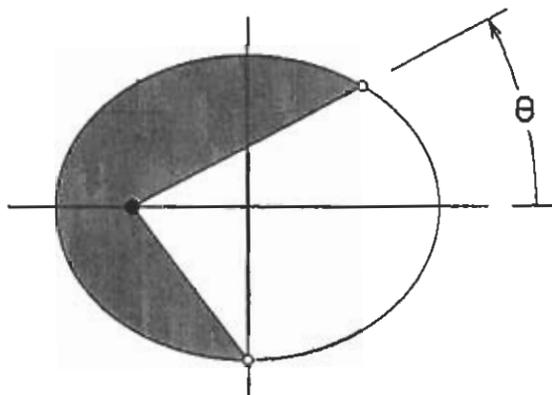


Here as with all our subsequent problem sets, your write-up should be clear, complete and concise. There will be no need to turn in pages and pages of numbers — on the contrary, you should usually prune and edit your work to about one page per problem — but you must always explain clearly your approach and reasoning, and offer convincing evidence that you solved these problems largely by yourself.

- 1 If a comet is situated right now on the minor axis of its elliptic orbit of eccentricity $e = 0.6$, where will it be a half-period later?



- 2 To an accuracy of one part in a million, find the largest positive value of the constant C that will permit all four roots of

$$P_4(x) = (x-1)(x-2)(x-3)(x-4) - Cx^3$$

to remain real ... and of course not too distant from $x = 1, 2, 3, 4$.

- 3 To a similar accuracy of at least six decimals, also locate the smallest positive root of the equation

$$1 - x + x^2/(2!)^2 - x^3/(3!)^2 + x^4/(4!)^2 - \dots = 0$$