



Name: _____

Block: _____

Test: Unit 6 and 11 Rational expressions + Polynomials

There are **10 questions** in this quiz. Question number has larger weight.

Standard test time is **40 minutes**.

Four operations calculator is allowed.

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Some reminders

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

- $\frac{1}{2} \div \frac{1}{3} = \frac{1}{2} \cdot \frac{3}{1} = \frac{3}{2}$

===== Start of test

1. Simplify. Remember to note excluded values.

$$\frac{x^2+10x+25}{x^2-9} \cdot \frac{x+3}{x+5}$$

2. Simplify. Remember to note excluded values.

$$\frac{x^2+x-6}{x^2+6x+9} \cdot \frac{(x+4)^2}{x^2+2x-8}$$

3. Simplify. Remember to note excluded values.

$$\frac{x^2-36}{x^2-8x+16} \div \frac{3x-18}{x^2-x-12}$$

4. Simplify. Remember to note excluded values.

$$\frac{2x-10}{x^2-25} - \frac{5-x}{25-x^2}$$

5. Simplify. Remember to note excluded values.

$$\frac{x^3-8}{x^2-4x+4} - \frac{x^3+3x^2}{x^2+x-6} - \frac{8}{x-2}$$

6. Solve. Show your work!

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

7. Solve. Show your work!

$$\frac{2x+3}{x-1} = \frac{10}{x^2-1} + \frac{2x-3}{x+1}$$

8. Divide using long division.

$$(6x^4 - x^3 - 21x^2 + 7x + 5) \div (3x - 5)$$

9. Divide using synthetic division.

$$(6x^4 + 2x^2 - 104) \div (x + 2)$$

10. Given the expression:

$$9x^2 + x^4 + 4x - 6x^3 - 12$$

a) Write the polynomial in standard form

$$P(x) = \underline{\hspace{15em}}$$

b) How many terms are there in $P(x)$?

c) What is the degree of the polynomial?

d) What is the sign of the leading coefficient?

e) What is the end behavior of the graph?

f) It is given that the polynomial has a root at $x = 3$, and another root at $x = 2$. Find the remaining roots of the polynomial (There's a place to write these on the next page).

(Hint: Start by dividing with the root at $x = 3$)

Roots:

- 1. _____
- 2. _____
- 3. _____
- 4. _____

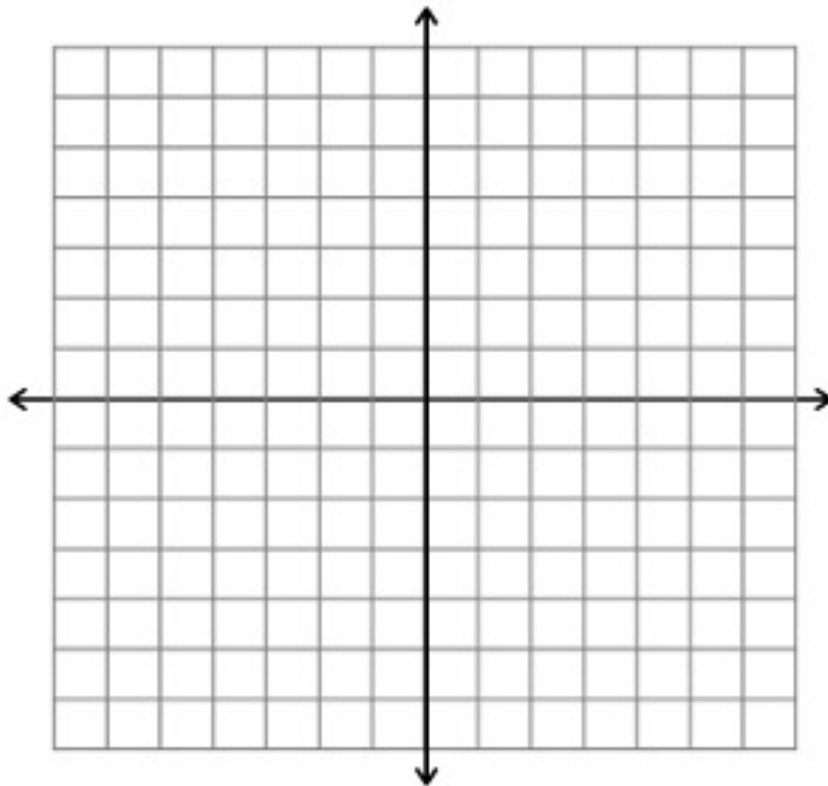
g) Write the polynomial in a factored form.

$$P(x) = \underline{\hspace{10cm}}$$

h) What is the y-intercept of the polynomial?

$$\underline{\text{y-intercept} = \hspace{10cm}}$$

i) Utilizing all the information gathered above (and only this information), plot $P(x)$ in the graph below.



This is an extra question for practice. You MAY get a question like this in the test (namely, with complex root).

11. Given the expression:

$$3x(x^2 - x) + x^5 - x^4 + 4 - 4x$$

a) Write the polynomial in standard form

$$P(x) = \underline{\hspace{15em}}$$

b) How many terms are there in $P(x)$?

c) What is the degree of the polynomial?

d) What is the sign of the leading coefficient?

e) What is the end behavior of the graph?

f) It is given that the polynomial has a root at $x = 1$, and another root at $x = -2i$. Find the remaining roots of the polynomial (There's a place to write these on the next page).
(Hint: Start by dividing with the root at $x = 1$.)

Roots:

- | | |
|----------|----------|
| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | |

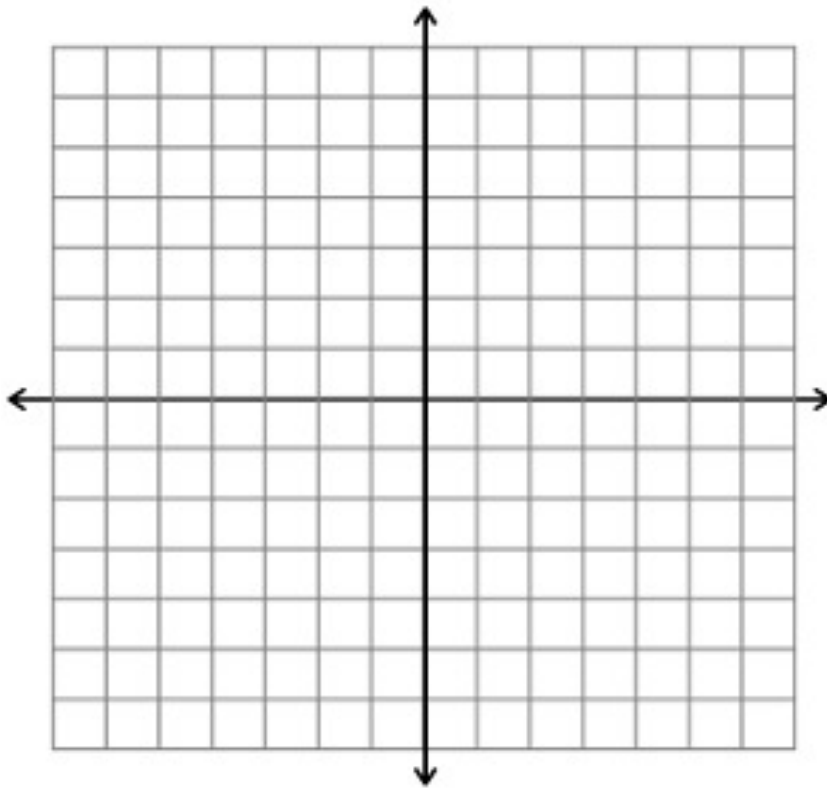
g) Write the polynomial in a factored form.

$$P(x) = \underline{\hspace{10cm}}$$

h) What is the y-intercept of the polynomial?

$$\underline{\hspace{10cm}} \text{ y-intercept} = \underline{\hspace{10cm}}$$

i) Utilizing all the information gathered above (and only this information), plot $P(x)$ in the graph below.



==== End of test