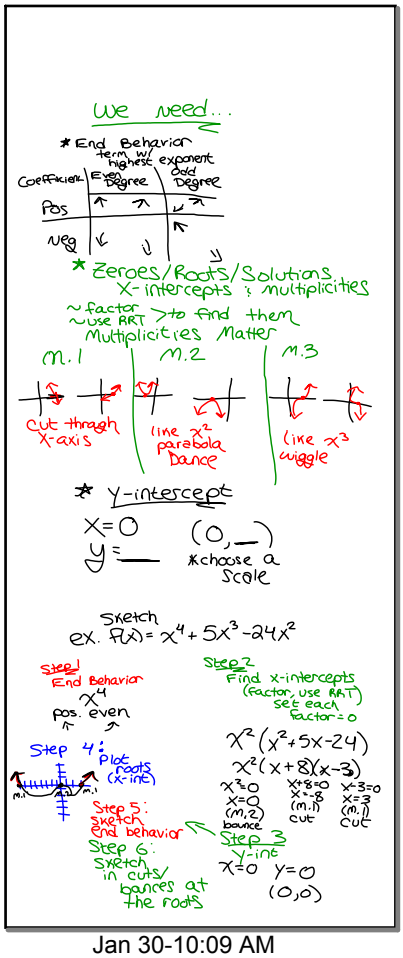



Jan 30-10:09 AM

Name: _____ Date: _____ **Unit 6 Class Work**

## Graphing Polynomials Class Work

**Objective:** *You will be able to sketch graphs of polynomials.*

**Turn & Talk:** What are some aspects of a polynomial that can help you determine certain points on its graph?

* To sketch graphs of polynomial functions, we will need to identify the following aspects:

- _____

- _____ (if reasonable)

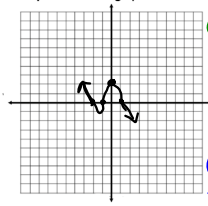
- If the function is positive (above the x-axis) or negative (below the x-axis) between each pair of roots (according to multiplicities) You can test points to check too!

- End behavior: Determined by the leading coefficient and degree of the polynomial

If the leading coefficient is **positive:**
- **even** degree: both ends of the graph point up
- **odd** degree: left side points down and right side points up

If the leading coefficient is **negative:**
- **even** degree: both ends of the graph point down
- **odd** degree: left side points up and right side points down

***Example:** Sketch a graph of the function $y = -x^3 - 2x^2 + x + 2$



① End Beh. $-x^3$ neg. odd

④ Sketch ends then insides

② x-int. $-x^2(x+2)+1(x+2)$ common leftover $(x+2)(-x^2+1)=0$

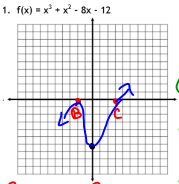
$x=-2$ $-x^2=-1$ $x^2=1$ $x=\pm 1$

$x=-1, 1, -2$ all M.1 all cuts

③ y-int $x=0$ $y=2$ (0,2)

**Practice:** Sketch a graph of each function.

1. $f(x) = x^3 + x^2 - 8x - 12$



① End $x^3$ pos odd ↗

③ y-int $x=0$ $y=-12$ $(0,-12)$ y-scale: 1 unit = 2

② Intercepts possible: $\pm1, \pm2, \pm3, \pm4, \pm6, \pm12$

④ sketch ends then rest

$x=-2$ (m.2) $x=3$

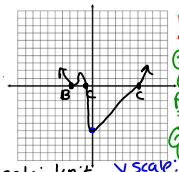
$x^2 - x - 6 = 0$

$(x-3)(x+2)$

$x=3$ $x=-2$

$x=-2$ | 1 | 1 | -8 | -12
| | | -2 | 2 | 12
| | 1 | -1 | -6 | 0

2. $y = 3x^4 + x^3 - 9x^2 - 9x - 2 = 0$



① $3x^4$ pos even ↑ ↑

② x-int. (factors) possible $\pm1, \pm2, \pm\frac{1}{3}, \pm\frac{2}{3}$

③ y-int $x=0$ $y=-2$ $(0,-2)$

④ sketch ends

x scale: 1 unit = $\frac{1}{3}$ y scale: 1 = $\frac{1}{3}$

$x=-1$ | 3 | 1 | -9 | -9 | -2
| | ↓ | -3 | 2 | 7 | 2
| 3 | -2 | -7 | -2 | 0 ✓

Not factorable use ART

$3x^3 - 2x^2 - 7x - 2 = 0$

$x=-1$ | 3 | -2 | -7 | -2
| | -3 | 5 | 2
| 3 | -5 | -2 | 0 ✓

$3x^2 - 5x - 2 = 0$

$x = \frac{5 \pm \sqrt{25+24}}{6}$

$x = \frac{5 \pm 7}{6} = \frac{12}{6}$ and $\frac{-2}{6}$

$\{2, -\frac{1}{3}\}$

$x=-1, 2, -\frac{1}{3}$ (m.2) plot on graph

Name: _____ Date: _____ **Unit 6 Class Work**

**Recap:**

List the important aspects of sketching graphs of polynomial functions.