$$\frac{36}{75} \times \frac{20}{75} = \frac{15}{75} \; ?$$

$$0.48 \times 0.27 = 0.2 \; ?$$

No

(40)

$$A+B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} + \begin{bmatrix} 2 & 3 & -1 \\ 4 & 6 & 1 \\ -7 & 5 & -2 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & 5 & 2 \\ 8 & 11 & 7 \\ 0 & 13 & 7 \end{bmatrix}$$

$$AB = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \begin{bmatrix} 2 & 3 & -1 \\ 4 & 6 & 1 \\ -7 & 5 & -2 \end{bmatrix}$$

$$= \begin{bmatrix} -11 & 30 & -5 \\ -14 & 72 & -11 \\ -17 & 114 & -17 \end{bmatrix}$$

(41)

$[A \mid I]$

$$\left[\begin{array}{ccc|ccc} 1 & 1 & 3 & 1 & 0 & 0 \\ 2 & 1 & 2 & 0 & 1 & 0 \\ 6 & 3 & 5 & 0 & 0 & 1 \end{array}\right]$$

$R_2 - 2R_1$, $R_3 - 6R_1$

$$\left[\begin{array}{ccc|ccc} 1 & 1 & 3 & 1 & 0 & 0 \\ 0 & -1 & -4 & -2 & 1 & 0 \\ 0 & -3 & -13 & -6 & 0 & 1 \end{array}\right]$$

$\frac{R_2}{-1}$

$$\left[\begin{array}{ccc|ccc} 1 & 1 & 3 & 1 & 0 & 0 \\ 0 & 1 & 4 & 2 & -1 & 0 \\ 0 & -3 & -13 & -6 & 0 & 1 \end{array}\right]$$

$R_1 - R_2$, $R_3 + 3R_2$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & -1 & -1 & 1 & 0 \\ 0 & 1 & 4 & 2 & -1 & 0 \\ 0 & 0 & -1 & 0 & -3 & 1 \end{array}\right]$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & -1 & -1 & 1 & 0 \\ 0 & 1 & 4 & 2 & -1 & 0 \\ 0 & 0 & 1 & 0 & 3 & -1 \end{array}\right]$$

$\frac{R_3}{-1}$

$R_1 + R_3$, $R_2 - 4R_3$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -1 & 4 & -1 \\ 0 & 1 & 0 & 2 & -13 & 4 \\ 0 & 0 & 1 & 0 & 3 & -1 \end{array}\right]$$

I $\qquad$ A^{-1}

(42) a) COMPOUND INTEREST

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

$r = 0.075 \quad m = 12 \quad P = 10{,}000 \quad t = 5$

$$A = 10{,}000\left(1 + \frac{0.075}{12}\right)^{60}$$

$$A \approx \$\,14{,}532.94$$

b) COMPOUND INTEREST

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

$r = 0.075 \quad m = 12 \quad A = 10{,}000 \quad t = 5$

$$10{,}000 = P\left(1 + \frac{0.075}{12}\right)^{60}$$

$$\frac{10{,}000}{\left(1 + \frac{0.075}{12}\right)^{60}} = P$$

$$P \approx \$\,6{,}880.92$$

Continued →

(42) c) FUTURE VALUE OF AN ANNUITY

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

$r = 0.075$ $m = 12$ $i = \frac{r}{m} = 0.00625$

$t = 5$ $n = mt = 60$ $FV = 10{,}000$

$$10{,}000 = PMT \cdot \frac{((1+0.00625)^{60} - 1)}{0.00625}$$

$$\frac{10{,}000\,(0.00625)}{((1+0.00625)^{60} - 1)} = PMT$$

$$PMT \approx \$137.88$$

d) PRESENT VALUE OF AN ANNUITY

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

$r = 0.075$ $m = 12$ $i = \frac{r}{m} = 0.00625$

$t = 5$ $n = mt = 60$ $PV = 10{,}000$

$$10{,}000 = PMT \cdot \frac{(1 - (1+0.00625)^{-60})}{0.00625}$$

$$\frac{10{,}000\,(0.00625)}{(1-(1+0.00625)^{-60})} = PMT$$

$$PMT \approx \$200.38$$

See notes or video to see how to input negative exponents on calculator. (section 8.4)