

play chip color _____.

(c) [1] **True / False** The minimax strategy is optimal for player C and the maximin strategy is optimal for player R in this case. This game is said to be *strictly determined*.

5⁵. Of 450 students asked to identify the leaders of North America,

- 300 correctly identified the Prime Minister of Canada,
- 308 correctly identified the President of the United States,
- 145 correctly identified the President of Mexico,
- 95 correctly identified everyone except the US President,
- 98 correctly identified everyone except the Canadian Prime Minister,
- 195 correctly identified everyone except the Mexican President,
- 75 correctly identified all three leaders.

(a) [1] The number who identified only one leader is closest to:

- (i) 200 (ii) 305 (iii) 145 (iv) 22 (v) 202

(b) [1] The number who did not know any of the leaders is closest to:

- (i) 43 (ii) 10 (iii) 72 (iv) 95 (v) 55

(c) [1] The number who knew the US President, but not the Mexican President, is closest to:

- (i) 110 (ii) 196 (iii) 210 (iv) 253 (v) 252
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6⁶. Consider the following problems.

(a) [1] If $P(A \cap B) = \frac{5}{7}$ and $P(B) = \frac{5}{6}$, then $P(A|B)$ is closest to:

- (i) $\frac{2}{3}$ (ii) $\frac{1}{7}$ (iii) $\frac{7}{6}$ (iv) $\frac{25}{42}$ (v) $\frac{6}{7}$

(b) [1] If A and B are independent, where $P(A) =$ and $P(B) = \frac{1}{6}$, then $P(A \cap B)$ is closest to:

- (i) $\frac{2}{18}$ (ii) $\frac{3}{9}$ (iii) $\frac{1}{6}$ (iv) $\frac{6}{7}$ (v) $\frac{2}{9}$

(c) [1] If A and B are independent, where $P(A|B) = \frac{3}{4}$ and $P(B|A) = \frac{1}{3}$, then $P(A \cap B)$ is closest to:

- (i) $\frac{3}{4}$ (ii) $\frac{1}{4}$ (iii) $\frac{3}{7}$ (iv) $\frac{1}{3}$ (v) $\frac{4}{7}$

⁵based on Grosnick, 3, Chapter 5 Exam, Math 124, March 1996.

⁶based on Brela, 35–37, Test 3, Statistics 213, Spring 1997.

9⁹. Determine whether the following augmented matrices (which are *not* necessarily row-reduced) are unique, inconsistent or dependent and, then, where possible, give their solution.

(a) [1] The matrix,

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 2 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 0 & 1 \end{array} \right]$$

is (circle one) **unique** / **inconsistent** / **dependent** with

(possible) solution(s) given by: _____.

(b) [1] The matrix,

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 2 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \end{array} \right]$$

is (circle one) **unique** / **inconsistent** / **dependent** with

(possible) solution(s) given by: _____.

10¹⁰. A manufacturer produces a product for sale at a retail price of \$5 per unit. For this product, the manufacturer's fixed cost is \$1600 and each unit costs \$3 to produce.

(a) [1] The (linear) total cost function is given by _____.

(b) [1] To break-even, the manufacturer must produce _____.

(c) [1] To make a profit of \$3000, the manufacturer must produce _____.

⁹related to Tan, p 108, 1997.

¹⁰based on Lauer, I, Final, Statistics 213, May 1997.

1. (a) 12 patients, cured or not, independence, 80% cured; (b) iii
2. (a) iii; (b) ii
3. (a) $1, 0, 0, 0; 0, \frac{2}{3}, \frac{1}{3}, 0; \frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \frac{1}{8}; 0, 0, 0, 1;$
 (b) $1, 0, 0, 0; 0, 1, 0, 0; 0, 0, \frac{2}{3}, \frac{1}{3}; \frac{1}{8}, \frac{1}{8}, \frac{1}{24}, \frac{1}{2};$
 (c) 0.5
4. (a) $10, 5, \boxed{2}; -5, 0, -5; -2, 5, -10;$ rows: $\boxed{2}, -5, -10;$ columns: $10, 5, \boxed{2};$
 (b) red; (c) True
5. (a) v; (b) ii; (c) iii
6. (a) v; (b) i; (c) ii
7. $17, 13, 15, 19, 14, 16, 11;$ $1, 2, 5, 6, 7 \geq 13;$ $1, 2, 3, 6, 7 \geq 15;$ $1, 2, 3, 4, 7 \geq 19;$ $1, 2, 3, 4, 5 \geq 14;$
 $2, 3, 4, 5, 6 \geq 16;$ $3, 4, 5, 6, 7 \geq 11$
8. (0,2) gives -30; (0.5,1.5) gives -19; (0.33,1) gives -12.7; (0,1) gives -15 so minimum point is (0,2) with -30
9. (a) inconsistent; (b) dependent with solution $(-3, 1, 3 - t, t)$
10. (a) $C(x) = 1600 + 3x;$ (b) $x = 800;$ (c) $x = 1400$