

HOW – TO: SYNTHETIC DIVISION



Example: $(4x^3 - 2x + 1) \div (x - 5)$

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Step #1:

Draw a corner
and a baseline.



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #2:

Look at the expression you're dividing by. Put the **OPPOSITE** of the number sitting next to x in the corner.



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #3:

Next to the corner, write the coefficients of each term of the first polynomial.

	x^3	x^2	x	c
5	4	0	-2	1

**Don't forget
placeholders!!!**



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #4:

Drop down the first number outside of the corner below the baseline.

	x^3	x^2	x	c
5	4	0	-2	1
	4			

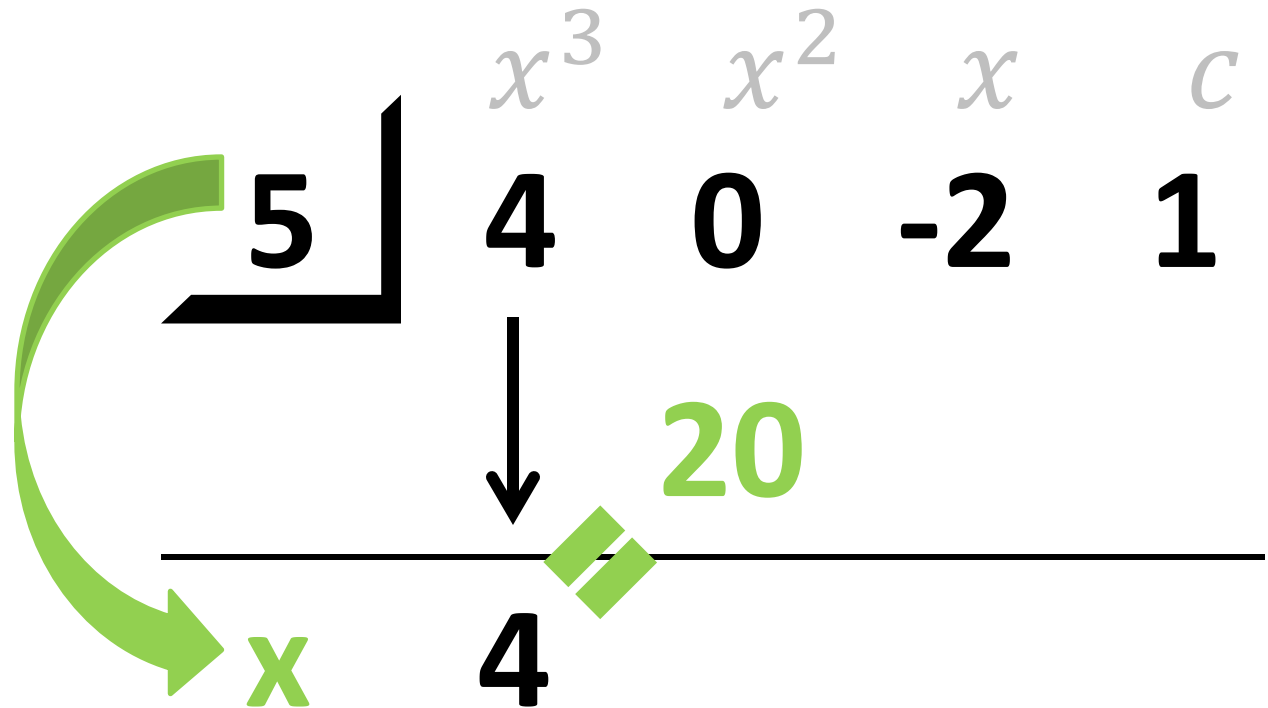
4

NEXT 

Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #5:

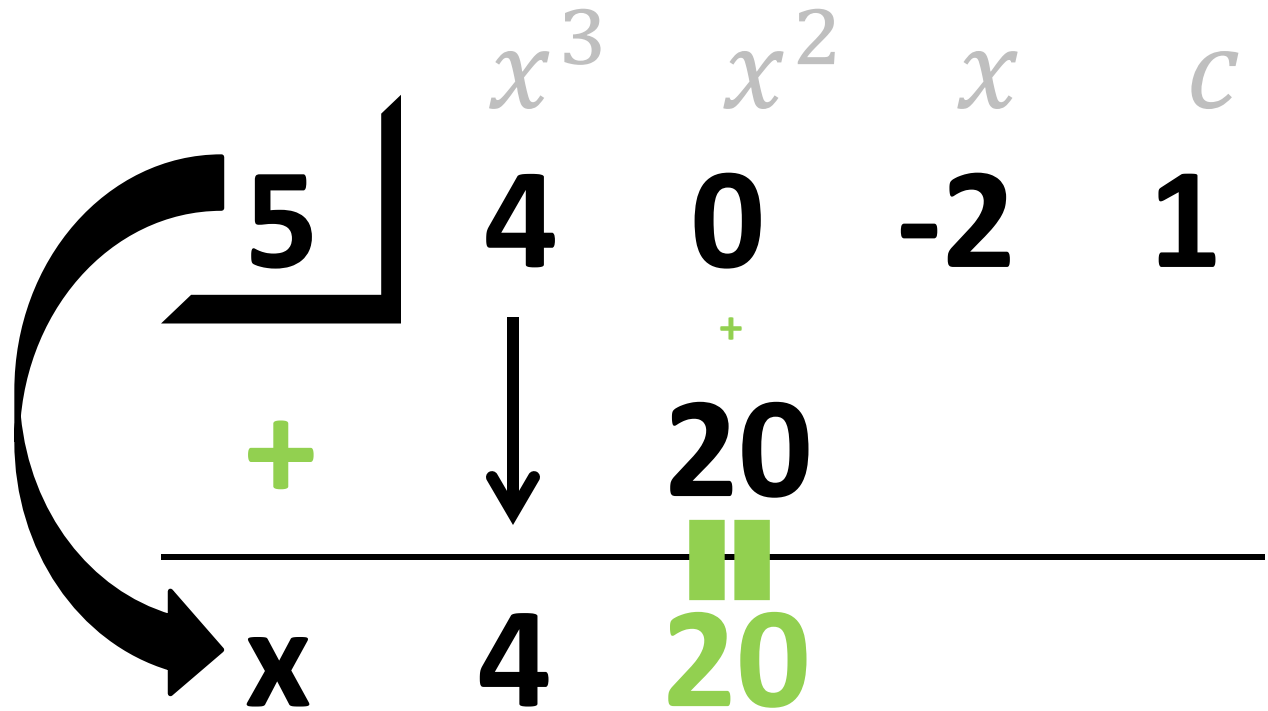
Multiply the number in the corner by the number you just dropped down below the baseline. Write the result above the baseline in the next column.



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #6:

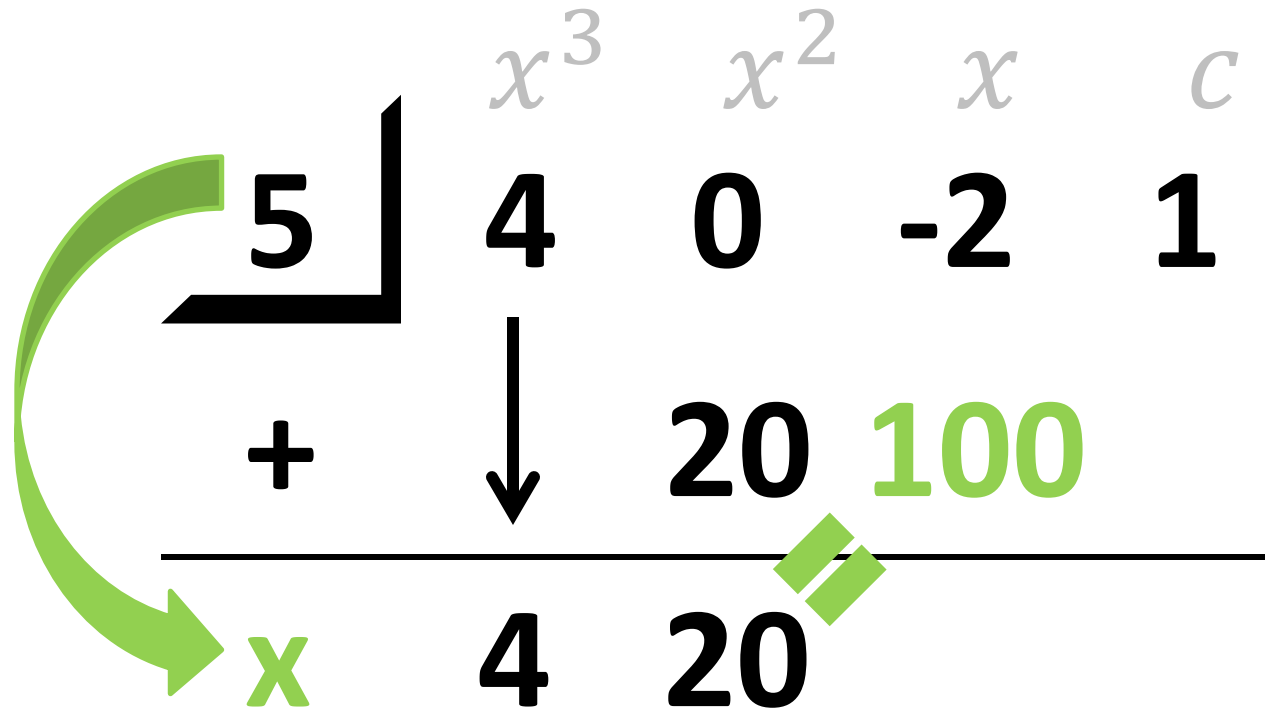
You should now have a column with two values. Add them together, and write the result below the baseline.



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #7:

Multiply the number in the corner by the number you just added to the baseline. Put this above the baseline in the next column.



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #8:

Repeat steps 6 & 7 until there are no empty spots below the baseline.

	x^3	x^2	x	c
5	4	0	-2	1
	↓		+	
+		20	100	
x	4	20	98	

NEXT

Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #8: (Cont.)

Repeat steps 6 & 7 until there are no empty spots below the baseline.

	x^3	x^2	x	c
5	4	0	-2	1
+	↓	20	100	490
x	4	20	98	98



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #8: (Cont.)

Repeat steps 6 & 7 until there are no empty spots below the baseline.

	x^3	x^2	x	c
5	4	0	-2	1
+	↓	20	100	490
x	4	20	98	491

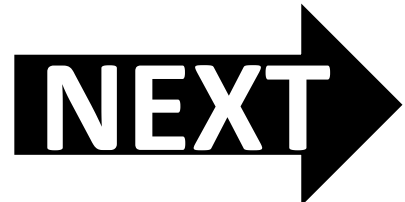


Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #9:

Each number on the baseline represents the coefficient of a variable with ONE LESS degree than the column started out with. The constant's column gives the remainder.

	x^3	x^2	x	c
5	4	0	-2	1
+	↓	20	100	490
x	4	20	98	491
	x^2	x	c	R



Example: $(4x^3 - 2x + 1) \div (x - 5)$

Step #10:

Write out the result of the division.

5	4	0	-2	1
$+$	\downarrow	20	100	490
x	4	20	98	491
	x^2	x	c	R

$$= 4x^2 + 20x + 98 + \frac{491}{x - 5}$$

Try this one on your own!

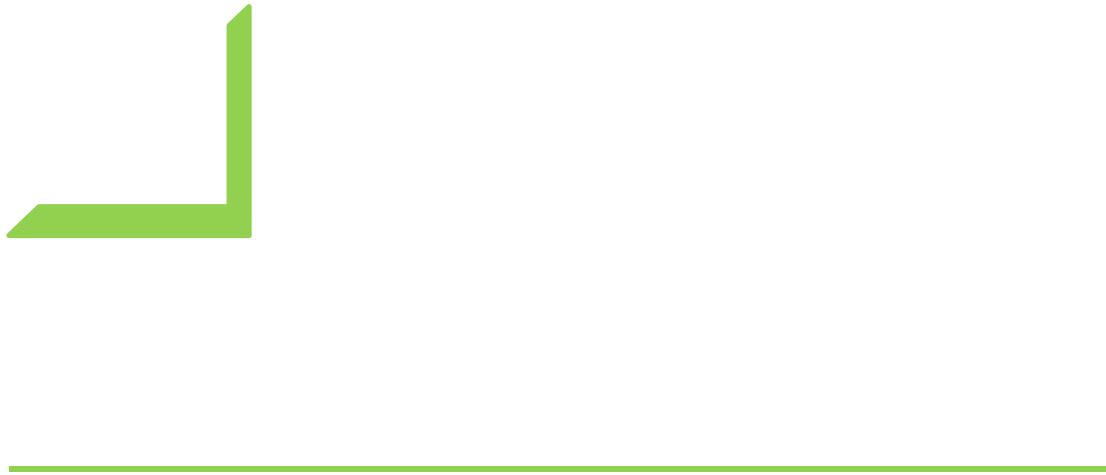
$$(3x^2 + 7x + 2) \div (x + 2)$$

Don't click "Next" until you've completed the problem!



NEXT

Example: $(3x^2 + 7x + 2) \div (x + 2)$



Draw corner and baseline!



$$\text{Example: } (3x^2 + 7x + 2) \div (x + 2)$$

-2



Look at the polynomial
you're dividing by. Put the
OPPOSITE of the number
sitting next to x in the
corner.



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2

Write the coefficients of the first polynomial!



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
<hr/>			
	3		

Drop down the first number.



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
		-6	
<hr/>			
	3		

$-2 \cdot 3 = -6$



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
		-6	
<hr/>			
	3	1	

$7 + -6 = 1$



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
		-6	-2
<hr/>			
	3	1	

$-2 \cdot 1 = -2$



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
		-6	-2
<hr/>			
	3	1	0

$2 + -2 = 0$



Example: $(3x^2 + 7x + 2) \div (x + 2)$

-2	<i>x</i> ²	<i>x</i>	<i>c</i>
3	7	2	
		-6	-2
	3	1	0
	<i>x</i>	<i>c</i>	<i>R</i>

Write what powers each coefficient now represents.



Example: $(3x^2 + 7x + 2) \div (x + 2)$

	x^2	x	c
-2	3	7	2
		-6	-2
<hr/>			
	3	1	0
	x	c	R

Write final answer.

$= 3x + 1$