Name: Key

Polynomial & Rational Functions Quiz Review

Simplify each of the following.

1. $\frac{x+6}{9x} \div \frac{x^2+10x+24}{2x+8}$

$\frac{(x+6)}{9x} \cdot \frac{2(x+4)}{(x+6)(x+4)}$

$\frac{2}{9x}$; $x \neq -4, -6$

2. $\frac{10p^2}{7p} \cdot \frac{30p^2-12p}{50p^3-20p^2}$

$\frac{10p^2}{7p} \cdot \frac{6p(5p-2)}{10p^2(5p-2)}$

$\frac{6}{7}$; $p \neq 0, \frac{2}{5}$

3. $\frac{x^2+9x+8}{8x^2+8x} \div \frac{x^2+2x-48}{4x^2-24x}$

$\frac{(x+1)(x+8)}{8x(x+1)} \cdot \frac{4x(x-6)}{(x+8)(x-6)}$

$\frac{1}{2}$; $x \neq 0, -1, -8, 6$

4. $\frac{3}{6x^2+12x} - \frac{4}{2x}$

$\frac{3}{6x(x+2)} - \frac{4 \cdot 3(x+2)}{2x \cdot 3(x+2)}$

$\frac{3-12(x+2)}{6x(x+2)} = \frac{3-12x-24}{6x(x+2)}$

$= \frac{-12x-21}{6x(x+2)}$

Solve each of the following. Find all real and complex zeros.

5. $\frac{2}{k+6} + \frac{1}{k^2+7k+6} = \frac{3k-15}{k^2+7k+6}$

$\frac{2}{(k+6)} + \frac{1}{(k+6)(k+1)} = \frac{3(k-5)}{(k+1)(k+6)}$

$2(k+1) + 1 = 3(k-5)$

$2k+2+1 = 3k-15$

$18 = k$

6. $4x^3 - 8x^2 + x - 2 = 0$

$4x^2(x-2) + 1(x-2) = 0$

$(x-2)(4x^2+1) = 0$

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

7. $x^3 - 1 = 0$ $\{-1, \frac{1+i\sqrt{3}}{2}, \frac{1-i\sqrt{3}}{2}\}$

$(x+1)(x^2-x+1) = 0$

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

$x = \frac{1 \pm \sqrt{-3}}{2} = \frac{1 \pm i\sqrt{3}}{2}$

8. $2x^4 - 5x^2 - 3 = 0$

$(2x^2+1)(x^2-3) = 0$

$2x^2+1=0$ $x^2-3=0$

$\sqrt{x^2} = \sqrt{-\frac{1}{2}}$ $x^2 = 3$

$x = \pm\sqrt{3}$

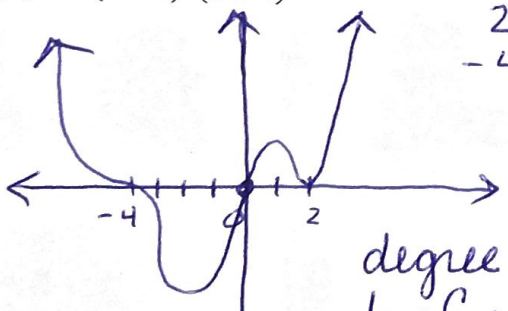
$x = \pm i\frac{1}{\sqrt{2}} = \pm \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\pm i\sqrt{2}}{2}$

$\{\pm\sqrt{3}, \pm\frac{i\sqrt{2}}{2}\}$

Sketch a graph for the following polynomials.

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

zeros: 0 mult. 1
2 mult 2
-4 mult 3

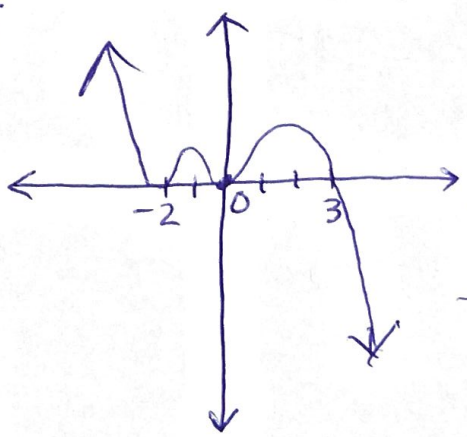


degree = 6
L.C. = 1

R.E.B $\lim_{x \to \infty} f(x) = \infty$

L.E.B $\lim_{x \to -\infty} f(x) = \infty$

10. $f(x) = -x^2(x-3)(x+2)^2$



zeros:
0 mult. 2
3 mult. 1
-2 mult. 2

degree = 5

L.C. = -1