Worksheet Exercise 4.3.
Calculating Truth-values

Name _____
Class _____ Date _____

Part A. Translate each of the following sentences into a regular English sentence, using the listed meanings for the symbols; and then, state their truth-value, **T** or **F**.

T = triangle, F = figure, C = circle, S = square,
U = four-sided, G = green, B = blue, c = Chicago

		truth-value
1.	(∀x)(Fx ⊃ Tx)	
2.	(∀x)(Cx ⊃ ~Sx)	
3.	(∃x)(Sx & Ux)	
4.	(∀x)(Sx & Gx)	
5.	(∃x)(~Sx & ~Cx)	
6.	(∀x)(Bx V Gx)	
7.	(∀x)(~Bx V ~Gx)	
8.	Tc	

Part B. In the spaces provided, calculate the truth-values of the following sentences, using the calculated truth-values from Part A. Use the Tree Method.

9. Tc ⊃ (∃x)(Sx & Ux)

10. (∀x)(Fx ⊃ Tx) V (∀x)(Bx V Gx)

11. (∃x)(Sx & Ux) ≡ (∃x)(~Sx & ~Cx)

12. ~[(∀x)(Bx V Gx) & Tc]

13. ~Tc V ~(∀x)(Cx ⊃ ~Sx)

14. ~(∀x)(Fx ⊃ Tx) ⊃ ~(∃x)(Sx & Ux)

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Ex. 4. 3. C. Name _____ / _____

Part C. In the spaces provided, calculate the truth-values of the following sentences. Use the Tree Method and the symbol meanings from Part A. You must first determine the values of the simple component sentences.

15. $(\forall x)(Fx \supset Sx) \equiv [(\forall x)(Tx \supset Ux) \vee \sim(Bc \,\&\, Tc)]$

16. $(\exists x)(Fx \,\&\, Cx) \,\&\, (\exists x)(Fx \,\&\, \sim Cx) \,\&\, \sim(\exists x)[Fx \,\&\, (Cx \,\&\, \sim Cx)]$

17. $[(\forall x)(Tx \supset Bx) \vee (\forall x)(Tx \supset \sim Bx)] \,\&\, (\forall x)[Tx \supset (Bx \vee \sim Bx)]$

18. $(\forall x)[(Sx \,\&\, Bx) \supset (Fx \,\&\, Ux \,\&\, \sim Gx)] \supset [(\exists x)(Sx \,\&\, Tx) \vee (\exists x)(Bx \,\&\, Gx)]$

19. $[(\forall x)(Cx \supset Bx) \,\&\, (\forall x)(Bx \supset Cx)] \equiv (\forall x)(Cx \equiv Bx)$

20. $\{(\exists x)[Fx \,\&\, (Tx \,\&\, \sim Ux \,\&\, \sim Cx)] \vee (\exists x)[Fx \,\&\, (\sim Tx \,\&\, Ux \,\&\, \sim Cx)]\} \supset \sim(\forall x)Gx$