King Fahd University of Petroleum and Minerals

Prep-Year Math Program

Math 001 - Term 141

Recitation (3.4)

Question 1: Determine the end behavior of the graph of the polynomial: $P(x) = -2(x-1)^2(9-x^2)$. Use that to sketch the graph.

Solution:

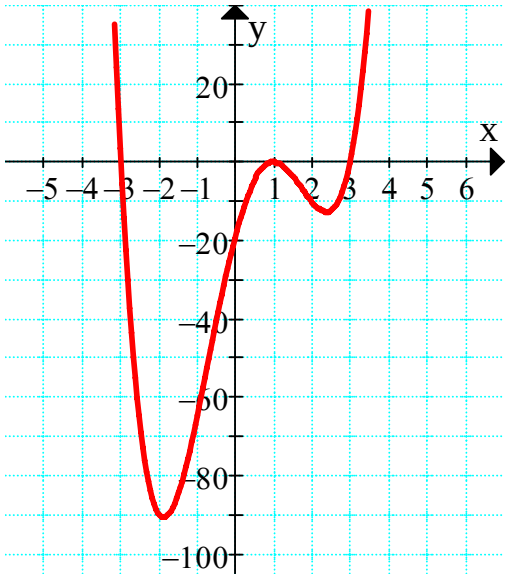
$n = 2+2 = 4$

$a_4 = -2(1)^2(-1) = 2$

The graph of p goes up to far left and up to far right

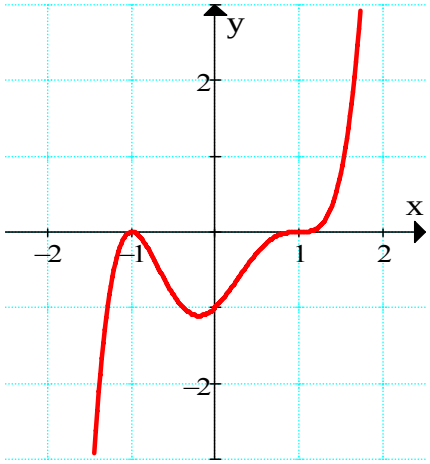
$P(x) = -2(x-1)^2(9-x^2) = -2(x-1)^2(3-x)(3+x)$

Zeros: -3 , 1 , 3



Question 2: Sketch the graph of the polynomial $P(x) = (x^2-2x+1)(x^2-1)(x+1)$

Answer: $P(x) = (x-1)^2(x-1)(x+1)(x+1) = (x-1)^3(x+1)^2$



Question 3: Show that $P(x)=x^3-2x^2-x+1$ has a real zero between 2 and 3

Solution:

$P(2)=2^3-2(2)^2-2+1=8-8-2+1=-1<0$

$P(3)=3^3-2(3)^2-3+1=27-18-3+1=28-21=7>0$

By intermediate value theorem there is a zero between 2 and 3.

Question 4:

The function $P(x)=2x^3+3x^2-23x-41$ has a real zero in the interval

a) $[0,1]$

b) $[1,2]$

c) $[2,3]$

d) $[3,4]$

e) $[4,5]$

Question 5: The function $P(x)=x^2(x-3)^3(x+1)$ has

a) Two turning points below x – axis and one turning point above x-axis

b) Two turning points above x – axis and one turning point below x-axis

c) Three turning points above x – axis.

d) Two turning points above x – axis and one turning point on the x-axis

e) Two turning points below x – axis and one turning point on the x-axis