Rational functions

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Look at three or four or twenty my guizzes and then fill in my please!



To integrate rational functions, we have to be able to recognize the type of this function first and then we use the proper method.



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1. Theory

In this test we divide all rational functions into three groups.

- The function which is a partial fraction can be integrated using basic formulas.
- The proper rational function which is not a partial fraction can be written as a sum of partial fractions. Then we integrate partial fractions using basic formulas.
- The improper rational function can be written as sum of a polynomial and a proper rational function. Then we integrate both polynomial and proper rational fraction separately.

Definition 1 Let $P_n(x)$ be an n-degree polynomial, $Q_m(x)$ be an m-degree polynomial and $R(x) = \frac{P_n(x)}{O_m(x)}$ be a rational function. The function R(x) is said be proper if n > m and improper if n < m.

Definition 2 Partial fractions are functions which an be written in one of the followina forms

$$\frac{A_1}{x-a'}$$
 $\frac{A_n}{(x-a)^n'}$ $\frac{Ax+B}{x^2+Mx+N}$

where n > 2 is a positive integer, x a variable, a, A_i , M, N real constants and the polynomial $x^2 + Mx + N$ has no real zeros.



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Test1

Quiz Distinguish the correct type of the function

- $\frac{3}{(x-1)^2}$ $\frac{\sqrt{x}}{x^2+x+1}$
- $\frac{6x 1}{x^2 + 8x + 100}$

Proper rational function, but not a partial fraction

Improper rational function

Test2

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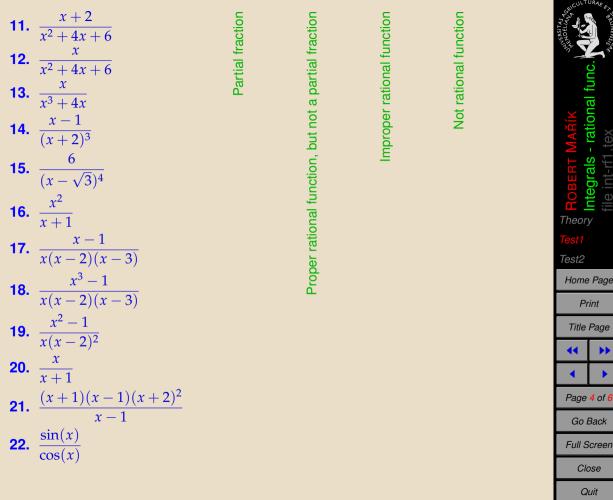
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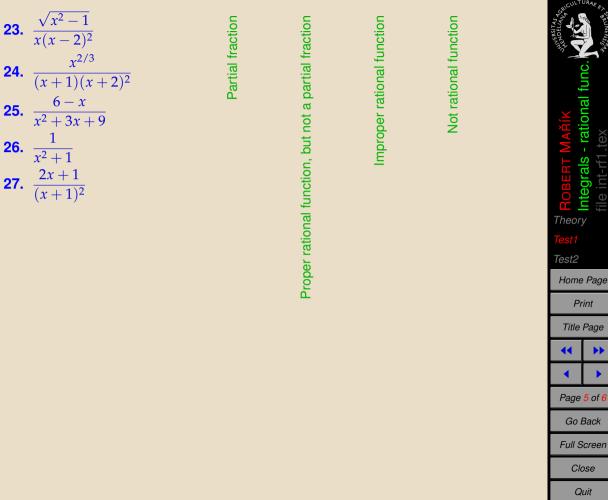
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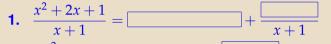
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Quiz

- Divide polynomials and write the improper rational function as sum of a polynomial and a proper rational function.
- Write the quotient (a polynomial) into the white field and the remainder (the numerator of the proper function) into the yellow field.



- x + 2
- $\frac{x^3 + x + 1}{x^2 + 2} =$
- $\frac{x^4 + 3x^2 + 4x + 5}{x^2 + 1} =$



Theory

Test1

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