First start with the basics... how would you do using long division?

Well first you would set up the problem as follows:

🡨 you wouldn’t start with the 1 but the 1 and 0, so



 - 9 and subtract

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 1 now bring down the 0 and so on.

The process is similar if you have



You can just start with the x3, you need the x3 – 2x2 since x – 3 has 2 terms also.

Now you try to see what value times x will result in x3???

The answer is x

So  🡪 multiply the x2 to the x – 3

 x3 – 3x2

---------------------------- Now subtract

 x2 + x and bring down the x, and continue on…

So 

 x3 – 3x2

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 x2 + x Now we need to determine what will eliminate the x2

 So we multiply (x – 3) by x to get x2

 x2 – 3x And subtract

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 4x So now we can finally multiply by 4

 

 x3 – 3x2

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 x2 + x Now we need to determine what will eliminate the 4x2

 So we multiply (x – 3) by 4x to get 4x2

 x2 – 3x And subtract

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 4x + 1 Bring down the 1and now can multiply (x -3) by 4

 3x - 12 Subtract

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 13 Thus the remainder is 40 so we write it as 13/(x – 3)

So your final answer is $x^{2}+x+4+\frac{13}{x-3}$