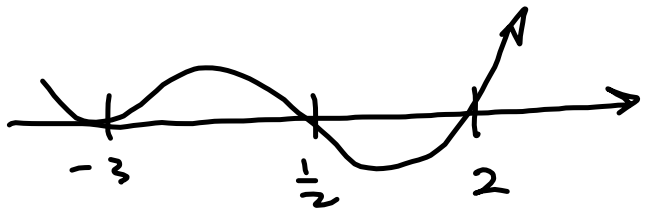
2x^4+7x^3-10x^2-33x+18

Graph suggests $x = -3$ $(m = 2)$



$f(x) = (x-2)(2x^3+11x^2+12x-9)$ ↳ Depressed Polynomial

2] 2 7 -10 -33 18

4 22 24 -18

-3] 2 11 12 -9 0 Sweet!

-6 -15 9

-3] 2 5 -3 0 Sweet!

-6 3

2 -1 0 Sweet!

$(x-2)(x+3)(2x^2+5x-3)$

$(x-2)(x+3)^2(2x-1)$

$f(x) = 2x^4 + 7x^3 - 10x^2 - 33x + 18$

1 2

2 or 0 positive zeros (roots)

$f(-x) = 2x^4 - 7x^3 - 10x^2 + 33x + 18$

1 2

Descartes

2 or 0 negative roots.

Rational zeros.

$(2x-1)(x+5) = 2x^2 + 9x - 5$

roots: $x = \frac{1}{2}$, $x = -5$

$2x^4 + \dots + 18$

$\frac{p}{q}$: $\frac{18}{2}$

2 | 18
3 | 9
3

Rational Zeros Theorem

$\frac{p}{q} = \pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$

$\pm \frac{1}{2}, \cancel{\pm 2}, \pm \frac{3}{2}, \cancel{\pm 6}, \pm \frac{9}{2}, \cancel{\pm 18}$

$4x^2-4x+2$ is irreducible over $\mathbb{R}$.

$f(x) = 4x^5+12x^4-26x^3-52x^2+66x-36$

Guess! $x=2$ & $x=-3$

2	4	12	-26	-52	66	-36
		8	40	28	-48	36
-3	4	20	14	-24	18	0 sweet!
		-12	-24	30	-18	
-3	4	8	-10	6	0	sweet!
		-12	12	-6		
	4	-4	2	0		sweet!

$a=4,\ b=-4,\ c=2$

$b^2-4ac = (-4)^2-4(4)(2)$

$= 16-32 = -16 < 0$

No real zeros

$4x^2-4x+2$ is

Irreducible over $\mathbb{R}$.

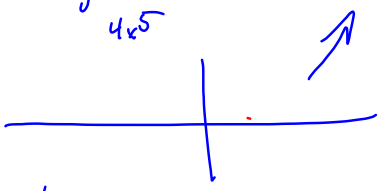
FACTORED over $\mathbb{R}$:

$(x-2)(x+3)^2(4x^2-4x+2)$

$x=-3, 2, x=3\ (m=2), x=2$

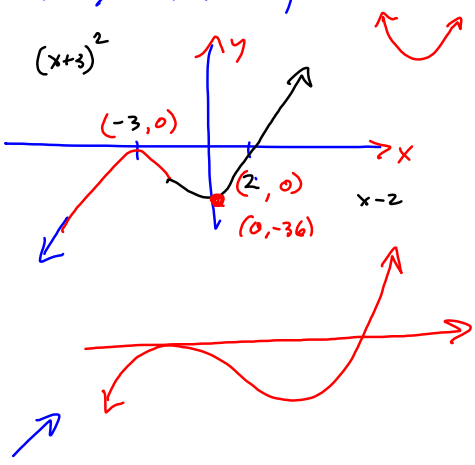
Rough sketch:

$4x^5$



$x=2,\ x=-3\ (m=2)$

$(x+3)^2$



Follow up (#7 on take-home)

$4x^2+4x-2$

$b^2-4ac = -16$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-4 \pm \sqrt{-16}}{2(4)} = \frac{-4 \pm 4i}{8}$

$= \frac{4(-1 \pm i)}{8} = \frac{-1 \pm i}{2}$

So $f(x) = 4(x-2)(x+3)^2\left(x-\left(\frac{-1+i}{2}\right)\right)\left(x-\left(\frac{-1-i}{2}\right)\right)$

$(x+3)(x+3)$

↗ Linear x^1

I think C3 video is pretty watchable.

Best students slump it all up.

Test 3 take-home due Friday.

↳ = Writing Project #3.

30% of Test 3.

ROLL