Pre Calc Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 WS Assessment

Target 13

Nonlinear system

Partial fraction decomposition

* Solving Nonlinear Systems
* Partial Fractions

HW 13 Write one page math essay:

Why do we need to do partial fraction decomposition and illustrating with examples

 A non-linear system of equations is a system in which at least one of the variables has an exponent other than 1 and/or there is a product of variables in one of the equations.

Solve the following by algebra and graph

x2 + y2 = 10

2x + y = 1

x2 – 2y2 = 2

xy = 2

2x2 + y2 = 24

x2 – y2 = -12

x2 + y = 8

x – y = 14

x2 + y2 = 34

x2 – 2y2 = 7

x2 – 2xy + y2 = 3

x2 + xy + y2 = 12

Two numbers add up to 300. One number is twice the square of the other number. What are the numbers?

The squares of two numbers add to 360. The second number is half the value of the first number squared. What are the numbers?

A laptop company has discovered their cost and revenue functions for each day:

C(x) = 3x2 − 10x + 200  and  R(x)= −2x2 + 100x + 50.

If they want to make a profit, what is the range of laptops per day that they should produce? Round to the nearest number which would generate profit.

A cell phone company has the following cost and revenue functions:

    C(x) = 8x2 − 600x + 21500  and  R(x) = −3x2 + 480x.

What is the range of cell phones they should produce each day so there is profit? Round to the nearest number that generates profit.

Partial Fraction decomposition

 Let add two fractions $\frac{2}{x+1}+\frac{3}{x-2}$

Now we want to work it backward, let decomposition $\frac{5x-1}{x^{2}-x-2}$

Step 1: Factor the denominator

Step 2: Depend on the number of factors, rewrite it into the number of fractions, where the degree of numerator is **1 less than** the degree of denominator (\*)

Step 3: Add those fractions and “equalize” the term with the given numerator find the unknow

Do the following

$\frac{5x-1}{x^{2}-2x-15}$ $\frac{3x-4}{x^{2}-2x}$ $\frac{5x-1}{(x^{3})(x^{2}+1)(x+3)}$

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

\*Repeated linear factor

$\frac{6x-11}{(x-1)^{2}}$ $\frac{5-x}{(x-7)^{2}}$ $\frac{2x^{3}-x^{2}5x}{(x^{2}+1)^{2}}$

$\frac{4x^{2}+55x+25}{5x(3x+5)^{2}}$ $\frac{54x^{3}+127x^{2}+80x+16}{2x^{2}(3x+2)^{2}}$

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

Perform the operation and then then find the partial fraction decomposition

$$\frac{2x}{x^{2}-16}-\frac{1-2x}{x^{2}+6x+8}-\frac{x-5}{x^{2}-4x}$$

**Target 13 Assessment**

The product of two numbers is 12, and the sum of their squares is 40. What are the numbers?

A brick-making company manufactures bricks with the same height and width. The volume of each brick is 112 cubic inches and the base area of each brick is 28 square inches. Find its dimension.

Solve the system

x2 + y2 = 5

x2 + 3x2y = x4

Perform the operation and then then find the partial fraction decomposition

$$\frac{1}{x-4}-\frac{3}{x+6}-\frac{2x+7}{x^{2}+2x-24}$$