SED #14 Using Fernal's theorem, find the remainder of 347 when it is divided by 23. Fernal's theorem implies that 322 = 1 (mod 23). Thus, 347 = (520)(3) = 1.33 = 27 = 4 (mod 23). Hence, the remainder will be 4. 14. Describe all solutions of the given congruence, as we did in transfer 20.14 and 20.15. 45 x = 15 (mod 24) Tives god (45, 24) = 3 and 3 15, from Theorem 20.12 that are exactly 3 solutions in II. Dividing by 3, we obtain the congruence 15 x = 5 (mod 3). Since 15 = 7 (mod 8) and 7.7 = 49 = 1 (mod 7), 157 = 7 in II. Hence, x = 15 1.5 = 7.5 = 35 = 3 (mod 8). Thus, x = 3 (mod 8). This implies that either x = 3 (mod 24), x = 11 (mod 24), or x = 19 (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes 3+24II, 11+24II, and 19+24II. \$21 #2. Describe the field F of quotients of the integral subdomain D = 20 + mod 2 n, mod 23 of IR. (armier the specient a+b) = (a+b) (c-b) = 2 - 2b + (bc-ad) = 2 - 2b + (c-b) =		
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Format's theorem implies that $3^{22} \equiv 1 \pmod{23}$. Thus, $3^{47} \equiv (3^{22})^2(3)^3 = 1^2 \cdot 3^3 \equiv 27 \equiv 4 \pmod{23}$. Thus, $3^{47} \equiv (3^{22})^2(3)^3 = 1^2 \cdot 3^3 \equiv 27 \equiv 4 \pmod{23}$. Theorem in the entire will be 4 . 14. Describe all solutions of the given construence, as we did in Examples 20.19 and 20.15 . $45 \times \equiv 15 \pmod{24}$. Since $90 \times 10^{12} = $	\$20 #4	Using Fermat's theorem, Find the remainder of 347 when it is
Hence, the remainder will be 4, 14. Describe all solutions of the given congruence, as we did in Examples 70.14 and 20.15. 45 \times = 15 (mod 24) Tince $\gcd(45,24) = 3$ and $3 \mid 15$, from Theorem 20.12 that are exactly 3 solutions in \mathbb{Z}_{H} . Dividing by 3, we obtain the congruence $15 \times = 5$ (mod 8). Since $15 = 7$ (mod 8) and $7 \cdot 7 = 49 = 1$ (mod 8), $15' = 7$ in \mathbb{Z}_{S} . Hence, $\times = 15' \cdot 5 = 7 \cdot 5 = 35 = 3$ (mod 8). Thus, $\times = 3$ (mod 8). This implies that either $\times = 3$ (mod 24), $\times = 11$ (mod 24), or $\times = 19$ (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes $3+24\mathbb{Z}$, $11+24\mathbb{Z}$, and $19+24\mathbb{Z}$. \$21 #2 Describe the field F of quotients of the integral subdomain. $D = \$n + m\sqrt{2} \mid n, n \notin \mathbb{Z}_{3} \text{ of } \mathbb{R}$. (consider the quotient $a + b\sqrt{2}$ ($a + b\sqrt{2}$)($a - b\sqrt{2}$) $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ Tince $a, b, c, d \in \mathbb{Z}_{2}$ at $b\sqrt{2}$ $c \in d\sqrt{2}$. With the appropriate choice of a becomed of, we can also show that $a(\sqrt{2}) \in F$. Hence, $F = a(\sqrt{2})$.		divided by 23.
Hence, the remainder will be 4, 14. Describe all solutions of the given congruence, as we did in Examples 70.14 and 20.15. 45 \times = 15 (mod 24) Tince $\gcd(45,24) = 3$ and $3 \mid 15$, from Theorem 20.12 that are exactly 3 solutions in \mathbb{Z}_{H} . Dividing by 3, we obtain the congruence $15 \times = 5$ (mod 8). Since $15 = 7$ (mod 8) and $7 \cdot 7 = 49 = 1$ (mod 8), $15' = 7$ in \mathbb{Z}_{S} . Hence, $\times = 15' \cdot 5 = 7 \cdot 5 = 35 = 3$ (mod 8). Thus, $\times = 3$ (mod 8). This implies that either $\times = 3$ (mod 24), $\times = 11$ (mod 24), or $\times = 19$ (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes $3+24\mathbb{Z}$, $11+24\mathbb{Z}$, and $19+24\mathbb{Z}$. \$21 #2 Describe the field F of quotients of the integral subdomain. $D = \$n + m\sqrt{2} \mid n, n \notin \mathbb{Z}_{3} \text{ of } \mathbb{R}$. (consider the quotient $a + b\sqrt{2}$ ($a + b\sqrt{2}$)($a - b\sqrt{2}$) $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ Tince $a, b, c, d \in \mathbb{Z}_{2}$ at $b\sqrt{2}$ $c \in d\sqrt{2}$. With the appropriate choice of a becomed of, we can also show that $a(\sqrt{2}) \in F$. Hence, $F = a(\sqrt{2})$.	en delen in stansassion, austras en alternativa anticipa si san participa de la filia frança de l'anticipa de l'an	Fermat's theorem implies that 322 = 1 (males). Thus,
Hence, the remainder will be 4, 14. Describe all solutions of the given congruence, as we did in Examples 70.14 and 20.15. 45 \times = 15 (mod 24) Tince $\gcd(45,24) = 3$ and $3 \mid 15$, from Theorem 20.12 that are exactly 3 solutions in \mathbb{Z}_{H} . Dividing by 3, we obtain the congruence $15 \times = 5$ (mod 8). Since $15 = 7$ (mod 8) and $7 \cdot 7 = 49 = 1$ (mod 8), $15' = 7$ in \mathbb{Z}_{S} . Hence, $\times = 15' \cdot 5 = 7 \cdot 5 = 35 = 3$ (mod 8). Thus, $\times = 3$ (mod 8). This implies that either $\times = 3$ (mod 24), $\times = 11$ (mod 24), or $\times = 19$ (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes $3+24\mathbb{Z}$, $11+24\mathbb{Z}$, and $19+24\mathbb{Z}$. \$21 #2 Describe the field F of quotients of the integral subdomain. $D = \$n + m\sqrt{2} \mid n, n \notin \mathbb{Z}_{3} \text{ of } \mathbb{R}$. (consider the quotient $a + b\sqrt{2}$ ($a + b\sqrt{2}$)($a - b\sqrt{2}$) $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ $a \in -2bd + b \in -ad$ $\sqrt{2}$ Tince $a, b, c, d \in \mathbb{Z}_{2}$ at $b\sqrt{2}$ $c \in d\sqrt{2}$. With the appropriate choice of a becomed of, we can also show that $a(\sqrt{2}) \in F$. Hence, $F = a(\sqrt{2})$.		$3^{47} = (3^{22})^2(3^3) = 1^2 \cdot 3^3 = 27 = 4 \pmod{23}$
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that are exactly 3 solutions in U_{AB} , lividing by 3, we obtain the congruence $15x = 5 \pmod{8}$. Since $15 = 7 \pmod{8}$ and $7 \cdot 7 = 99 = 1 \pmod{8}$, $15' = 7$ in \mathbb{Z}_8 . Hence, $x = 15' \cdot 5 = 7 \cdot 5 = 35 = 3 \pmod{8}$. Thus, $x = 3 \pmod{8}$. This implies that either $x = 3 \pmod{24}$, $x = 11 \pmod{24}$, or $x = 19 \pmod{24}$. Hence, all solutions to the congruence are the integers in the three residue classes $3 + 24\mathbb{Z}$, $11 + 24\mathbb{Z}$, and $19 + 24\mathbb{Z}$. § 21 #2 Describe the field F of quotients of the integral subdomain $10 = 20 + 10 + 10 + 10 = 10 + 10 = 10 = 10 = 1$		
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This implies that either $X = 3$ (mod 24), $X = 11$ (mod 24), or $X = 19$ (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes $3+24\%$, $11+24\%$, and $19+24\%$. § 21 #2. Describe the field F of quotients of the integral subdomain $D = 2n + m\sqrt{2} + n + m$		the construence $15x = 5 \pmod{8}$. Since $15 = 7 \pmod{8}$ and
This implies that either $X = 3$ (mod 24), $X = 11$ (mod 24), or $X = 19$ (mod 24). Hence, all solutions to the congruence are the integers in the three residue classes $3+24\%$, $11+24\%$, and $19+24\%$. § 21 #2. Describe the field F of quotients of the integral subdomain $D = 2n + m\sqrt{2} + n + m$		7.7=49=1 (mod 8), 15=7 in To. Hence,
$X = 19' \pmod{24}$. Hence, all solutions to the congruence are the integers in the three residue classes $3+247L$, $11+247L$, and $19+247L$. § 21 # 2. Describe the field F of quotients of the integral subdomain? $D = \{x \mid x $	-	X=15,5=7.5=35=3 (mad 8). Thus, X=3 (mod 8).
the integers in the three residue classes $3+2472$, $9+242$, and $19+242$. § 21 # 2. Describe the field F of quotients of the integral subdomain $D=3n+mJz$ $n,m\in\mathbb{Z}$ of R . Consider the quotient $a+bJz$ = $(a+bJz)(c-dJz) = ac-2bd+(bc-ad)Jz$ $c+dJz = (c+dJz)(c-dJz) = c^2-7d^2$ $= ac-2bd+bc-ad-Jz$ $= ac-2bd+bc-ad-Jz$ $= ac-2bd+bc-ad-Jz$ Since $a,b,c,d\in\mathbb{Z}$, $a+bJz\in Q(Jz)=5$ $= 5$ $c+dJz$ Thence, $F=Q(Jz)$. With the appropriate choice of $a,b,c,andd$, we can also show that $Q(Jz)\subseteq F$. Hence, $F=Q(Jz)$.	-	This implies that either X = 3 (mod 24), X = 11 (mod 24), or
\$21#2 Describe the field F of quotients of the integral subdomain? $D = 2n + mJz + n = 23$ of R . Consider the quotient $a + bJz = (a + bJz)(c - dJz) = ac - 2bd + (bc - ad)Jz$ $c + dJz = (c + dJz)(c - dJz) = c^2 - 2d^2$ $= ac - 2bd + bc - ad Jz$ $= ac - 2bd + bc - ad Jz$ $= ac - 2bd + bc - ad Jz$ $= ac - 2bd + bc - ad Jz$ Tince $a, b, c, d \in \mathbb{Z}$, $atbJz \in \Omega(Jz) = \frac{1}{2}q_1 + q_2 + \frac{1}{2}q_2 + \frac{1}{2}q_$		
D=3n+mJz n,m EZ3 of IR. Consider the quotient at $b\sqrt{z}$ (a+ $b\sqrt{z}$) (c- $d\sqrt{z}$) = ac- $2bd$ + (bc- ad) \sqrt{z} $c+d\sqrt{z}$ (c+ $d\sqrt{z}$) (c- $d\sqrt{z}$) = c^2-7d^2 = $ac-2bd$ + $bc-ad$ \sqrt{z} $-2c-7d^2$ c^2-7d^2 Dince a,b,c,d \in Z, at $b\sqrt{z}$ \in $C(\sqrt{z}) = \{g_1+g_2\} = \{g_1+g_2$		the integers in the three residue classes 3+2472, 91+2472, and 19+2472.
D=3n+mJz n,m EZ3 of IR. Consider the quotient at $b\sqrt{z}$ (a+ $b\sqrt{z}$) (c- $d\sqrt{z}$) = ac- $2bd$ + (bc- ad) \sqrt{z} $c+d\sqrt{z}$ (c+ $d\sqrt{z}$) (c- $d\sqrt{z}$) = c^2-7d^2 = $ac-2bd$ + $bc-ad$ \sqrt{z} $-2c-7d^2$ c^2-7d^2 Dince a,b,c,d \in Z, at $b\sqrt{z}$ \in $C(\sqrt{z}) = \{g_1+g_2\} = \{g_1+g_2$		
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C+d\(\siz\) (c+d\(\frac{1}{2}\)) (c-d\(\frac{1}{2}\)) \(e^2 - 7d^2\) $= ac - 2bd + bc - ad \(\siz\) = \(e^2 - 7d^2\) \(e^2 - 7d^2\) $		D=3n+mJz / n,m & Z3 of 18.
$= \frac{ac-2bd}{2^2-7d^2} + \frac{bc-ad}{2^2-7d^2}$ Since $a,b,c,d \in \mathbb{Z}$, $a+b\sqrt{2} \in \mathcal{Q}(\sqrt{2}) = \{q_1+q_2\sqrt{2} \mid q_1,q_2 \in \mathcal{Q}\}$ $+ \frac{bc-ad}{2^2-7d^2} + \frac{c^2-7d^2}{2^2-7d^2}$ Hence, $F \subseteq \mathcal{Q}(\sqrt{2})$. With the appropriate choice of $a,b,c,andd$, we can also show that $\mathcal{Q}(\sqrt{2}) \subseteq F$. Hence, $F = \mathcal{Q}(\sqrt{2})$.		
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Hence, $F \in Q(JZ)$. With the appropriate choice of abor, and of we can also show that $Q(JZ) \subseteq F$. Hence, $F = Q(JZ)$.		
Hence, $F \in Q(JZ)$. With the appropriate choice of abor, and of we can also show that $Q(JZ) \subseteq F$. Hence, $F = Q(JZ)$.	utasa kutata untarriki, dapunarrika kunsu dirik anno varriparrikitas gili ndarmas sortespen	Dince a, b, c, & E &, atb/2 & Q(J2) = \$ a, 1 a, 5 1 4, a & 6 2
		Ctdsz Egipe girge
	The BANKARIAN as the character as a particular description of the character and the character as a character as	Hence, I = Ol(12). With the appropriate choice of appropriate
) \$27. #20 Find a polynomial of degree >0 in Zy[X] that is a unit. [2x+1] has degree 1 and is a unit in Zy[X] with (2x+1) = 2x+1 since (2x+1)(2x+1) = 4x2+4x+1 = 1 in Zy[X].		we can also show that OU(12) S.F. Hence, F=OU(JZ).
Tx+1 has degree I and is a unit in Ty[X] with (2x+1) = 1x+1 since (2x+1) (2x+1) = 4x2+4x+1 = 1 in Ty[X].	Them item	
Since $(2x+1)(2x+1) = 4x^2+4x+1 = 1$ in $(2x+1) = 2x+1$	1341.#02.	tind a polynomial of degree 20 in CylXI that is a unit.
Since $(lx+1)(lx+1) = 4x^{l}+4x+1 = 1$ in $[lx]$.		(x+1 has degree I and is a unit in Ry(X) with (2x+1) = (x+1)
		since (lx+1)(zx+1) = 4x+4x+1=1 in Zy(x).

TO THE RESIDENCE OF THE PROPERTY OF THE PROPER	
2	4. Prove that if Dis an integral domain, then DIXI is an integral
VIII-lika in treesperuulga ja saan oo sa tii in heli-salika ja	domain.
Mikanijan, gaggioos sym-stain intristrikasiya ning mikansayaya ya	Proof i From Theorem 22,2, we know that DIXI is a commutative
	ring with unity 1. We need only show that DIXI contains no
	zero divisors. We wish to show that if a(x)b(x)=0, then a(x)=0
	or b(x)=0. Instead, we will show the contrapositive: If a(x) +0 and
	b(x) +0, then a(x) b(x) +0. Let a(x) = axxn+axxn++ + + +ax+ax
	and b(x)=boox"+bonxx"++box+bo where an \$0 and booto
	Then the leading coefficient of alxible is a bm. Since an +0,
AGE CONTROL CO	bon +0, and D has no zero divisors, unbon +0. Therefore,
	aldb(x) +0. Thus, D[x] is an integral domain.
\$23. #6	the given finite field.
Alexandriae Selection and Company and Company	the given finite field.
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entigenskelikansgallerkens soodianessekinessekralankiskansoonanesseksaansaa	(onsider 7, *= \$1,23,4,5,63 (the exclic multiplicative group of units)
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der Karrensus Signes (bestuden i Francisco (kalansus segue del globolistico (side (kilonis segue assessingui m	Hence Z7 has generators 3 and 5.
Boulencourses administration 644 540-640, 25 designed, education on internet collections many discourse	
12	Is $x^3 + 2x + 3$ an irreducible polynomial in $\mathbb{Z}_5[x]$? Why? Express it as a product of irreducible polynomials in $\mathbb{Z}_5[x]$.
Providental interested interested interested in the contract of the contract o	as a product of irreducible polynomials in ZsIXI.
	We have that 4 is a root of x3+7x +3 in Us since 43+2(4)+3=75=0
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SANSKEEP VAARIGEVUUSSE SOOT REELENGISSUUSSE SERVENISE	is a factor of x3+2x+3 in R5[X].
and the second s	

	x2 -x +3	
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Windows with the party of the party of the property of the party of th	$x+1/x^3+0x^2+2x+3$ -(x ³ +x ²) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
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Miller Life Adjanosky richnes (and describe a constraint for the Constraint and Cons	$x'+2x+3 = (x+1)(x^2-x+3) = (x+1)(x^2+4x+3)$	
	$= (x+1)(x+1)(x+3) = (x+1)^2(x+3)$	in 76[x]
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