Ch 1: Introduction to Calculus Date: _____

1.1: Radical Expressions: Rationalizing Denominators

Ex1. Simplify by rationalizing the denominators.

a. $\frac{14}{3\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$

$= \frac{14\sqrt{7}}{3(7)}$

$= \frac{2\sqrt{7}}{3}$

b. $\frac{3}{1+\sqrt{2}} \times \frac{1-\sqrt{2}}{1-\sqrt{2}}$ conjugate

$= \frac{3-3\sqrt{2}}{1-\sqrt{2}+\sqrt{2}-2}$

$= \frac{3-3\sqrt{2}}{-1}$

$= -3+3\sqrt{2}$

c. $\frac{\sqrt{3}}{\sqrt{2}-\sqrt{6}} \times \frac{\sqrt{2}+\sqrt{6}}{\sqrt{2}+\sqrt{6}}$

$= \frac{\sqrt{6}+\sqrt{18}}{2-6}$

$= \frac{\sqrt{6}+3\sqrt{2}}{-4}$

$= \frac{-\sqrt{6}-3\sqrt{2}}{4}$

d. $\frac{\sqrt{3}}{2\sqrt{3}+5} \times \frac{2\sqrt{3}-5}{2\sqrt{3}-5}$

$= \frac{2(3)-5\sqrt{3}}{4(3)-25}$

$= \frac{6-5\sqrt{3}}{-13}$

$= \frac{5\sqrt{3}-6}{13}$

Ex2. Simplify by rationalizing the numerators.

a. $\dfrac{7\sqrt{2}-\sqrt{21}}{7\sqrt{6}} \times \dfrac{7\sqrt{2}+\sqrt{21}}{7\sqrt{2}+\sqrt{21}}$

$= \dfrac{49(2)-21}{49\sqrt{12}+7\sqrt{2\times3\times3\times7}}$

$= \dfrac{98-21}{98\sqrt{3}+21\sqrt{14}}$

$= \dfrac{77}{98\sqrt{3}+21\sqrt{14}}$

$= \dfrac{11}{14\sqrt{3}+3\sqrt{14}}$

b. $\dfrac{\sqrt{a^2+b^2}+a}{b} \times \dfrac{\sqrt{mm}-a}{\sqrt{mm}-a}$

$= \dfrac{a^2+b^2-a^2}{b(\sqrt{mm}-a)}$

$= \dfrac{b}{\sqrt{a^2+b^2}-a}$

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