20. $\dfrac{n+1}{3^{n-1}} \cdot \dfrac{3^{n+1}}{n^2+n}$

21. $\dfrac{2x+3}{5x} - \dfrac{2x-1}{10x} + \dfrac{4}{x}$

22. $\dfrac{2x-5}{4-3x} + \dfrac{2-x}{3x-4}$

23. $\left(4+\dfrac{1}{a-1}\right) \div \left(\dfrac{2}{a-1}+3\right)$

24. $\dfrac{2a}{a^2-1} - \dfrac{a+1}{a-1} + 1$

25. $1 - \left(\dfrac{a^x - a^{-x}}{a^x + a^{-x}}\right)$

26. $\left(\dfrac{a^x + a^{-x}}{2}\right)^2 - \left(\dfrac{a^x - a^{-x}}{2}\right)^2$

27. $\dfrac{1}{x^n} + \dfrac{2}{x^{n+1}}$

28. $\dfrac{a}{x^{n+1}} + \dfrac{b}{x^n}$

29. $\dfrac{2}{x^{n-1}} - \dfrac{1}{x^{n+1}}$

30. $\dfrac{\tan x}{2} - \dfrac{\tan x - 1}{2}$

31. $\dfrac{1}{\tan x - 1} + \dfrac{2}{1 - \tan x}$

32. $\dfrac{2 - \tan x}{3 - 2\tan x} - \dfrac{4}{2\tan x - 3}$

33. $\dfrac{5}{2\tan^2 x} - \dfrac{3}{4\tan x}$

34. $\dfrac{1}{\tan x} - \tan x$

35. $\dfrac{4\cos x}{5} + \dfrac{2}{5\cos x} - \dfrac{\cos x}{2}$

36. $\dfrac{\tan x}{\tan^2 x - 4} - \dfrac{1}{\tan x + 2}$

37. $\dfrac{\cos x}{\cos x - 1} - \dfrac{2}{\cos^2 x - 1}$

38. $\dfrac{\cos x + 1}{2\cos x + 6} + \dfrac{4 - \cos^2 x}{2\cos^2 x + 2\cos x - 12}$

39. $\dfrac{1}{h}\left(\dfrac{1}{x+h} - \dfrac{1}{x}\right)$

40. $\dfrac{1}{h}\left[\dfrac{2}{(x+h)^2} - \dfrac{2}{x^2}\right]$

Math 20

Algebra Review

I. Complex Fractions

Recall that a complex fraction is one in which there are fractions in the numerator, denominator, or both. The fastest way to simplify a complex fraction is to multiply the numerator and denominator by the least common denominator of all of the fractions which appear inside.

Example 1

To simplify the complex fraction $\dfrac{3 - \dfrac{1}{x^2}}{2 - \dfrac{3}{x}}$ we would multiply the numerator and denominator by the LCD of the fractions which is x^2:

$$\frac{\left(3 - \dfrac{1}{x^2}\right)x^2}{\left(2 - \dfrac{3}{x}\right)x^2} = \frac{3x^2 - 1}{2x^2 - 3x}$$

Example 2

To simplify the complex fraction $\dfrac{\dfrac{b}{b-a} - \dfrac{a}{b+a}}{\dfrac{b^2+a^2}{b^2-a^2}}$ we would multiply the numerator and denominator by the LCD of the fractions which is $b^2 - a^2 = (b-a)(b+a)$:

$$\frac{\left(\dfrac{b}{b-a} - \dfrac{a}{b+a}\right)(b-a)(b+a)}{\left(\dfrac{b^2+a^2}{b^2-a^2}\right)(b-a)(b+a)} = \frac{b(b+a) - a(b-a)}{b^2 + a^2}$$

$$= \frac{b^2 + ab - ab + a^2}{b^2 + a^2} = \frac{b^2 + a^2}{b^2 + a^2} = 1$$