Synthetic Division

Tuesday, January 9, 2018 10:24 AM

Synthetic Substitution

$(3x^3+4x^2+10) \div (x-2)$

LD:

$$x-2 \;\overline{)\; 3x^3+4x^2+0x+10}$$

$3x^2 + 10x + 20$

$-(3x^3 - 6x^2)$

$10x^2 + 0x$

$-(10x^2 - 20x)$

$20x + 10$

$-(20x - 40)$

50

$3x^2+10x+20+\frac{50}{x-2}$

$(3x^3+4x^2+10) \div (x-2)$

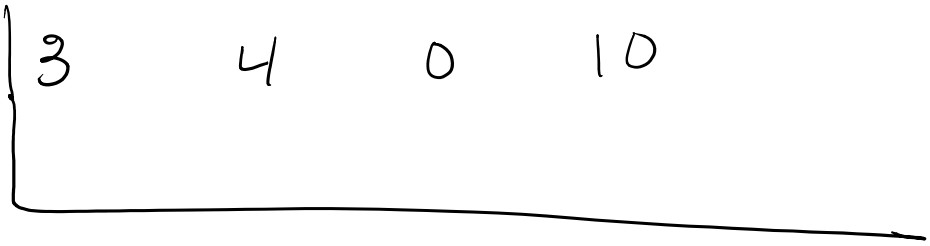
Because the divisor is linear (exponent 1)

We can use Synthetic.

A. use all coefficients (include 0's) of dividend

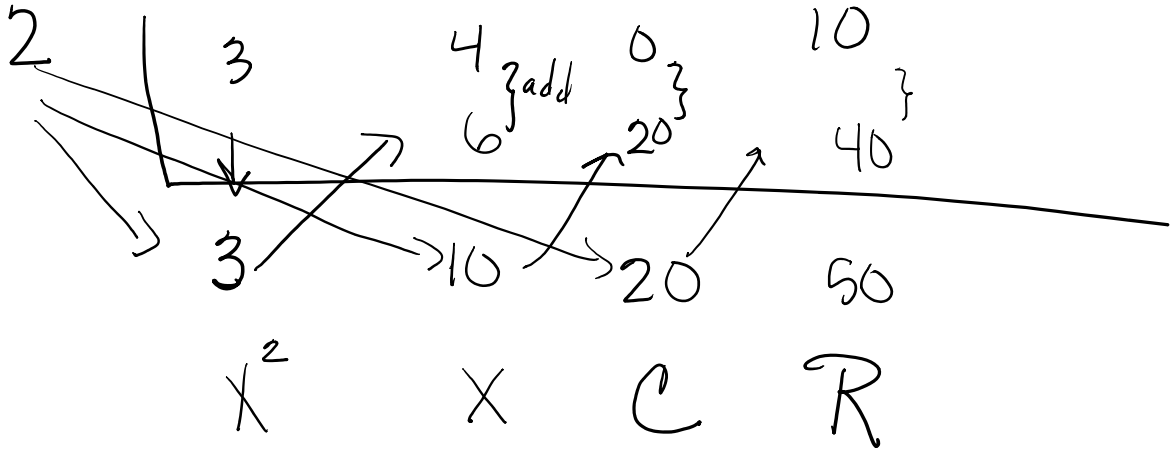
3 4 0 10

B. weird division sign.



C. change sign of a in (x-a) divisor.

$x-2 \Rightarrow +2$



$$3x^2 + 10x + 20 \text{ R } 50$$

Remainder Thm.

$P(2) = 50$

Evaluate $3x^3 + 4x^2 + 10$ @ 2

$3(8) + 4(2)^2 + 10$

$24 + 16 + 10$

$40 + 10$

50

$(x^2 + 5x - 28) \div (x + 3)$

3	1	5	−28
	↓	3	24
	1	8	−4
	X	C	R

$x + 8 \ R\ {-4}$

- Since $R = -4$, We know $P(3) = -4$ } Remai...

1 $P(3) = -4$

- aka: Evaluate $x^2+5x-28$ at $x=3$.

$9+15-28 = -4$

Remainder Thm.

$R=0$ means the divisor is a factor.

$R \neq 0$ means the divisor is not a factor

A • $(4x^2-12x-9) \div (x+\frac{1}{2})$

B • Evaluate P @ $x=-1/2$

C • Is $(x+1/2)$ a factor of $4x^2-12x-9$?

change sign.

$-\frac{1}{2}$ | 4 | −12 | −9

| | −2 | 7

4 | −14 | −2

X | C | R

A. $4x-14$ $R=-2$

B $P(-1/2) = -2$

B. $P(-1/2) = -2$ (no change)

C. No because $R \neq 0$.

Factoring:

1. $x^2 - y^2 \Rightarrow (x+y)(x-y)$

2. Quadratic type:

$x^4 - y^8$

$(x^2)^2 - (y^4)^2 \Rightarrow (x^2+y^4)(x^2-y^4)$

$\downarrow$

$(x^2+y^4)(x+y^2)(x-y^2)$

3) $3x^4 - 26x^2 - 9$ quadratic Type.

$a = x^2$

$3a^2 - 26a - 9$

grouping $\left\{\right.$ $3a^2+1a-27a-9$

$a(3a+1)-9(3a+1)$

$(3a+1)(a-9)$ $\Rightarrow (3x^2+1)(x^2-9)$

$(3x^2+1)(x+3)(x-3)$

$a^3+b^3 \Rightarrow (a+b)(a^2-ab+b^2)$

$x^3-y^3 \Rightarrow (x-y)(x^2+xy+y^2)$

SD: 6.3 : 19-24

SS: 6.3 : 8-11 ; 25-28

Factors? 6.4: 17-19, 41, 42

Factor worksheet.