

Use Calculator only if the problem can't be solved algebraically. Write all general solutions in terms of Z. Circle all final answers!! No work = No credit!

Short Answer

1. Solve the following system:  $\begin{cases} x+y-4=0\\ x^2+y^2-4x=0 \end{cases}$ 

$$y = 4 - x$$

$$x^{2} + (u - x)^{2} - 4x = 0$$

$$(4 - x)(4 - x)$$

$$x^{2} + 16 - 4x - 4x + x^{2} - 4x = 0$$

$$2x^{2}-12x+16=0$$

$$x^{2}-6x+8=0$$

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

$$(410)$$

2. Solve the following System:

$$\begin{cases} 2x + 4y + z = 1 & 2x + 4y + z = 1 \\ x - 2y - 3z = 2 & x + y - z = -1 \\ x + y - z = -1 & 3x + 5y = 0 \end{cases}$$

$$\frac{6x+12y+3z=3}{x-2y-3z=2}$$

$$\frac{5-11-z=1}{7x+10y=5}$$

$$\frac{5-11-z=1}{3x+10y=5}$$

$$\frac{3x+10y=5}{3x+10y=5}$$

$$\frac{3x+10y=5}{3x+10y=5}$$

$$\frac{3x+10y=5}{2z=3}$$

$$\frac{3x+10y=5}{2z=3}$$

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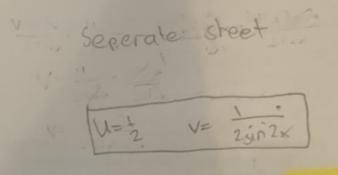
3. Solve the following system:

$$\begin{cases} x + 2y = 8 & x = 8 - 2y & different \\ y = \log_2 x & x & 2^3 = x \end{cases}$$

$$\begin{cases} 2^3 = x & \text{formily} \\ 3^3 = x & \text{formily} \end{cases}$$

4. Solve the following system for u and v:

$$\begin{cases} v \tan 2x - u \sec 2x = 0 \\ u(-2 \cot 2x) + v(2 \sec 2x) = \tan 2x \end{cases}$$



5. Solve the following system:  $\begin{cases} x + 2y - 7z = -4 \\ 2x + y + z = 13 \\ 3x + 9y - 36z = -33 \end{cases}$ 

(-3210 , 52-7, 2)

6. Find the equation of the parabola:  $y = ax^2 + bx + c$  that passes through (2,0), (3,-1), and (4,0).

$$5a+1-7a=4$$
 $-2a=-2$ 
 $4(1)+2(-6)+c=0$ 
 $a=1$ 
 $y=x^2-6x+8$ 

7. A chemist needs 12 gallons of a 20% acid solution. The solution is to be mixed from three solutions whose concentrations are 10%, 15%, and 25%. How many liters of each solution will be used if the chemist wishes to use the least amount of the 25% solution as possible?

x= 2 g of 10%

女+ リナマ=12

y = gof 15%. Z = gof 15%.

0.15/12-2 1+0.25== 2.4

-0.152+0.152=0.6

0.12=0.6

O sallow of 10%.

6 gallon of 15%.

6 gallors of 25%.

y=12-6 y=6

2=1

8. A mixture of 5 pounds of fertilizer A, 13 pounds of fertilizer B, and 4 pounds of fertilizer C provides the optimal nutrients for a plant. Commercial brand X contains equal parts of fertilizer B and fertilizer C. Commercial brand Y contains one part of fertilizer A and two parts of fertilizer B. Commercial brand Z contains two parts fertilizer A, five parts fertilizer B, and two parts fertilizer C. How much of each fertilizer brand is needed to obtain the desired mixture?

- 9. An airplane flying into a headwind travels the 990-mile flying distance between Rochester Hills, Michigan and Atlanta, Georgia in 3 hours and 40 minutes. On the return flight, the distance is traveled in 3 hours.
  - a) Find the airspeed of the plane.

b) Find the wind speed.

W= 300-270 W= 30mph

P= 300 mph



Write the partial fraction decomposition of the rational expression:

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

$$1et x = 2$$
  $1et x = -1$   $1et x = -2$   $12R = 6$   $-3C = 3$   $14R = 2$ 

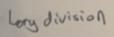
$$\frac{x+4}{x^{3}+x^{2}-4x-4} = \frac{1}{2(x+2)} + \frac{1}{2(x-2)} = \frac{1}{x+1}$$

11. Write the partial fraction decomposition of the rational expression.

$$\frac{x}{16x^4 - 1}$$

12. Write the partial fraction decomposition of the improper rational expression:

$$\frac{81x^4}{(3x-1)^3}$$



1823-102+1

$$\frac{X}{|b \times^{4} - 1|} = \frac{A}{(2 \times 1)} + \frac{B}{2 \times - 1} + \frac{C \times 1}{4 \times^{2} + 1}$$

$$(4 \times^{2} + 1) (4 \times^{2} - 1)$$

$$(4 \times^{2} + 1) (2 \times - 1) (2 \times - 1)$$

$$X = A (2 \times - 1) (4 \times^{2} + 1) + B (2 \times + 1) (4 \times^{2} + 1) + (c \times + D) (4 \times^{2} - 1)$$

$$1e + X = \frac{1}{2} \qquad 1e + x = -\frac{1}{2} \qquad 8A \times^{3} + 8B \times^{3} + 4c \times^{3} = 0 \times^{3}$$

$$1 + 1 + 4c = 0$$

1(3x)(+1) 3(3x)(+1) 3(3x)(+1)3

$$\frac{27x^{3}-27x^{2}+9x-1}{-81x^{4}+0x^{3}+0x^{2}+0x+0}$$

$$\frac{-81x^{4}+81x^{3}+27x^{2}+3x-1}{81x^{3}+27x^{2}+3x-1}$$

$$\frac{81x^{3}-27x^{2}+3x-1}{-81x^{3}+81x^{2}+27x+3}$$

$$3 \times +3 + \left[ \frac{54 \times^2 - 24 \times +3}{(27 \times^3 - 27 \times^2 + 4 \times -1)} \right]$$

$$3 \times +3 + \left[ \frac{54x^2 - 24x + 3}{(27x^3 - 27x^2 + 0x - 1)} \right] = \frac{-81x^3 + 81x^2 + 27x + 3}{(3x - 1)^3} + \frac{7}{(3x - 1)^2} + \frac{7}{(3x - 1)^3}$$

45 = 3y + 2z 234 = 4x + 12y + 10z 72 = 4x + 4z 4x = 72 - 4z x = 8 - 4z

X=8-4(=)

X=4

3- 45-22 9-15-32  $234 = 9(8 - \frac{4}{4}z) + 12(15 - \frac{3}{4}z) + 10z$  234 = 7x - 4z + 1x0 - 8z + 10z -18 = -4z - 8z + 10z -16 = -2z z = 4

 $y = 15 - \frac{3}{3}; \frac{9}{1}$  y = 15 - 6 y = 9

11-

(Ax+B) (4x2-1) + C(8x3-4x2+2x-x) + D(8x3+4x2+2x+1) = X

4Ax2, 4Bx2Ax-B+ (8x2-C4x2+C2x-Cx+D8x3+D4x2+D2x+D=X

4A + 4B = 72 = 0 A+B=0  $B=\frac{7}{8}$ 

-Ax-(x 20x = x -Ax-(x 20x = x -Ax-(x 20x = x - x - x - x - x = x 1ctx-8 -8A=7

A =- 78

311 + 8-6 Martin B=6-31 C= 1-A -A+ 3(1-A) - (6-3A) -10 -A +3-38-6+38-10 -A = 13 A = -13 (-1-(-13) 9x19 = -13 + 45x +19 (3x-1)2 C= 14 888204 4. 5107 x + 605 x 21 vtan2x - Usec2x = 0 1 + COLIN = (36, X bon's +1 = 5003x y tanzx = useczx Vella - Sec 3 - 402 x =1 V = Usec2x tary (4(-2cot2x) + 21 sec2 2x = (+an2x) +an2x V= 2 sec2x tan2x -24 + 24 sec2 2x = +a n2x V= 1 . (92 x 502) -24 (1-5022x) = tan 2x V= 1/2 5:02x -2-1 (-tan) = tan's -tan's U= 2 V = Zainly - 24 = -1

4= 5