Spiral Review

Given the x-intercepts, find the equation of a quadratic that opens up.

a.) (3,0) and (-4,0)

$(x-3)(x+4)=f(x)$

$\boxed{x^2+x-12=f(x)}$

b.) $\left(\frac{1}{3},0\right)$ and $\left(\frac{5}{2},0\right)$

$(3x-1)(2x-5)=f(x)$

$\boxed{6x^2-17x+5=f(x)}$

HWQ 2.5

a.) Find all the zeros.
b.) Write the polynomial as a product of linear factors.
c.) Use your factorization to determine the x-intercepts.

$$f(x)=3x^3-4x^2+8x+8$$

p.100 2.2 Polynomials of Higher Degree

How can you tell whether a function is continuous?

Leading Coefficient Test:

1.) If n is odd:

↓ ↑ a.) a>0 then the graph falls to the left and rises to the right.

↑ ↓ b.) a<0 then the graph rises to the left and falls to the right

2.) If n is even:

↑ ↑ a.) a>0 then the graph rises to the left and rises to the right.

↓ ↓ b.) a<0 then the graph falls to the left and falls to the right

Students will be able to find a polynomial function that has the given zeros.

Example 1: Find a polynomial function that has the given zeros. **Do not multiply out**

a.) -2, 5

$(x+2)(x-5)=f(x)$

b.) 0, 1 , 6

$x(x-1)(x-6)=f(x)$

c.) $4+\sqrt{3}$, $4-\sqrt{3}$

$(x-4+\sqrt{3})(x-4-\sqrt{3})=f(x)$

Students will be able to find a polynomial function with the given zeros, multiplicities, and degree.

Example 2: Find a polynomial function with the given zeros, multiplicities, and degree.

a.) Zero: 3, Multiplicity:1
Zero: 2, Multiplicity: 3
Degree: 4

$(x-3)(x-2)(x-2)(x-2)=f(x)$

b.) Zero: 1, Multiplicity:2
Zero: 4, Multiplicity: 2
Degree: 4
Falls to the left
Falls to the right

$(a<0)$

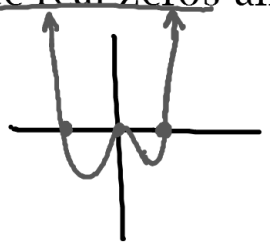
$-(x-1)(x-1)(x-4)(x-4)=f(x)$

Students will be able to sketch the graph of the polynomial function that satisfies the given condition.

Example 3: Sketch the graph of the polynomial function that satisfies the given condition.

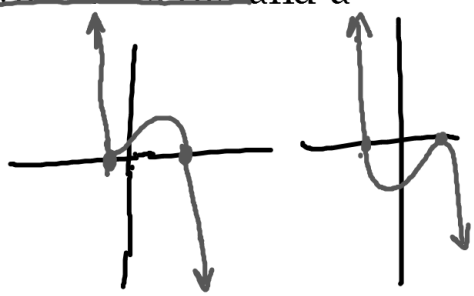
(even) crossing x-axis

a.) Fourth degree polynomial with three real zeros and a positive leading coefficient. ↑ ↑



(odd) crossing x-axis

b.) Third degree polynomial with two real zeros and a negative leading coefficient. ↑ ↓



Students will be able to use the given zero to find all the zeros of the function.

Example 4: Use the given zero to find all the zeros of the function.

a.) $f(x) = x^3 + x^2 + 9x + 9$

zero: $3i$ automatic: $-3i$

$$\begin{array}{r|rrrr} \boxed{3i} & 1 & 1 & 9 & 9 \\ & \downarrow & 3i & 3i+9i & -9i \\ \hline & 1 & 1+3i & 3i & 0 \checkmark \end{array}$$

$$\begin{array}{r|rrr} \boxed{-3i} & 1 & 1+3i & 3i \\ & \downarrow & -3i & -3i \\ \hline & 1 & 1 & 0 \checkmark \end{array}$$

$x+1=0$

$\boxed{x=-1}$

b.) $g(x) = 4x^3 + 23x^2 + 34x - 10$

zero: $-3+i$ automatic: $-3-i$

$$\begin{array}{r|rrrr} \boxed{-3+i} & 4 & 23 & 34 & -10 \\ & \downarrow & -12+4i & -37-i & 10 \\ \hline & 4 & 11+4i & -3-i & 0 \checkmark \end{array}$$

$$\begin{array}{r|rr} \boxed{-3-i} & 4 & 11+4i & -3-i \\ & \downarrow & -12-4i & 3+i \\ \hline & 4 & -1 & 0 \checkmark \end{array}$$

$4x-1=0$

$\boxed{x=\frac{1}{4}}$

Turn-in: p.110 (70, 78)

HW: p.110 (65-83 odd), p. 140 (38,40,59,61,65,67)

** do not multiply out