

Name:

ID:

PMath 330

Assignment 7

Mark _____

In each of the following you are given a pair of terms that you are to test for being unifiable, and if they are unifiable, give the most general unifier.

[illegible][illegible][illegible][illegible][illegible][illegible][illegible]

For the Normal Form TRS given by

$$\mathcal{R} \approx \{fffx \longrightarrow fx\}$$

find the normal forms for the following terms:

Term	Normal Form
fx	_____
$ff y$	_____
$ff fz$	_____
$ff ff u$	_____
$ff ff fv$	_____

For the Normal Form TRS given by

$$\mathcal{R} \approx \{g f x \longrightarrow f g x, f f x \longrightarrow g x, g g g x \longrightarrow f x\}$$

find the normal forms for the following terms:

Term	Normal Form
$g f g x$	_____
$g f f g y$	_____
$g f g f g z$	_____
$f f g g u$	_____
$f g f g f v$	_____

For the Normal Form TRS given by

$$\mathcal{R} \approx \{(x + y) + z \longrightarrow x + z\}$$

find the normal forms for the following terms:

Term	Normal Form
$(x + x) + x$	_____
$(x + u) + (y + v)$	_____
$(x + (u + v)) + (v + u)$	_____
$((x + w) + (x + u)) + y$	_____
$(x + y) + ((y + z) + (z + w))$	_____

Indicate why the TRS

$$\mathcal{R} \approx \{x \cdot y \longrightarrow z + x\}$$

is not terminating for the term $x \cdot y$ by filling in a few steps of

$$x \cdot y \xrightarrow{\mathcal{R}} \underline{\hspace{2cm}} \xrightarrow{\mathcal{R}} \underline{\hspace{2cm}} \xrightarrow{\mathcal{R}} \underline{\hspace{2cm}}$$

Indicate why the TRS

$$\mathcal{R} \approx \{(x + y) + z \longrightarrow (z + x) + y\}$$

is not terminating for the term $(x + y) + z$ by filling in a few steps of

$$(x + y) + z \longrightarrow_{\mathcal{R}} \underline{\hspace{10em}} \longrightarrow_{\mathcal{R}} \underline{\hspace{10em}} \longrightarrow_{\mathcal{R}} \underline{\hspace{10em}}$$

Indicate why the terminating TRS

$$\mathcal{R} \approx \{x + fy \longrightarrow y + x, \quad fx + y \longrightarrow x\}$$

is not a normal form TRS by giving two different terminal forms:

Term	Terminal Form
$fx + fy$	
$fx + fy$	

Indicate why the terminating TRS

$$\mathcal{R} \approx \{(x + y) + z \longrightarrow y + (x + z)\}$$

is not a normal form TRS by giving two different terminal forms:

Term	Terminal Form
$((x + y) + z) + w$	
$((x + y) + z) + w$	

Given the pair of term rewrite rules (with disjoint variables)

$$\underline{fgfx} \longrightarrow gfgx \quad \text{and} \quad gf\underline{fu} \longrightarrow fgu$$

find the critical pair that results from unifying the underlined subterms:(Show Work)

Answer: _____

DETAILS:

Given the pair of term rewrite rules (with disjoint variables)

$$\underline{(y + z)} \cdot x \longrightarrow (y \cdot x) + (z \cdot x) \quad \text{and} \quad \underline{(u + v) + w} \longrightarrow u + (v + w)$$

find the critical pair that results from unifying the underlined subterms:(Show Work)

Answer: _____

DETAILS: