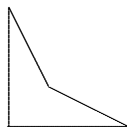


1. A company manufactures widgets and gadgets. To make a widget requires 3 oz of steel and 1 oz of plastic. A gadget requires 2oz of steal and 3 oz of plastic. Widgets earn the company a profit of \$1.50 while gadgets earn \$2.00. The company has 120 oz of steel and 75 oz of plastic available.

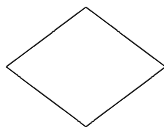
- (a) Introduce variables to set this up as a linear programming problem.
- (b) Write down a mixture chart for this problem.
- (c) Write down **all** the constraint inequalities.
- (d) Write down an expression for the profit.
- (e) Sketch the feasible region on the graph shown:
- (f) Find the production policy that maximizes profit.



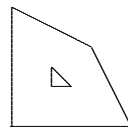
2. Which of the following regions could be feasible sets for a linear programming problem?



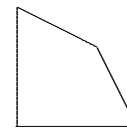
(A) Yes / No



(B) Yes / No



(C) Yes / No



(D) Yes / No

3. Opinion polls are usually conducted by asking questions of 1500 people.

- a) Such opinion polls normally state that their ‘margin of error’ is $\pm 3\%$. Explain what this means.
- b) If an opinion poll is conducted by asking 4000 people, do you think the margin or error will be more, less, or the same as $\pm 3\%$?

4. Find a simple random sample of 5 members out of a population of 60 using the following random digits: 36948 00783 93515 10801 00626 54898 85558 97708

5. Two students wish to study what proportion of the population drop litter.
- The first student sends out questionnaires to a simple random sample of 100 students from her university asking whether or not they drop litter. Give **three** reasons why this is not a good study.
 - The second student instead decides to stand in a shopping mall one Monday morning and count the number of people dropping litter. Give **three** reasons why this is not a good study.

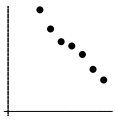
6. The yield of corn grown in several test plots are: 24, 26, 25, 13, 25, 22, 25, 25, 23, 19, 25, 25, 21, 22, 25.

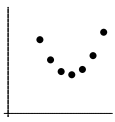
- Draw a histogram representing this information. (Label your axes carefully. Use classes of size 2.)

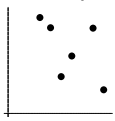


- Describe the distribution fully.
- Calculate the mean and median.
- Are the mean and median close to each other or not? Explain why.

7. For each of the three scatterplots below, circle the most likely correlation coefficient (r), least squares regression line ($y = ax + b$), and whether you think x and y are strongly related.

(A) 
 1) $r = -.9$ 2) $r = -.3$ 3) $r = .3$ 4) $r = .9$
 1) $y = x + 1$ 2) $y = x - 1$ 3) $y = -x + 5$ 4) $y = -x - 5$
 Strongly related Yes / No

(B) 
 1) $r = -.9$ 2) $r = -.3$ 3) $r = .3$ 4) $r = .9$
 1) $y = x + 1$ 2) $y = x - 1$ 3) $y = -x + 5$ 4) $y = -x - 5$
 Strongly related Yes / No

(C) 
 1) $r = -.9$ 2) $r = -.3$ 3) $r = .3$ 4) $r = .9$
 1) $y = x + 1$ 2) $y = x - 1$ 3) $y = -x + 5$ 4) $y = -x - 5$
 Strongly related Yes / No