Precalculus '14-15
PreCalc Basics
Round to 3 decimal places.
Show all work.

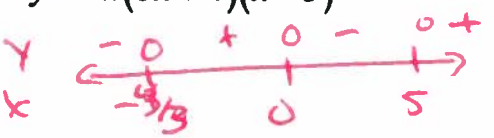
Name: SOLUTION KEY

score_____

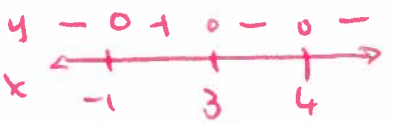
1. Find the equation of the line thru $(-3, 6)$ and $(-7, -1)$.

$m = \frac{6-(-1)}{-3+7} = \frac{7}{4}$ $\quad y+1 = \frac{7}{4}(x+7)$

2. Show the sign patterns for
$y = 6x(3x+4)(x-5)$



$y = (3-x)(x+1)(x-4)^2$



3. Find the zeros of $y = 6x^4 - 5x^3 - 150x^2 + 125x$ by factoring.

$= x(6x^3 - 5x^2 - 150x + 125)$

$= x[x^2(6x-5) - 25(6x-5)]$

$= x(6x-5)(x^2-25)$

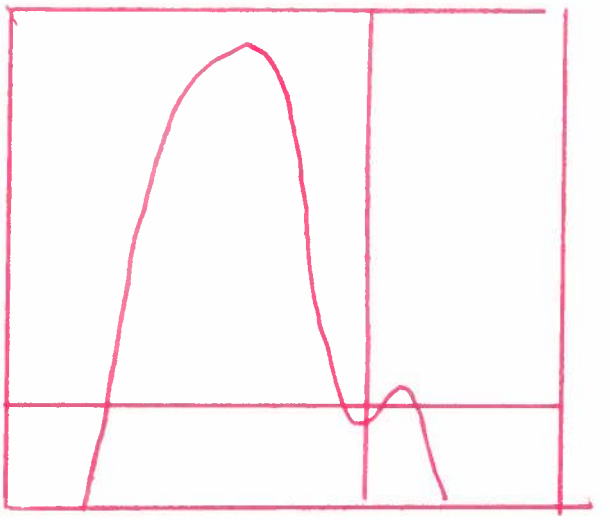
$= x(6x-5)(x-5)(x+5)$

$(0,0)\ (\pm 5, 0)\ (5/6, 0)$

4. Use your graphing calculator to find **and sketch** a complete graph of $f(x)=-15x^4-122x^3+655x^2-486x+72$, draw it, and state the window used.

$x \in [-20, 10]$

$y \in [-1000, 50000]$



5. Use your graphing calculator to find the zeros and the extremes of $f(x)=-15x^4-122x^3+655x^2-486x+72$.

ZEROS

(-12, 0)

(.2, 0)

(2/3, 0)

(3, 0)

EXTREMES

(-8.713, 48280.351)

(.425, -26.095)

(2.188, 522.648)

6. Find an inequality that has this sign pattern and solution:

y	$-$	0	$+$	0	$-$	0	$+$
x		-2		$2/3$		4	

and $x \in (-\infty, -2] \cup [2/3, 4]$

$(x+2)(3x-2)(x-4) \le 0$

7. Use synthetic division to find $f\left(-3/4\right)$ if $f(x) = 8x^4 - 6x^2 + 3$.

$-3/4$	8	0	-6	0	3
		-6	4.5	1.125	$-.84375$
	4	-6	-1.5	1.125	2.15625

8. Simplify the following expression:

(a) $\dfrac{8x^3-27}{4x^2-9} \div \dfrac{8x^2+12x+18}{2x+3}$ $= \dfrac{(2x-3)(4x^2+6x+9)}{(2x-3)(2x+3)} \cdot \dfrac{2x+3}{2(4x^2+6x+9)}$

$= \dfrac{1}{2}$

(b) $y = \dfrac{3x^3-8x^2-20x+16}{3x^2+7x-6}$ $= \dfrac{(x+4)(3x-2)(x-4)}{(3x-2)(x+3)}$

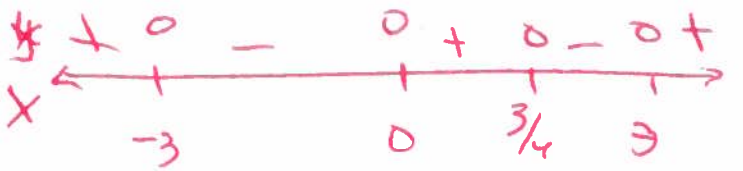
-2	3	-8	-20	16
		-6	28	-16
	3	-14	8	0

$2/3$	3	-14	8
		2	-8
	3	-12	0

9. Show the sign pattern and solve $4x^4 - 3x^3 - 36x^2 + 27x > 0$

$x(x^2(4x-3) - 9(4x-3))$

$x(x^2-9)(4x-3)$

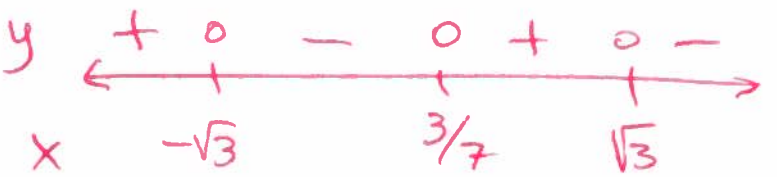


$x \in (-\infty, -3) \cup (0, 3/4) \cup (3, \infty)$

10. Show the sign pattern and solve $-7x^3 + 3x^2 + 21x - 9 \geq 0$

$-x^2(7x-3) + 3(7x-3)$

$(3-x^2)(7x-3)$



$x \in (-\infty, -\sqrt{3}] \cup [3/7, \sqrt{3}]$