Name: ____ Algebra 2: 1st Semester Benchmark Exam Example Sheet 2

Study Guide Problem & Solution	New Example			
State whether the function has a maximum or minimum value and find it $f(x) = x^2 + 10x - 3$	16	State whether the function has a maximum or minimum value and find it $f(x) = -x^2 + 6x - 2$		
Since the first term is Positive (x^2) , it faces Up. That				
MEANS IT HAS A MINIMUM. THE MIN IS THE Y-VALUE OF THE VERTEX.				
$x = \frac{-b}{2a} = \frac{-10}{2(1)} = \frac{-10}{2} = -5$ Plug it in to find the min @ Y!				
$f(-5) = (-5)^2 + 10(-5) - 3 = 25 - 50 - 3 = -25 - 3 = -28$				
The minimum is at $y = -28!$				
Find the roots of the equation $14x - 60 = -2x^2$ by factoring.	17	Find the roots of the equation $-15x + 90 = -5x^2$.		
$ADD - 2x^2$ to both sides to get the equation in standard				
$2x^2 + 14x - 60 = 0$				
Divide out the two (because x^2 should be alone), then use				
X-FACTOR!				
$x^2 + 7x - 30 = 0$ -30/				
(x-3)(x+10) = 0 -3/10				
x - 3 = 0 or $x + 10 = 0$ 7				
x = 3 OR $x = -10$				
$x = \{-10, 3\}$				
Write a quadratic function in standard form with zeros 3 and -2.	18	Write the quadratic function in standard form with zeros		
If the zeros are $3 \cdot 2$, then that means the factors are		5 and -7.		
(x-3) & $(x-(-2))$. So, set up the equation and multiply.				
f(x) = (x - 3)(x + 2)				
$f(x) = x^{2} + 2x - 3x - 6 \qquad x \qquad x^{2} + 2x - 3x - 6$				
$F(x) = x^2 - x - 6$				
Given the equation $y = xn$ where $x > 1$ and $0 < n < 1$, which statement is valid for the real values of y ?	19	Given the equation $ax = by$ where $x > 0$, $a < -1$, $b > 1$, which statement is valid for the real values of y ?		
A. $y < 0$ B. $y < x$ C. $y > x$ D. $y = 0$		A. $y > 0$ B. $y < 0$ C. $y > x$ D. $y = 0$		
Plug in examples and try to eliminate your options.				
TRY $x = 2$ & $n = 0.5$.				
y = xn = 2(0.5) THE ANSWER IS NOT C. BECAUSE Y < X				
y = 1 The answer IS NOT D, because $y \neq 0!$				
The answer MUST BE B. y < x.				
Solve the equation $x^2 - 6x - 22 = 41$.	20	Solve the equation $x^2 - 8x - 56 = 32$.		
$x^2 - 6x - 22 = 41$ Subtract 41 from both sides				
$x^2 - 6x - 63 = 0$ Use Quadratic Formula!!!				
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-63)}}{2(1)} = \frac{6 \pm \sqrt{36 + 252}}{2}$				
$\sum_{k=0}^{24} 6 \pm \sqrt{288} = 6 \pm \sqrt{144} \sqrt{2} = 6 \pm 12\sqrt{2} = 6 \pm 12\sqrt{2} = 2 \pm 6\sqrt{2}$				
$x = \frac{1}{2} = $				
The solution is $x = 3 \pm 6\sqrt{2}!$				

If x is a real number, which best describes the values of x for which the inequality $x^2 > 0$ is true? A. all x < 0 B. all x ≤ 0 C. all values of x D. none SINCE x^2 will ALWAYS EQUAL A POSITIVE NUMBER, EXCEPT WHEN x = 0. THE ONLY WAY THAT $x^2 > 0$ is if $x \neq 0$. However, THAT is NOT ONE OF OUR OPTIONS, SO I HAVE TO CHOOSE D. NONE. Express $5\sqrt{-117}$ in terms of <i>i</i> . TEST NUMBERS TO SEE IF 117 HAS A PERFECT SQUARE FACTOR. SINCE (9)(13)=117, I CAN SIMPLIFY THE RADICAL: $5\sqrt{-117} = 5\sqrt{-1}\sqrt{9}\sqrt{13} = (5)(3)i\sqrt{13} = 15i\sqrt{13}$	21	If x is a real number, which best describe the values of x for which the inequality $\frac{1}{x^2} > 0$ is true? A. $x < 0$ C. all values of x B. $x > 0$ D. all values of x, except when $x = 0$. Express $2\sqrt{-176}$ in terms of <i>i</i> .		
Find the complex conjugate of $7 - 2i$ To create a complex conjugate, change the sign for the IMAGINARY NUMBER. <u>7+21</u>	23	Find the complex conjugate of $3 + 4i$.		
Graph the complex number $3 + 6i$. Imaginary -8i $-6i \cdot 3 + 6i$ -2i	24	Graph the complex number 2 – 5 <i>i</i> .		
Subtract. Write the result in the form $a + bi$. (8 - 4i) - (2 + 3i) 8 - 4i - 2 - 3i = 6 - 7i	25	Subtract. Write the result in the form $a + bi$. (2 + 7i) - (3 - 6i)		
Multiply $4i(6-9i)$. Write the result in the form $a + bi$. DISTRIBUTE: $24i - 36i^2 = 24i - 36(-1) = 24i + 36 = 36 + 24i$	26	Multiply $5i(9-3i)$. Write the result in the form $a + bi$.		
Simplify $\frac{-5+9i}{3-3i}$ MULTIPLY THE BOTTOM'S COMPLEX CONJUGATE $\left(\frac{-5+9i}{3-3i}\right)\left(\frac{3+3i}{3+3i}\right) = \frac{-15-15i+27i+27i^2}{9+9i-9i-9i^2} = \frac{-15+12i+27(-1)}{9-9(-1)}$ $= \frac{-15+12i-27}{9+9} = \frac{-42+12i}{18} = \frac{-42}{18} + \frac{12i}{18} = -\frac{7}{3} + \frac{2}{3}i$	27	Simplify $\frac{3-6i}{8+8i}$		
A toy rocket is launched from the ground level with an initial vertical velocity 32 ft/s. The position of the rocket can be tracked using the following equation $f(t) = -16t^2 + 32t$, where t is the time in seconds. After how many seconds will the rocket hit the ground? FIND THE ZEROS OF THE FUNCTION: $f(t) = -16t^2 + 32t$ $0 = -16t^2 + 32t$ Divide By -16 $0 = t^2 - 2t$ FACTOR OUT THE t	28	A toy rocket is launched from the ground level with an initial vertical velocity of 48 ft/s. The position of the rocket can be tracked using the following equation $f(t) = -16t^2 + 48t$, where <i>t</i> is the time in seconds. After how many seconds will the rocket hit the ground?		
0 = t(t-2) Split up the equations & solve 0 = t or $0 = t-22 = tThe rocket will hit the ground at t = 2 seconds.$				

A. $(x + 3)(x^2 + 16)$ C. $(x + 3)(x + 4)(x - 4)$ B. $(x - 3)(x^2 + 16)$ D. $(x - 5)(x + 7)(x - 7)$ B. $(x - 5)(x^2 + 4)9$ C. $(x + 5)(x^2 - 7)(x - 7)$ B. $(x + 5)(x^2 - 49)$ D. $(x - 5)(x + 7)(x - 7)$ B. $(x + 3)(x^2 - 4)$ D. $(x - 5)(x + 7)(x - 7)$ D. $(x - 5)(x + 7)(x - 7)$ D. $(x + 3)(x^2 - 4)$ D. $(x - 5)(x + 7)(x - 7)$ D. $(x - 5)(x + 7)(x - 7)(x - 7)(x + 3)$ Then subtract Down. -7x + 7 $(-7)(x)$ Gives us $-7xThe coerricentra sak y = -4y Z.(x + 3)(x^2 - 4x) - 3 W. They x + 3, Then subtract Down.(x + 3)$ is a LIAR, so we put -3 in the box. The coerricentra sak $y = -4y$ Z. (x + 3)(x - 1) M. Theoremutation of the fourth	Factor $x^3 + 3x^2 - 16x - 48$ completely.	29	Factor $x^3 + 5x^2 - 49x - 245$ completely.		
B. $(x-3)(x^2+16)$ D. $(x-3)(x+4)(x-4)$ The Easter struce is therefore is to MULTIPLY ECA. How See Children Mo See which one works. Remainder, Housen-The Question Asks for the COMPLETE factorization. More than one Mawier could multiply to make $x + 3x^2 - 16x - 48$. The Concect Answere is the over that must the MOST factors. (You cube also use switherit convision to make over your choices, it you like that methods better? I tested each Answere choice. C is the correct answer. C. $(x+3)(x^2-16)$ $x + \frac{x^2}{4} + \frac{44}{3}$ $x^1 + 3x^2 - 16x - 48$ Divide. $(x^2 - 4x + 7) + (x + 3)$ Use entries of the out intuity to the original equation. Divide. $(x^2 - 4x + 7) + (x + 3)$ Use entries one for C multiply to the original equation. $x - 7 + \frac{28}{x+3}$ $x + 3 \frac{x^2 - 4x}{x^2 - x(1)}$ Multiply $x(x + 3)$, then subtract down. $-7x + 7 (-7)(x)$ Gives us x^2 $-(x^3 + 3x)$ $ $ Multiply $x(x + 3)$, then subtract down. $-7x + 7 (-7)(x)$ Gives us x^2 $-(x^3 + 3x)$ $ $ Multiply $x(x + 3)$, then subtract down. $-7x + 7 + \frac{28}{x+3}$ Solution: $x - 7 + \frac{28}{x+3}$ $x + 3 \frac{x^2 - 4x}{x^2 - 21}$ multiply -3 in the subtract down. $-3 \frac{1}{1} - 7 \frac{28}{x+3}$ $x + 3 \frac{x^2 - 4x}{x^2 - 3} \frac{21}{1} - 7 \frac{28}{x+3}$	A. $(x + 3)(x^2 + 16)$ C. $(x + 3)(x + 4)(x - 4)$		A. $(x + 5)(x^2 + 49)$	C. $(x + 5)(x + 7)(x - 7)$	
The EASIEST METHOD IS TO MULTIPLY EACH ANSWER CLOICE AND SEE WINCH OWNERS. REMAINTER CLOICE AND SEE WINCH OWNERS. THE MEMBER, THOUGH THE AND THAN OME ARKS FOR THE COMPLETE FACTORIZATION. MORE THAN OME ARKS FOR THE COMPLETE FACTORIZATION. MORE THAN OME ARKSWER CISOL DUITIPLY TO MARKE $x^{+} + 3x^{-}$ I TESTED EACH ANSWER CHOICE. C IS THE CORRECT ANSWER. C. $(x+3)(x^{2}-16x)$ $(x+3)(x^{2}-16x)$ $(x+3)(x^{2}-16x)$ $(x^{+} + 7)x(x)$ $(x^{+} + 3)x^{+} - 4x + 7)x(x)$ $(x^{+} + 3)x^{-} - 4x - 7)x(x)$ $(x^{+} + 3)x^{-} - 3)x(x) - 7(x^{+} + \frac{28}{x^{+} - 3})x(x) + 8x + 7x + 7x(x) + 7x + 7x + 7x(x) + 7x + $	B. $(x-3)(x^2+16)$ D. $(x-3)(x+4)(x-4)$		B. $(x + 5)(x^2 - 49)$	D. $(x-5)(x+7)(x-7)$	
SEE WITCH ONE WORKS. REMEMBER, THOUGH-THE QUESTION ARSS FOR THE COMPLETE FACTORIZATION. MORE THAN ONE ANSWER COULD MULTIPLY TO MARE x^3 , $3x^3 - 10x - 48$. THE CORRECT ANSWER IS THE OPE THAT INST THE MOST FACTORS. (YOU COULD ALSO USE SYNTHETIC DIVISION TO HARROW YOUR CMOLES, IN YOU LIKE THAT METHOD BETTER) I TESTED EACH ANSWER COUCE. C IS THE CORRECT ANSWER. C. $(x + 3)(x^2 - 16)$ $x^3 + 3x^2 - 16x - 48$ THE FACTORS GIVEN FOR C MULTIPLY TO THE ORIGINAL EQUATION. Divide. $(x^2 - 4x + 7) + (x + 3)$ USE EITHER SWITHETIC OR LONG DIVISION. BOTH METHODS ARE SHOWN BELOW. USES WITCHERY ONE YOU PREFER. LONG DIVISION: $x - 7 + \frac{28}{x + 3}$ SUUTION: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC DIVISION: $(x^2 + 3x) \downarrow$ MULTIPLY $(x^2)(x + 3)$, THEN SUBTRACT. 28 THIS IS THE REMAINDER: PUT IT OVER $x + 3$ SOLUTION: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC DIVISION: $(x^2 + 3) = LIAR, SO WE PUT - 3 IN THE BOX. THE COEFFICIENTSION: (x^3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE BOX.THE COEFFICIENTSION:(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE SUBTRACT. (x^4 + 3) = LIAR, SO WE PUT - 3 IN THE SUBTACT.(x^4 + 3) = LIAR, SO WE PUT - 3 IN THE SUB$	The easiest method is to multiply each answer choice and				
Asks for the Could ultrieur to make $x^{4} + 3x^{2} - 10x - 48$. The correct answer solution ultrieur to make $x^{4} + 3x^{2} - 10x - 48$. The correct answer. C. ($yu = could base of set shart mass the MOST FACTORS.$ ($yu = could base of set shart method better()$) I tested fact answer could. C is the correct answer. C. ($x + 3$)($x + 4$)($x - 4$) $x^{3} + 3x^{2} - 16x - 48$ $x^{3} + 3x^{2} - 16x - 48$ Divide. ($x^{2} + 4x + 7$) + ($x + 3$) Use for the synthetic to long bivision. Both methods are shown below. Use whichever one you prefere. LONG Division: $x - 7 + \frac{28}{x + 3}$ x + 3 $x^{2} - 4x + 7$ X(x) Gives us x^{4} $-(x^{2} + 2x) \downarrow$ Multiply X($x + 3$). Then subtract down. $-7x + 7$ (-7)(x) Gives us x^{2} $-(x^{2} + 2x) \downarrow$ Multiply X($x + 3$). Then subtract. 28 This is the remainder: put it over $x + 3Solution: x - 7 + \frac{28}{x + 3}SYNTHETIC Division:(x+3) is a LLAR, so we put -3 in the Box.The coefficients are 1x^{2} - 4x + 74 - 3 - 211 - 7 - 28x + \frac{4}{x} - 3Solution: x - 7 + \frac{28}{x + 3}$	SEE WHICH ONE WORKS. REMEMBER, THOUGH-THE QUESTION				
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Consider models also uses any method that the model of the loss. Considers, it you like that method betters) I rested back answer choice. C is the correct answer. C. (x + 3)(x + 4)(x - 4) $x + \frac{x}{2} + \frac{x}{2} + \frac{x}{3}$ $(x + 3)(x^2 - 16)$ $x^3 + 3x^2 - 16x - 48$ The factors given for C multiply to the original equation. Divide. $(x^2 - 4x + 7) + (x + 3)$ Use services switheric or long division. Both methods are shown below. Use whichever one you prefers. LONG onvision: $x - 7 + \frac{28}{x + 3}$ $x + 3 \frac{x^2 - 4x + 7}{x^2 - 4x + 7} x(x)$ gives us x^8 $- (x^2 + 3x) + 400000000000000000000000000000000000$	ANSWER COULD MULTIPLY TO MAKE $X + 5X - 10X - 48$. THE				
(10) Cold and the first	(You could also use synthetic division to happow your				
$\begin{array}{c} 1 \text{ TESTED EACH ANSWER CHOICE. C IS THE CORRECT ANSWER.} \\ C. \\ (x+3)(x+4)(x-4) & \hline x + \frac{x+4}{4-4x^4} \\ \hline x + \frac{x}{2-4x} \\ \hline x + \frac{x}{2-4$	CHOICES. IF YOU LIKE THAT METHOD BETTER)				
C. $(x+3)(x+4)(x-4)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x^{2}-16)$ $($	I TESTED EACH ANSWER CHOICE. C IS THE CORRECT ANSWER.				
$\frac{x}{(x+3)(x+4)(x-4)}$ $\frac{x}{x} + \frac{x^2}{4} + \frac{x^4}{4}$ $(x+3)(x^2-16)$ $\frac{x}{x^3} + \frac{x^2}{3x^2} + \frac{x^3}{3x^2}$ $\frac{x^3}{16} + \frac{x^3}{16} + \frac{x^3}{16} + \frac{x^3}{16}$ $\frac{x^3}{16} + \frac{x^3}{16} + x^$	С.				
$x^{3} + 3x^{2} - 16x - 48$ The FACTORS GIVEN FOR C MULTIPLY TO THE ORIGINAL EQUATION. Divide. ($x^{2} - 4x + 7$) ÷ ($x + 3$) USE EITHER SYNTHETIC OR LONG DIVISION. BOTH METHODS ARE SHOWN BELOW. USE WHICHEVER ONE YOU PREFER. LONG DIVISION: $x - 7 + \frac{28}{x + 3}$ $x + 3 \int x^{2} - 4x + 7 x(x)$ GIVES US x^{2} $- (x^{2} + 3x) \downarrow MULTIPLY x(x + 3)$, THEN SUBTRACT DOWN. $-7x + 7 (-7)(x)$ GIVES US $x^{-7}x$ - (-7x - 21) MULTIPLY (x/x + 3), THEN SUBTRACT. 28 THIS IS THE REMAINDER: PUT IT OVER $x + 3SOLUTION: x - 7 + \frac{28}{x + 3}SYNTHETIC DIVISION:(x+3) IS A LIAR, SO WE PUT -3 IN THE BOX.THE COEFFICIENTS ARE 1x^{8} - 4x + 7-3 1 -4 7x + RSOLUTION: x - 7 + \frac{28}{x + 3}SOLUTION: x - 7 + \frac{28}{x + 3}$	$(x+3)(x+4)(x-4)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$ $(x+3)(x^{2}-16)$				
THE FACTORS GIVEN FOR C MULTIPLY TO THE ORIGINAL EQUATION.Divide.30Divide.30 $(x^2 - 4x + 7) + (x + 3)$ USE ETHER SWITHETIC OR LONG DIVISION. BOTH METHODS ARE SHOWN BELOW. USE WHICHEVER ONE YOU PREFER.LONG DIVISION: $x - 7 + \frac{28}{x + 3}$ $x + 3 \ x^2 - 4x + 7$ $-(x^2 + 3x) \downarrow$ MULTIPLY $x(x + 3)$, THEN SUBTRACT DOWN. $-7x + 7$ $-7x + 7$ $(-7x - 21)$ MULTIPLY $(-7)(x + 3)$. THEN SUBTRACT.28Solution: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC Division: $(x^+ 3)$ is a LIAR, so we put -3 in the Box.The coefficients are $1x^2 - 4x + 7$ -3 1 -7 28 $x + \pi$ $x + \pi$ Solution: $x - 7 + \frac{28}{x + 3}$	$x^3 + 3x^2 - 16x - 48$ -16 -16x -48				
Divide. $(x^2 - 4x + 7) + (x + 3)$ USE EFFREE SYMTHETIC OR LONG DIVISION. BOTH METHODS ARE SHOWN BELOW. USE WHICHEVER ONE YOU PREFER. LONG DIVISION: $x - 7 + \frac{28}{x + 3}$ $x + 3 \int x^2 - 4x + 7$ $x(x)$ GIVES US x^2 $-(x^2 + 3x) \downarrow$ MULTIPLY $x(x + 3)$, THEN SUBTRACT DOWN. -7x + 7 $(-7)(x)$ GIVES US $-7x-(-7x - 21)$ MULTIPLY $(-7)(x + 3)$, THEN SUBTRACT. 28 THIS IS THE REMAINDER: PUT IT OVER $x + 3$ SOLUTION: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC DIVISION: (x+3) IS A LIAR, SO WE PUT -3 IN THE BOX. THE COEFFICIENTS ARE $1x^2 - 4x + 7$ -3 1 -4 $7-3$ 211 -7 $28x$ $#$ R SOLUTION: $x - 7 + \frac{28}{x + 3}$	The factors given for C multiply to the original equation.				
$(x^{2} - 4x + 7) + (x + 3)$ USE EITHER SYNTHETIC OR LONG DIVISION. BOTH METHODS ARE SHOWN BELOW. USE WHICHEVER ONE YOU PREFER. LONG DIVISION: $x - 7 + \frac{28}{x + 3}$ $x + 3 \int x^{2} - 4x + 7 x(x) \text{ GIVES US } x^{2}$ $- (x^{2} + 3x) \downarrow \text{MULTIPLY } x(x + 3), \text{ THEN SUBTRACT DOWN.}$ $- 7x + 7 (-7)(x) \text{ GIVES US } -7x$ $- (-7x - 21) \text{MULTIPLY } (-7)(x + 3), \text{ THEN SUBTRACT.}$ $28 \text{THIS IS THE REMAINDER: PUT IT OVER } x + 3$ Solution: $x - 7 + \frac{28}{x + 3}$ $SYNTHETIC DIVISION:$ $(x+3) \text{ Is A LIAR, so wE PUT -3 IN THE BOX.}$ $THE COEFFICIENTS ARE 1x^{2} - 4x + 7 -3 \qquad 1 -4 \qquad 7 \qquad 1 x + 3 \qquad x + 3 \qquad x = 3 Solution: x - 7 + \frac{28}{x + 3} Solution: x - 7 + \frac{28}{x + 3}$	Divide.	30	Divide.		
Use either symthetic or long division. Both methods are shown becow. Use whichever one you prefer. LONG division: $x - 7 + \frac{28}{x+3}$ $x + 3 \int x^2 - 4x + 7 x(x)$ gives us x^2 $-(\frac{x^2 + 3x}{x+3}) \downarrow multiply x(x + 3)$, then subtract down. -7x + 7 (-7)(x) gives us $-7x-(-7x - 21) \qquad multiply (-7)(x + 3), then subtract.28 This is the remainder: put it over x + 3Solution: x - 7 + \frac{28}{x+3}SYNTHETIC division:(x+3) is a LIAR, so we put -3 in the box.The coefficients are 1x^2 - 4x + 7-3 \qquad 1 \qquad -4 \qquad 7x \qquad \# \qquad RSolution: x - 7 + \frac{28}{x+3}$	$(x^2 - 4x + 7) \div (x + 3)$		$(x^2 + 2x - 6) \div (x - 4)$		
SHOWN BELOW. USE WHICHEVER ONE YOU PREFER. LONG DIVISION: $x - 7 + \frac{28}{x+3}$ $x + 3 \int x^2 - 4x + 7$ $x(x)$ GIVES US x^2 $- (x^2 + 3x) \downarrow$ MULTIPLY $x(x + 3)$, THEN SUBTRACT DOWN. -7x + 7 $(-7)(x)$ GIVES US $-7x-(-7x - 21)$ MULTIPLY $(-7)(x + 3)$, THEN SUBTRACT. 28 THIS IS THE REMAINDER: PUT IT OVER $x + 3$ SOLUTION: $x - 7 + \frac{28}{x+3}$ SYNTHETIC DIVISION: (x+3) IS A LIAR, SO WE PUT -3 IN THE BOX. THE COEFFICIENTS ARE $[x^2 - 4x + 7]$ -3 1 -4 7 $x\frac{1}{x} - 3 211$ -7 $28x$ $#$ $RSOLUTION: x - 7 + \frac{28}{x+3}$	Use either synthetic or long division. Both methods are				
LONG Division: $x - 7 + \frac{28}{x+3}$ $x + 3 \int x^2 - 4x + 7 x(x) \text{ Gives US } x^2$ $- (x^2 + 3x) \downarrow \text{MULTIPLY } x(x+3), \text{ THEN SUBTRACT DOWN.}$ $- 7x + 7 (-7)(x) \text{ Gives US } -7x$ $- (-7x - 21) \text{MULTIPLY } (-7)(x+3), \text{ THEN SUBTRACT.}$ $28 \text{THIS IS THE REMAINDER: PUT IT OVER } x+3$ Solution: $x - 7 + \frac{28}{x+3}$ SYNTHETIC Division: (x+3) IS A LIAR, SO WE PUT - 3 IN THE BOX. THE COEFFICIENTS ARE $1x^2 - 4x + 7$ $-3 \qquad 1 \qquad -4 \qquad 7$ $\frac{4}{x+3}$ Solution: $x - 7 + \frac{28}{x+3}$ Solution: $x - 7 + \frac{28}{x+3}$	shown below. Use whichever one you prefer.				
$\begin{array}{c} x - 7 + \frac{28}{x+3} \\ x + 3 \\ x + 3 \\ \hline x^2 - 4x + 7 \\ x(x) \text{ Gives US } x^2 \\ \hline - (x^2 + 3x) \downarrow \\ -7x + 7 \\ (-7)(x) \text{ Gives US } -7x \\ \hline -7x + 7 \\ (-7)(x) \text{ Gives US } -7x \\ \hline -7x + 7 \\ (-7)(x) \text{ Gives US } -7x \\ \hline -7x + 7 \\ (-7)(x) \text{ Gives US } -7x \\ \hline -7x + 7 \\ 28 \\ THIS IS THE REMAINDER: PUT IT OVER x + 3 \\ Solution: x - 7 + \frac{28}{x+3} \\ \hline Solution: x - 7 + \frac{28}{x+3} \\ \hline -3 \\ 1 \\ -7 \\ 28 \\ x \\ x \\ R \\ \hline Solution: x - 7 + \frac{28}{x+3} \\ \hline \end{array}$	LONG division:				
$\frac{x+3}{x^2-4x+7} x(x) \text{ gives us } x^2$ $-(\frac{x^2+3x}{x+3}) \downarrow \text{multiply } x(x+3), \text{ then subtract down.}$ $-7x+7 (-7)(x) \text{ gives us } -7x$ $-(-7x-21) \text{multiply } (-7)(x+3), \text{ then subtract.}$ $28 \text{This is the remainder: put it over } x+3$ Solution: $x-7+\frac{28}{x+3}$ SYNTHETIC division: $(x+3) \text{ is a LIAR, so we put -3 in the box.}$ $The coefficients are 1x^2-4x+7 -3 1 -4 7 -3 1 -4 7 -3 21 1 -7 28 x \# R Solution: x-7+\frac{28}{x+3}$	$x-7+\frac{28}{1+2}$				
$-\frac{(x^{2}+3x)}{-7x+7} \downarrow \text{MULTIPLY } x(x+3), \text{ THEN SUBTRACT DOWN.} \\ -\frac{-7x+7}{-7x+7} (-7)(x) \text{ Gives us } -7x \\ -\frac{-(-7x-21)}{28} \text{ MULTIPLY } (-7)(x+3), \text{ THEN SUBTRACT.} \\ 28 \text{ THIS IS THE REMAINDER: PUT IT OVER } x+3 \\ \text{Solution: } x-7+\frac{28}{x+3} \\ \text{Solution: } x-7+\frac{28}{x+3} \\ \text{Solution: } x-7+\frac{28}{x+3} \\ -3 1 -4 7 \\ -3 1 -7 28 \\ x \# R \\ \text{Solution: } x-7+\frac{28}{x+3} \\ \text{Solution: } x-7+\frac{28}{x+3}$	$\frac{x+3}{x^2-4x+7}$ x(x) gives us x ²				
$-(x + 3x) \downarrow \text{ multiply } x(x + 3), \text{ then subtract down.}$ $-7x + 7 (-7)(x) \text{ gives us } -7x$ $-(-7x - 21) \text{multiply } (-7)(x + 3), \text{ then subtract.}$ $28 \text{This is the remainder: put it over } x + 3$ Solution: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC division: $(x + 3) \text{ is a LIAR, so we put } -3 \text{ in the box.}$ $The coefficients are 1x^2 - 4x + 7$ $-3 1 -4 7$ $-3 1 -4 7$ $\frac{1}{x + 3} -3 21$ $1 -7 28$ $x \# R$ Solution: $x - 7 + \frac{28}{x + 3}$					
$\frac{-(-7)(x)}{(-7)(x)} Gives us -7x}$ $\frac{-(-7x - 21)}{28} \text{Multiply } (-7)(x + 3), \text{ then subtract.}$ $28 \text{This is the remainder: put it over } x + 3$ Solution: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC division: $(x+3) \text{ is a LIAR, so we put -3 in the box.}$ $The coefficients are 1x^2 - 4x + 7 \frac{-3}{1} -4 7 \frac{-3}{1} -4 7 \frac{-3}{28} x \# R Solution: x - 7 + \frac{28}{x + 3}$	-(x + 5x) MULTIPLY $x(x + 5)$, THEN SUBTRACT DOWN.				
$\frac{-(-7x - 21)}{28} \text{MULTIPLY } (-7)(x + 3), \text{ THEN SUBTRACT.}$ $28 \text{THIS IS THE REMAINDER: PUT IT OVER } x + 3$ Solution: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC DIVISION: $(x+3) \text{ is a LIAR, so we PUT } -3 \text{ in the BOX.}$ $THE coefficients are 1x^2 - 4x + 7$ $-3 1 -4 7$ $-3 1 -4 7$ $\frac{1}{28}$ $x \# R$ Solution: $x - 7 + \frac{28}{x + 3}$	-7x + 7 (-7)(x) GIVES US -7x				
28 THIS IS THE REMAINDER: PUT IT OVER x+3 SOLUTION: $x-7+\frac{28}{x+3}$ SYNTHETIC DIVISION: (x+3) IS A LIAR, SO WE PUT -3 IN THE BOX. THE COEFFICIENTS ARE $1x^2-4x+7$ -3 1 -4 7 -3 21 1 -7 28 x # R Solution: $x-7+\frac{28}{x+3}$	-(-7x - 21) multiply $(-7)(x + 3)$, then subtract.				
Solution: $x - 7 + \frac{28}{x + 3}$ SYNTHETIC division: (x+3) is a LIAR, so we put -3 in the box. The coefficients are $1x^2 - 4x + 7$ -3 1 -4 7 -3 21 1 -7 28 x # R Solution: $x - 7 + \frac{28}{x + 3}$	28 This is the remainder: put it over x +3				
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SYNTHETIC DIVISION: (x+3) is a LIAR, so we put -3 in the box. The coefficients are $1x^2 - 4x + 7$ -3 1 -4 7 -3 21 1 -7 28 x # R Solution: $x-7+\frac{28}{x+3}$					
$\begin{array}{c c} (x+3) \text{ is a Liak, so we put -3 in the box.} \\ \hline The coefficients are \underline{1x^2} - 4x + 7 \\ \hline -3 & 1 & -4 & 7 \\ \hline & & -3 & 21 \\ \hline & 1 & -7 & \underline{28} \\ x & \# & R \\ \hline & x & \# & R \\ \hline & & Solution: x - 7 + \frac{28}{x+3} \end{array}$	STNIHEIL DIVISION:				
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$x \# R$ Solution: $x-7+\frac{28}{x+3}$	1 -7 28				
SOLUTION: $x - 7 + \frac{28}{x + 3}$	x # R				
Solution: $x - 7 + \frac{1}{x + 3}$	28				
	Solution: $x-7+\frac{1}{x+3}$				