
Assignment 06

Solve the equation

$$x^4 - 16x^3 + 61x^2 - 22x - 12 = 0,$$

exactly and numerically

Find the sum of the squares of the roots of

$$x^6 - 21x^5 + 175x^4 - 735x^3 + 1624x^2 - 1764x + 720 = 0$$

A theorem from algebra says that if

$$p(x) = a_0 + a_1x + a_2x^2 + \dots + a_{n-1}x^{n-1} + a_nx^n,$$

the sum of the roots of the equation $p(x)=0$ is $-\frac{a_{n-1}}{a_n}$ and their product is $(-1)^n \frac{a_0}{a_n}$

Verify this for the equation

$$20x^7 + 32x^6 - 221x^5 - 118x^4 + 725x^3 - 18x^2 - 726x + 252 = 0$$

Sketch the graphs of $f(x) = x^3 - 7x^2 + 2x + 20$ and $g(x) = x^2$ on the same set of axes and find their points of intersection exactly and approximately

(i) Find an equation of the line passing through (2,5) and (7,9)

line: $y = ax + b$

(ii) Find an equation of the circle passing through (1,4), (2,7) and (4,11)

circle: $x^2 + y^2 + ax + by + c = 0$

Solve the equation $5 \cos(x) = 4 - x^3$. Make sure you find all solutions.

Find the area of the bounded region trapped between the graphs of the function $\exp(x)$ and the function $4 - x^2$.

Follow these steps:

(i) Plot together the two functions to picture where this area appears and which

of the functions is larger.

(ii) Find the points where the two functions meet.

(iii) Compute the area.