

1. Solve the system.

$$\begin{aligned} x+y-z &= -1 \\ -2x+y+z &= 7 \\ 2x-2y+4z &= -4 \end{aligned}$$

2. Find the partial fraction decomposition.

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

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1. Solve the system.

$$\begin{cases} x+y-z = -1 \\ -2x+y+z = 7 \\ 2x-2y+4z = -4 \end{cases}$$

$$\begin{aligned} x+y-z &= -1 \\ -2x+y+z &= 7 \\ \hline -x+2y &= 6 \end{aligned}$$

$$\begin{aligned} 4(x+y-z) &= 4(-1) \\ 2x-2y+4z &= -4 \\ \hline 4x+4y-4z &= -4 \\ 6x+2y &= -8 \end{aligned}$$

$$\begin{aligned} 6(-x+2y) &= 6(6) \\ -6x+12y &= 36 \\ \hline 14y &= 28 \\ y &= 2 \end{aligned}$$

$$\begin{aligned} -x+2y &= 6 \\ -x+2(2) &= 6 \\ -x+4 &= 6 \\ -x &= 2 \\ x &= -2 \end{aligned}$$

$$\begin{aligned} x+y-z &= -1 \\ -2+2-z &= -1 \\ -z &= -1 \\ z &= 1 \end{aligned}$$

$(-2, 2, 1)$

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2. Find the partial fraction decomposition.

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

$$\frac{x-4}{x(x+2)^2} = \frac{A}{x} + \frac{B}{x+2} + \frac{C}{(x+2)^2}$$

$$x-4 = A(x+2)^2 + B(x)(x+2) + C(x)$$

If $x = -2$

$$\begin{aligned} -2-4 &= A(-2+2)^2 + B(-2)(-2+2) + C(-2) \\ -6 &= -2C \\ C &= 3 \end{aligned}$$

If $x = 0$

$$\begin{aligned} 0-4 &= A(0+2)^2 + B(0)(0+2) + C(0) \\ -4 &= 4A \\ A &= -1 \end{aligned}$$

$$x-4 = A(x+2)^2 + B(x)(x+2) + C(x)$$

$$x-4 = -1(x+2)^2 + B(x)(x+2) + 3x$$

$$x-4 = -x^2-4x-4 + Bx^2+2Bx+3x$$

$$0 = -x^2-4x-4 + Bx^2+2Bx+3x$$

$$0 = -x^2-4x-4 + Bx^2+2Bx+3x$$

$$0 = 2Bx-2x$$

$$\frac{2Bx}{2x} = \frac{2x}{2x}$$

$$1 = B$$

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$$\frac{4x^2+9}{x^2+3x^2} = \frac{4x^2+9}{x^2(x+3)}$$

$$\frac{4x^2+9}{x^2(x+3)} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x+3}$$

$$4x^2+9 = A(x)(x+3) + B(x^2) + C(x^2)$$

If $x = 0$

$$\begin{aligned} 4(0)+9 &= A(0)(0+3) + B(0^2) + C(0^2) \\ 9 &= 3B \\ B &= 3 \end{aligned}$$

If $x = -3$

$$\begin{aligned} 4(-3)^2+9 &= A(-3)(-3+3) + B(-3)^2 + C(-3)^2 \\ 36+9 &= 9C \\ 45 &= 9C \\ C &= 5 \end{aligned}$$

$$4x^2+9 = A(x)(x+3) + B(x^2) + C(x^2)$$

$$4x^2+9 = A(x)(x+3) + 3(x^2) + 5x^2$$

$$4x^2+9 = Ax^2+3Ax+3x^2+5x^2$$

$$4x^2 = Ax^2+3Ax+3x^2+5x^2$$

$$-5x^2 = Ax^2+3Ax+3x^2$$

$$-1x^2 = Ax^2+3Ax+3x$$

$$A = -1$$

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Solving a word problem involving geometry

$P = 17.2m$ $P = 2x+2y$ $17.2 = 2x+2y$
 $A = 17.28m^2$ $A = xy$ $8.6 = x+y$
 Find L & w $17.28 = xy$ $17.28 = xy$

$17.28 = x(8.6-x)$
 $8.6x - x^2 = 17.28$
 $x^2 - 8.6x + 17.28 = 0$

$x = \frac{8.6 \pm \sqrt{8.6^2 - 4(1)(17.28)}}{2}$

$x = 5.4$
 $x = 3.2$

$8.6 - x = y$
 $8.6 - 5.4 = y$ $y = 3.2$
 $8.6 - 3.2 = y$ $y = 5.4$

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$$y = 3x^2 + 2$$

$$9x + y = -4$$

$$9x + 3x^2 + 2 = -4$$

$$3x^2 + 9x + 6 = 0$$

$$3(x^2 + 3x + 2) = 0$$

$$3(x+2)(x+1) = 0$$

$$x = -2 \quad x = -1$$

$$y = 3(-2)^2 + 2$$

$$y = 3(4) + 2 = 14$$

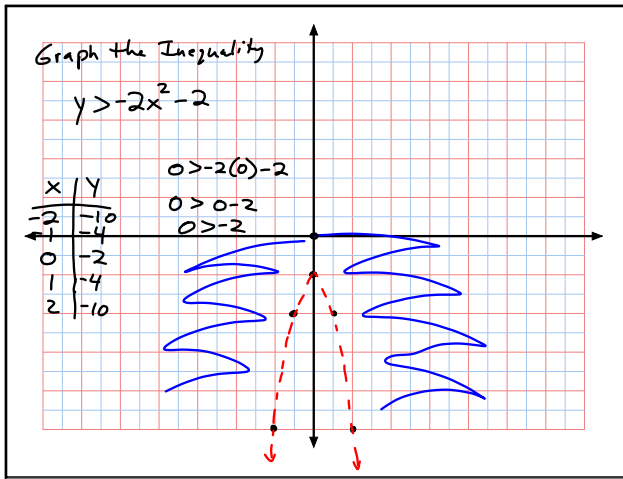
$(-2, 14)$

$$y = 3(-1)^2 + 2$$

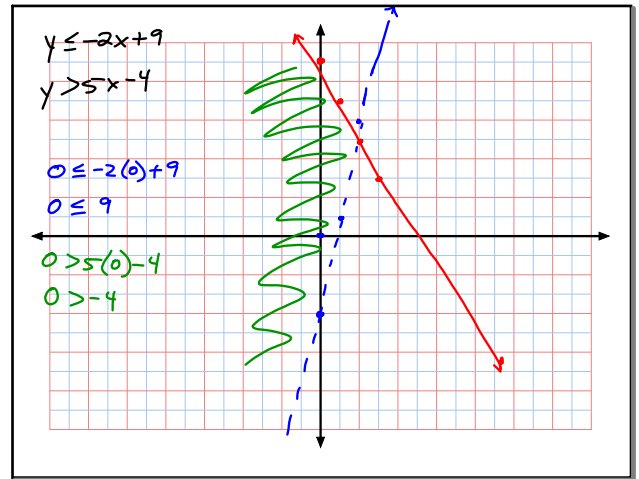
$$y = 3(1) + 2$$

$(-1, 5)$

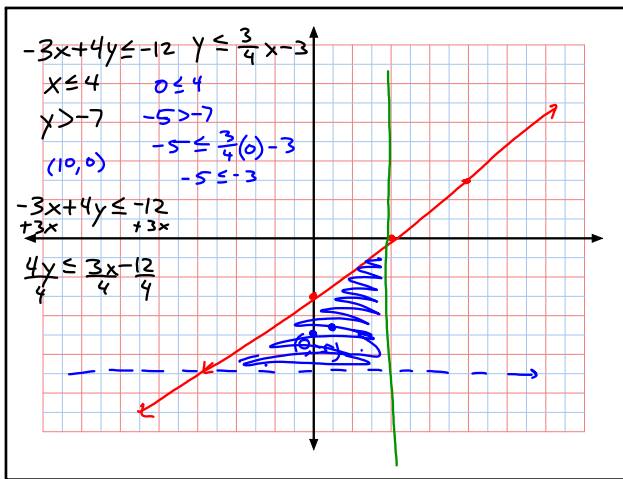
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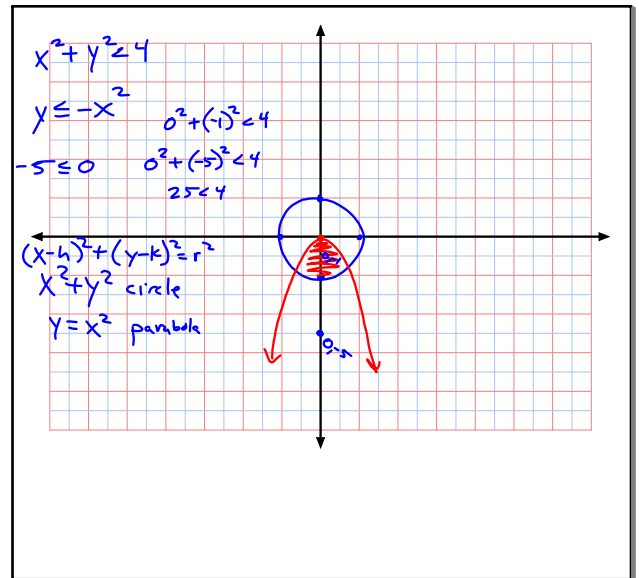
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