1. Ponts & Lines: Given the points $(3,10)$ and $(-5,2)$.
   a. midpoint of segment *AB*
   b. equation of line *AB*
   c. *y*-intercept of line
   d. *x*-intercept of line
   e. equation of the line parallel to *AB* through $(5,1)$
   f. equation of the line perpendicular to *AB* through $(5,1)$
   g. angle of inclination of *AB*

2. Algebra: Given the function $f(x) = 2x^2 - x - 3$.
   a. what is the shape of the graph of $y = f(x)$
   b. what are the zeros of f
   c. what are the *x*-intercept of the graph of $y = f(x)$
   d. what is the *y*-intercept of the graph of $y = f(x)$
   e. what are the coordinates of the vertex
   f. what is the equation of the axis of symmetry for the graph of $y = f(x)$
   g. what are the coordinates of the points of intersection of the graphs of $y = f(x)$ and $y = -x - 2$ (with and without a calculator)
   h. write a formula for the polynomial $P(x)$ given that it has zeros of $2, 3, -1,$ and -4 with multiplicities of $1, 2, 3,$ and 1 respectively and $P(0) = 144$
   i. solve the equation $\frac{x}{x-2} + \frac{1}{x} = 2$ (with and without a calculator)

3. Matrices: Given the matrices:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 4 \end{bmatrix},\ B = \begin{bmatrix} -2 & 1 & 1 & 4 \\ 0 & 1 & 2 & 3 \\ -3 & 1 & 0 & 0 \end{bmatrix},\ C = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 4 \end{bmatrix},\ D = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$$

   a. For each of the following give the answer or write that it cannot be determined.
   $A \cdot B,\ A \cdot C,\ B \cdot A,\ A \cdot C^{\mathrm{T}},\ A + B,\ A + C,\ Det(D),\ D^{-1}$
   b. Textbook p561: 4,5,6,7

4. Statistics
   a. given the population : $85, 74, 92, 87, 84, 78, 90, 84$ find the mean, median, mode and standard deviation
   b. given the frequency table for # of siblings of 75 students find the mean, median, mode and standard deviation

# of Siblings	0	1	2	3	4	5
# of Students	6	30	24	12	1	2

   c. Thirty out of 500 lightbulbs tested were defective. What is the 95% confidence interval for the proportion of defective bulbs of the entire population of bulbs. What is the 99% confidence interval?

d. The length of babies born at a particular hospital is normally distributed with a mean of 18 inches and a standard deviation of 3 inches. In each part of this problem answer the question for a randomly selected baby's length, x.

$P(x<16)=$, $P(x>24)=$, $P(17<x<25)=$, $P(x>x_1)=0.7$, $x_1=$

$P(15<x<x_4)=0.8$, $x_4=$, $P(x_5<x<21)=0.6$, $x_5=$

5. Trigonometry
   a. find the values of all the trig functions if you know $\sin x = 2/3$ and $\cos x < 0$.
   b. convert $120°$ and $200°$ to radians
   c. convert $-\pi/6$ radians and 2.4 radians to degrees
   d. a central angle of $120°$ in a circle of radius 5" intercepts an arc of what length
   e. solve: $2\cos x + 1 = 2 + 2x - x^2$ for $0 \le x < 2\pi$
   i. exact values of: $\sin(2\pi/3), \tan(-\pi/3), \sec(7\pi/4)$
   j. Write a formula for the sinusoidal that has a maximum at $(2, 10)$ and the nearest minimum to the right at $(7, 4)$. For parts(k&l) refer to this function as g.
   k. For the sinusoidal in part(j), write an interval for which the function value is less than 5.
   l. For the sinusoidal in part(j), what is the value of $g(-4)$?

6. Calculus
   a. Sketch the graph of a function f for which $\lim_{x\to 2^-} f(x)=1$ and $\lim_{x\to 2^+} f(x)=2$.
   b. $\lim_{x\to 0}(x^2+x-2)=$
   c. $\lim_{x\to 1}\dfrac{x^2+x-2}{x-1}=$
   d. Let f be the function given by $f(x)=x^3-3x^2+1$. Determine each of the following.
      (i) AROC from $x=0$ to $x=3$
      (ii) IROC at $x=1$
      (iii) $f'(3)$
      (iv) an equation for the line tangent to the graph of $y=f(x)$ at $x=1$.