#6D Pre-Calculus WS Zeros of Polynomials Day 2 Name Key

Determine the EXACT VALUES of the zeros of each polynomial. Use your calculator to get started

1. $f(x)=2x^5+9x^4+6x^3-20x^2-24x$

0	2	9	6	-20	-24	0
		0	0	0	0	
	2	9	6	-20	-24	0
-2		-4	-10	8	24	
	2	5	-4	-12	0	
-2		-4	-2	12		
	2	1	-6	0		
-2		-4	6			
	2	-3	0			

$2x-3=0$

$x=\frac{3}{2}$

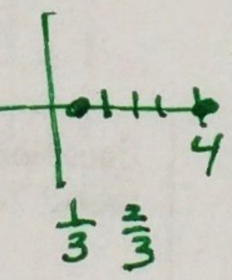
Triple

$\left(0,-2,\frac{3}{2}\right)$

2. $f(x)=x^5+3x^4+21x^3+75x^2-100x$

3. $f(x)=3x^4-26x^3+79x^2-102x+40$

1/3	3	-26	79	-102	40
		1	-25	18	-40
	3	-25	NOT This one		



2/3	3	-26	79	-102	40
		2	-16	42	-40
4	3	-24	63	-60	
		12	-48	60	
	3	-12	15		
	A	B	C		

$x=\frac{12\pm\sqrt{(-12)^2-4(3)(15)}}{2(3)}=\frac{12\pm\sqrt{36}}{6}$

$x=\frac{12\pm6i}{6}=2\pm i$

$\left\{\frac{2}{3},4,2\pm i\right\}$

4. $f(x)=x^5-10x^4+26x^3+8x^2-107x-78$

Determine the remaining zeros given one of the zeros. Explain how you arrived at your answer.

(5) $f(x)=x^4-2x^3+2x^2-8x-8$ Root: $2i$

2i	1	-2	2	-8	-8
		2i	$(-4i-4)$	$(8-4i)$	8
-2i	1	$(-2+2i)$	$(-2-4i)$	$-4i$	0
		-2i	4i	4i	
	1	-2	-2		
	A	B	C		

$x=\frac{2\pm\sqrt{(-2)^2-4(1)(-2)}}{2(1)}$

$x=\frac{2\pm\sqrt{12}}{2}=\frac{2\pm2\sqrt{3}}{2}$

$x=1\pm\sqrt{3}$

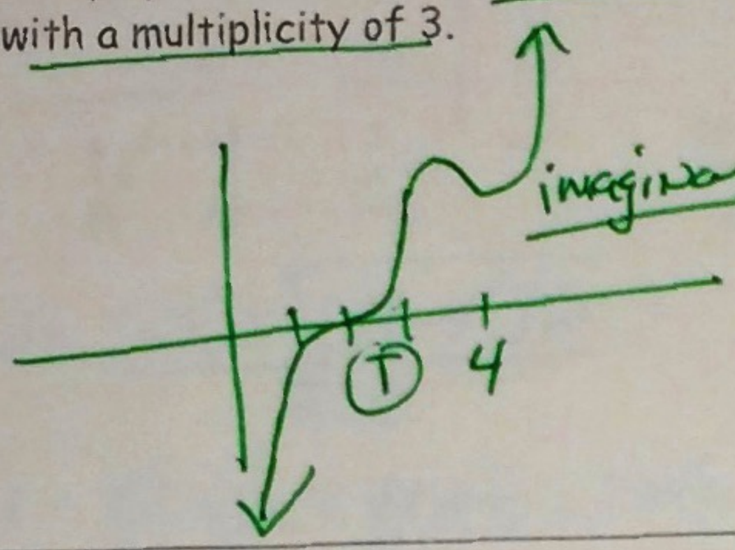
$2i(-2+2i)-4$
$-4i+4i^2$
$-4-4i$

$2i(-2+-4i)$
$-4i-8i^2+8$

Solution $\{2i,-2i,1\pm\sqrt{3}\}$

Sketch a possible graph with the following characteristics.

7. A 5^{th} degree polynomial with a positive leading coefficient. The polynomial has two imaginary zeros. The polynomial has one positive real zero less than 4 with a multiplicity of 3.

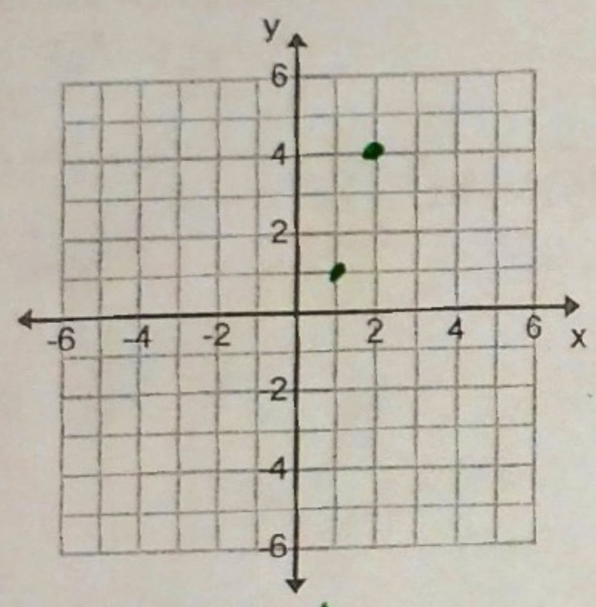


8. A 6^{th} degree polynomial with a negative leading coefficient. The polynomial has two irrational zeros, one negative and one positive. Another root is -5 with a multiplicity of 2 and another root has a multiplicity of 3 with positive root greater than the irrational roots.

NO CALCULATOR

9. Graph and find each of the indicated values.

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



Zeros
$0 = -3(x-2)^2 + 4$
$-4 = -3(x-2)^2$
$\sqrt{\frac{4}{3}} = \sqrt{(x-2)^2}$
$2 \pm \frac{2}{\sqrt{3}} = x$

Vertex: (2, 4)
Axis of Symm.: $x = 2$
Zeroes: $2 \pm \frac{2}{\sqrt{3}}$ y-int: -8

$y = -3(0-2)^2 + 4$
$y = -3(4) + 4$
$y = -12 + 4$
$y = -8$

10. Graph and find each of the indicated values.

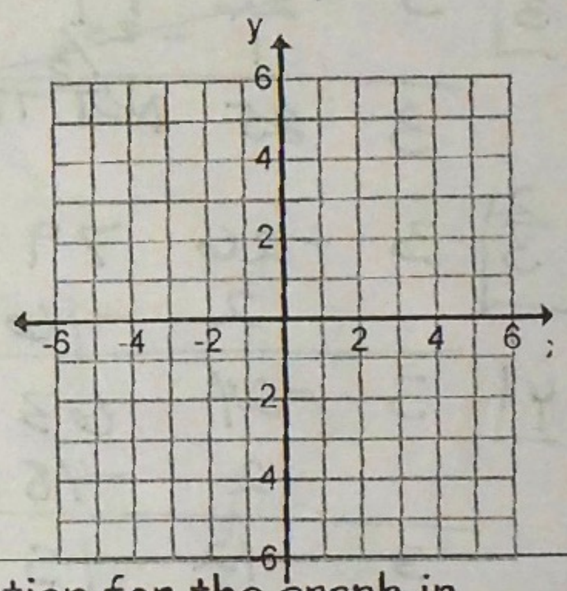
$y = x^2 + 12x + 30$

Equation in Vertex Form:

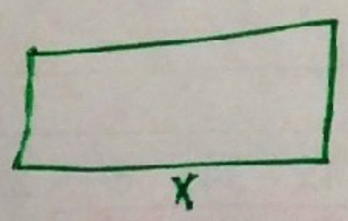
Vertex:

Zeroes: _____

Y-int: _____



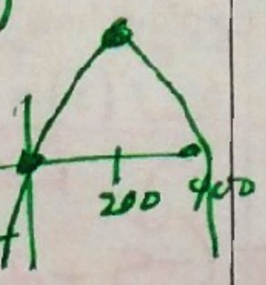
11. You have a 800-foot roll of fencing and a large field. You want to construct a rectangular playground area. What are the dimensions of the largest such yard? What is the largest area?



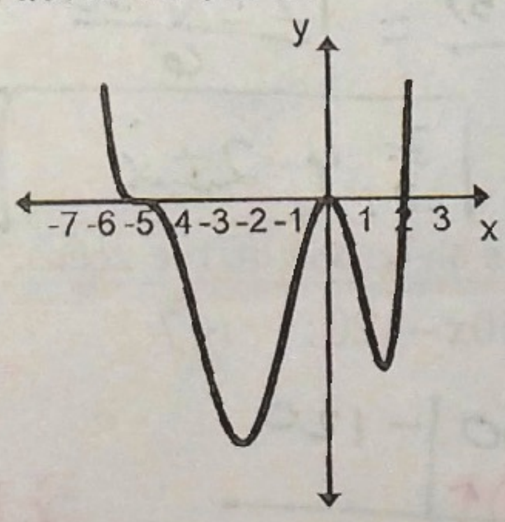
$A = x \cdot y$
$A = x(400 - x)$

$800 = 2x + 2y$
$y = 400 - x$

Dim: 200' x 200'
$A = 40{,}000 ft^2$



12. Write a possible equation for the graph in factored form.



Determine all the REAL ZEROES by factoring.

13. $f(x) = x^4 - 17x^2 + 16$

$f(x) = (x^2 - 16)(x^2 - 1)$
$f(x) = (x+4)(x-4)(x+1)(x-1)$

Zeros: $\pm 4, \pm 1$

14. $f(x) = -3x^4 + 33x^3 - 84x^2$