$-14x^4 + 4x^2$ $-(-14x^2 + 28x^2)$ $-(-24x^2 + 18x)$ $-(-24x^2 + 18x)$ $-(-38x + 16)$ $-(-3x^2 + 4x^2)$ $-(-20x^2 + 30x^2)$ $-(-32x + 10x)$ $-(-32x + 1$	i) $x-2$ $x^{3} - 14x^{2} - 24x - 38$ $x-2)\overline{x^{4} - 16x^{3} + 4x^{2} + 10x - 11}$ $\underline{-(x^{4} - 2x^{3})}$	
$\frac{-(-38x-76)}{87}$ ii) $x+4$ $x^3-20x^2+84x-326$ $x+4)x^3-16x^4-4x^2+10x-11$ $\frac{-(x^4+4x^2)}{2}$ $-20x^2+4x^2+10x-11$ $\frac{-(x^4+4x^2)}{2}$ $-20x^2+4x^2-10x$ $\frac{-(84x^2+336x)}{2}$ $-225x-11$ $\frac{-(-326x-1304)}{2}$ 1293  iii) $x-1$ $x-1)x^3-16x^4+4x^2+10x-11$ b) Are any of the binomials in part a) factors of $x^4-16x^4+4x^2+10x-12$ Explain. No, this is bosouse there is a remainder when you try to divide it with any of above binomials, meaning it doesn't factor fully.  State the degree of the quorient for each of the following division state, if possible.  a) $(x^4-16x^2+2x^2+12x-10):(x^2-4)$ b) $(6x^3-4x^2-3x-4)+(x+3)$ c) $(x^4-7x^2+2x^2+9x):(x^3-x^2+2x+1)$ d) $(2x^2+5x-4):(x^4-3x^2-5x^2+4x-2)$ Complete the divisions in question 2, if possible.  a) $(x^4-15x^4+2x^2+12x-10)+(x^2-4)$ b) $(6x^3-4x^2-3x-4)+(x+3)$ c) $(x^4-7x^3+2x^2+9x)+(x^3-x^2+2x+1)$ d) $(2x^2+5x-4):(x^4-3x^4-5x^2+4x-2)$ Complete the following table.  Dividend Divisor Quotient Remainder $2x^5-5x^2+8x+4$ $x+3$ $2x^2-11x-41$ $199$ $6x^4+2x^2+3x^2+11x-43$ $2x^2-11x-41$ $199$ $6x^4+2x^2+3x^2+11x-3$ $3x+1-2x^2+3x^2+3x-4$ $-5$ $3x^2-x^2-6x+16$ $x+2-3x^2+3x^2+3x-4$ $-5$ $3x^2-x^2-6x+16$ $x+2-3x^2+3x^2+3x-4$ $-5$ $3x^2-x^2-6x+16$ $x+2-3x^2+3x-4$ $-5$ $x^2-x^2-6x+16$ $x+2-3x^2+3x-4$ $-5$ $x^2-x^2-6x+16$ $x+2-2$ $x^2-6x+16$ $x^2-6x+1$	$-14x^{3} + 4x^{2}$ $-(-14x^{3} + 28x^{2})$ $-24x^{2} + 10x$ $-(-24x^{2} + 48x)$	
$x^{2}-2 x^{2}+84x-326$ $x-4)x^{2}-16x^{3}+4x^{2}+10x-11$ $-(x^{4}-4x^{2})$ $20x^{2}+4x^{2}$ $-(-24x^{2}-84x^{2})$ $-(-24x^{2}-36x^{2})$ $-(-24x^{2}-36x^$	$\frac{-(-38x+76)}{-87}$	
$84x^2 + 10x \\ -(84x^2 + 336x) \\ 326x = 11 \\ -(-326x + 1304) \\ 1293$ iii) $x - 1$ $x - 1)x^3 - 16x^3 + 4x^2 + 10x - 11$ b) Are any of the binomials in part a) factors of $x^4 - 16x^3 + 4x^2 + 10x - 16x^3 + 10x^3 +$	$x^{3} - 20x^{2} + 84x - 326$ $x + 4)\overline{x^{4} - 16x^{3} + 4x^{2} + 10x - 11}$ $\underline{-(x^{4} + 4x^{3})}$ $-20x^{3} + 4x^{2}$	
iii) $x-1$ $x-1)x^4-16x^3+4x^2+10x-11$ b) Are any of the binomials in part a) factors of $x^4-16x^3+4x^2+10x-1$ Explain.  No, this is because there is a remainder when you try to divide it with any of above binomials, meaning it doesn't better fully.  State the degree of the quotient for each of the following division states, if possible.  a) $(x^4-15x^3+2x^2+12x-10)\div(x^2-4)$ b) $(5x^3-4x^2+3x-4)\div(x+3)$ c) $(x^2-7x^3+2x^2+9x)\div(x^3-x^2+2x+1)$ d) $(2x^2+5x-4)\div(x^4+3x^3-5x^2+4x-2)$ Complete the divisions in question 2, if possible.  a) $(x^4-15x^3+2x^2+12x-10)\div(x^2-4)$ b) $(5x^3-4x^2+3x-4)\div(x+3)$ c) $(x^4-7x^3+2x^2+9x)\div(x^3-x^2+2x+1)$ d) $(2x^2+5x-4)\div(x^4+3x^3-5x^2+4x-2)$ Complete the following table.  Dividend  Dividend  Divisor  Quotient  Remainder $2x^3-5x^2+8x+4$ $x+3$ $2x^2-11x+41$ $199$ $6x^4+2x^3-10x^2-4x+32$ $2x+4$ $3x^3-5x+8$ $-3$ $6x^4+2x^3+3x^2-11x-9$ $3x+1$ $2x^3-x+4$ $8$ Calculate each of the following using long division.  a) $(x^3-2x+1)\div(x-4)$ b) $(x^3-2x^2-6x+1)\div(x+2)$ c) $(2x^4+6x^2-8x+12)\div(x^4-x^2-x+1)$	$ 84x^{2} + 10x $ $ -(84x^{2} + 336x) $ $ -326x - 11 $	
b) Are any of the binomials in part a) factors of $x^4 - 16x^3 + 4x^2 + 10x - $ Explain.  No, this is because there is a remainder when you try to divide it with any of above binomials, meaning it doesn't factor fully.  State the degree of the quotient for each of the following division states, if possible.  a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 - 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the divisions in question 2, if possible.  a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 - 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the following table.  Dividend  Dividend  Divisor  Quotient  Remainder $2x^3 - 5x^2 + 8x + 4 - x + 3 - 2x^2 - 11x + 41 - 199$ $6x^4 + 12x^3 - 10x^2 - 4x + 32 - 2x + 4 - 3$ $6x^4 + 2x^3 + 3x^2 - 11x - 9 - 3x + 1 - 2x^3 + x - 4 - 5$ $3x^3 + x^2 - 6x + 16 - x + 2 - 3x^2 - 5x + 4 - 8$ calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	1293 <b>iii)</b> $x - 1$	
shove binomials, meaning it doesn't factor fully.  State the degree of the quotient for each of the following division states, if possible.  a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the divisions in question 2, if possible.  a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the following table.  Dividend $2x^3 - 5x^2 + 8x + 4$ $2x^3 - 5x^2 + 8x + 4$ $x + 3 - 2x^2 - 11x + 41$ $-199$ $6x^4 + 2x^3 + 3x^2 - 11x - 9$ $3x + 1 - 2x^3 + x - 4$ $-5$ $3x^3 + x^2 - 6x + 16$ $x + 2 - 3x^2 - 5x + 4$ 8  Calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^3 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	b) Are any of the binomials in part a) factors of $x^4 - 16x^3 + 4x^2 + 10$ Explain.	
a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) : (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) : (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the divisions in question 2, if possible. a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ complete the following table. $\begin{array}{ c c c c c c c c c c c c c c c c c c c$	above binomials, meaning it doesn't factor fully.  State the degree of the quotient for each of the following division	
c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ Complete the divisions in question 2, if possible. a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ Complete the following table. Dividend Divisor Quotient Remainder $2x^3 - 5x^2 + 8x + 4$ $x + 3$ $2x^2 - 11x + 41$ $-199$ $6x^4 + 12x^3 - 10x^2 - 4x + 32$ $2x + 4$ $3x^3 - 5x + 8$ $-3$ $6x^4 + 2x^3 + 3x^2 - 11x - 9$ $3x + 1$ $2x^3 + x - 4$ $-5$ $3x^3 + x^2 - 6x + 16$ $x + 2$ $3x^2 - 5x + 4$ 8  Calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$	
Complete the divisions in question 2, if possible.  a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$ b) $(5x^3 - 4x^2 + 3x - 4) \div (x + 3)$ c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ Complete the following table.  Dividend  Divisor  Quotient  Remainder $2x^3 - 5x^2 + 8x + 4$ $x + 3$ $2x^2 - 11x + 41$ $-199$ $6x^4 + 12x^3 - 10x^2 - 4x + 32$ $2x + 4$ $3x^3 - 5x + 8$ $-3$ $6x^4 + 2x^3 + 3x^2 - 11x - 9$ $3x + 1$ $2x^3 + x - 4$ $-5$ $3x^3 + x^2 - 6x + 16$ $x + 2$ $3x^2 - 5x + 4$ 8  Calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$	
c) $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$ d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ Complete the following table. $\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Complete the divisions in question 2, if possible. a) $(x^4 - 15x^3 + 2x^2 + 12x - 10) \div (x^2 - 4)$	
Dividend Divisor Quotient Remainder $2x^3 - 5x^2 + 8x + 4$ $x + 3$ $2x^2 - 11x + 41$ $-199$ $6x^4 + 12x^3 - 10x^2 - 4x + 32$ $2x + 4$ $3x^3 - 5x + 8$ $-3$ $6x^4 + 2x^3 + 3x^2 - 11x - 9$ $3x + 1$ $2x^3 + x - 4$ $-5$ $3x^3 + x^2 - 6x + 16$ $x + 2$ $3x^2 - 5x + 4$ 8  Calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	<b>b)</b> $(5x^3 - 4x^2 + 3x - 4) \div (x+3)$ <b>c)</b> $(x^4 - 7x^3 + 2x^2 + 9x) \div (x^3 - x^2 + 2x + 1)$	
$2x^{3} - 5x^{2} + 8x + 4 \qquad x + 3 \qquad 2x^{2} - 11x + 41 \qquad -199$ $6x^{4} + 12x^{3} - 10x^{2} - 4x + 32 \qquad 2x + 4 \qquad 3x^{3} - 5x + 8 \qquad -3$ $6x^{4} + 2x^{3} + 3x^{2} - 11x - 9 \qquad 3x + 1 \qquad 2x^{3} + x - 4 \qquad -5$ $3x^{3} + x^{2} - 6x + 16 \qquad x + 2 \qquad 3x^{2} - 5x + 4 \qquad 8$ Calculate each of the following using long division.  a) $(x^{3} - 2x + 1) \div (x - 4)$ b) $(x^{3} + 2x^{2} - 6x + 1) \div (x + 2)$ c) $(2x^{3} + 5x^{2} - 4x - 5) \div (2x + 1)$ d) $(x^{4} + 3x^{3} - 2x^{2} + 5x - 1) \div (x^{2} + 7)$ e) $(x^{4} + 6x^{2} - 8x + 12) \div (x^{3} - x^{2} - x + 1)$	d) $(2x^2 + 5x - 4) \div (x^4 + 3x^3 - 5x^2 + 4x - 2)$ Complete the following table.	
$3x^3 + x^2 - 6x + 16$ $x + 2$ $3x^2 - 5x + 4$ 8 Calculate each of the following using long division.  a) $(x^3 - 2x + 1) \div (x - 4)$ b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
b) $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$ c) $(2x^3 + 5x^2 - 4x - 5) \div (2x + 1)$ d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	$3x^3 + x^2 - 6x + 16$ $x + 2$ $3x^2 - 5x + 4$ 8 Calculate each of the following using long division.	
d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$ e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$	<b>b)</b> $(x^3 + 2x^2 - 6x + 1) \div (x + 2)$	
	d) $(x^4 + 3x^3 - 2x^2 + 5x - 1) \div (x^2 + 7)$	
	e) $(x^4 + 6x^2 - 8x + 12) \div (x^3 - x^2 - x + 1)$ f) $(x^5 + 4x^4 + 9x + 8) \div (x^4 + x^3 + x^2 + x - 2)$	

Polynomial Division

Jacob Zante

September 17th, 2024

a) Divide  $x^4 - 16x^3 + 4x^2 + 10x - 11$  by each of the following binomials.

1.