

Math Analysis
Chapter 4 Review

Name: _____

Period: _____

Show all work and steps.

1. Using the Remainder Theorem, find the remainder when $x^3 - 6x + 9$ is divided by $(x - 3)$. The binomial a factor of the polynomial?

1. NO

$$\begin{array}{r|rrrr} 3 & 1 & 0 & -6 & 9 \\ & & 3 & 9 & 9 \\ \hline & 1 & 3 & 3 & 18 \end{array}$$

2. Write a polynomial of least degree if the zeros are 3, $2i$, and $-2i$. How many times does the polynomial's graph cross the x -axis?

2. Crosses once

$$x^3 - 3x^2 + 4x - 12$$

$$\begin{aligned} & (x-3)(x-2i)(x+2i) \\ & (x-3)(x^2+4) \\ & x^3 + 4x \\ & - 3x^2 - 12 \end{aligned}$$

3. Find the discriminant.
Describe the roots.
Find the roots.

$$9 + 4(8)(-2)$$

3. 73
2 real roots

$$-2y^2 + 3y + 8 = 0$$

$$x = \frac{-3 \pm \sqrt{73}}{-4}$$

4. Find the all possible rational roots. $\frac{p}{q} = \pm 1, \pm 2, \pm 4, \pm 3, \pm 6, \pm 12$

4. $x = -3, 2, 2$

Make PNI chart.

Find the roots.

$$x^3 - x^2 - 8x + 12 = 0$$

2 or 3 +

$$-x^3 - x^2 + 8x + 12$$

1 -

P	N	I
2	1	8
0	1	2

$$\begin{array}{r|rrrrr} -3 & 1 & -1 & -8 & 12 & \\ & & -3 & 12 & -12 & \\ \hline & 1 & -4 & 4 & 0 & \end{array}$$

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

$$(x-2)(x-2)$$

5. Solve by completing the square.

$$x^2 - 12x + 7 = 0$$

5. _____

$$x^2 - 12x + 36 = -7 + 36$$

$$x = 6 \pm \sqrt{29}$$

$$(x-6)^2 = 29$$

$$x-6 = \pm \sqrt{29}$$

6. Find the **FACTORS** of the polynomial. Show work.

List the roots of the polynomial.

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

6. $x = -1, -4, 2$

$$\begin{array}{r|rrrrr} -1 & 1 & 3 & -6 & -8 & \\ & & -1 & -2 & 8 & \\ \hline & 1 & 2 & -8 & 0 & \end{array}$$

$$(x+1)(x+4)(x-2)$$

$$x^2 + 2x - 8$$

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

7. Determine between which consecutive integers the real zeros are located.

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

7. _____

Between 0 and 1

Between 3 and 4

8. Approximate the real zeros of $f(x) = 2x^3 + 9x^2 - 12x - 40$ to the nearest tenth.

8. _____

$$x \approx -4.9, -1.8, 2.2$$

9. Decompose $\frac{8y+7}{y^2+y-2}$ into partial fractions.

9. $\frac{3}{y+2} + \frac{5}{y-1}$

$$\frac{8y+7}{(y+2)(y-1)} = \frac{A}{y+2} + \frac{B}{y-1}$$

2-1
 $A(y-1) + B(y+2) = 8y+7$
 $-3A = -9 \quad 3B = 15$
 $A = 3 \quad B = 5$

10. Solve using Complete the Square or the Quadratic Formula.
 $x^2 - 6x - 16 = 0$

10. $x = 8, -2$

$$x = \frac{6 \pm \sqrt{36 + 64}}{2} = \frac{6 \pm \sqrt{100}}{2} = \frac{6 \pm 10}{2} =$$

11. Solve.

$$\frac{1}{2m} + \frac{6m-9}{3m} = \frac{2}{m}$$

4.S
6.75

$$\frac{12}{6m} = \frac{12m-18}{6m} + \frac{3}{6m}$$

11. $m = \frac{9}{4}$

$\frac{0}{4.5}$

$$\frac{12}{2} + \frac{6}{3} = \frac{2}{1} \quad 12 = 12m - 18 + 3$$

$$12 = 12m - 15$$

$$12m = 27$$

$$m = \frac{27}{12} = \frac{9}{4} = 2.25$$

12. Solve.

$$\sqrt{x-2} + 8 = 14$$

$$\sqrt{x-2} = 6$$

$$x-2 = 36$$

$$x = 38$$

12. $x = 38$

13. Solve.

$$\sqrt[3]{7r+5} = -3$$

$$7r+5 = -27$$

$$7r = -32$$

$$r = \frac{-32}{7}$$

13. _____

14. Solve.

$$\frac{9}{y+1} > 9$$

$$y \neq -1$$

$$9 > 9(y+1)$$

$$1 > y+1$$

$$0 > y > -1$$

14. _____

15. Solve.

$$\sqrt{2a+7} + 4 \geq 6$$

$$\sqrt{2a+7} \geq 2$$

$$2a+7 \geq 4$$

$$2a \geq -3$$

$$a \geq -\frac{3}{2}$$

$$a \geq -\frac{7}{2}$$

15. _____