

Calculus 1-3

$$1. a) \frac{\sqrt{x-3} \cdot \sqrt{x+3}}{x-9} \cdot \frac{\sqrt{x+3}}{\sqrt{x+3}}$$

$$\frac{x+3\sqrt{x-3}\sqrt{x-9}}{(x-9)(\sqrt{x+3})}$$

$$\frac{\cancel{x-9} \cdot 1}{(\cancel{x-9})(\sqrt{x+3})}$$

$$\frac{1}{\sqrt{x+3}}$$

$$b) \frac{\frac{1}{\sqrt{x}} - 1}{x-1} \cdot \frac{\sqrt{x}+1}{\sqrt{x}+1}$$

$$\frac{\frac{1}{\sqrt{x}} + \frac{1}{\sqrt{x}} - \frac{1}{\sqrt{x}} - 1}{(x-1)(\frac{1}{\sqrt{x}}+1)}$$

$$\frac{\frac{1}{\sqrt{x}} - 1}{(x-1)(\frac{1}{\sqrt{x}}+1)} \cdot \frac{x}{x}$$

$$\frac{1-x}{x(x-1)(\frac{1}{\sqrt{x}}+1)}$$

$$c) \frac{x\sqrt{x}-8}{x-4} \cdot \frac{x\sqrt{x}+8}{x\sqrt{x}+8}$$

$$\frac{x^2x-64}{(x-4)(x\sqrt{x}+8)}$$

$$\frac{x^3-64}{(x-4)(x\sqrt{x}+8)}$$

$$\frac{-1(\cancel{x-1})}{x(\cancel{x-1})(\frac{1}{\sqrt{x}}+1)}$$

$$\frac{-1}{\frac{x}{\sqrt{x}}+x}$$

$$\frac{-1}{\sqrt{x}+x}$$

$\frac{x}{\sqrt{x}} = \frac{x^1}{x^{\frac{1}{2}}} = x^{\frac{1}{2}}$

$$\frac{\cancel{x-4}(x^2+4x+16)}{\cancel{x-4}(x\sqrt{x}+8)}$$

$$\frac{x^2+4x+16}{x\sqrt{x}+8}$$

$$d) \frac{\sqrt{a+h} + \sqrt{a-h}}{h} \cdot \frac{\sqrt{a+h} - \sqrt{a-h}}{\sqrt{a+h} - \sqrt{a-h}}$$

$$\frac{(a+h) - (a-h)}{h(\sqrt{a+h} - \sqrt{a-h})}$$

$$\frac{a+h-a+h}{h(\sqrt{a+h} - \sqrt{a-h})}$$

$$\frac{2h}{h(\sqrt{a+h} - \sqrt{a-h})}$$

$$\frac{2}{\sqrt{a+h} - \sqrt{a-h}}$$

1-3 cont.

$$1. e) \frac{\sqrt{x^2+3x+4}-x}{1} \cdot \frac{\sqrt{x^2+3x+4}+x}{\sqrt{x^2+3x+4}+x}$$

$$\frac{x^2+3x+4-x^2}{\sqrt{x^2+3x+4}+x}$$

$$\frac{3x+4}{\sqrt{x^2+3x+4}+x}$$

$$f) \frac{\sqrt{x^2+x}-\sqrt{x^2-x}}{1} \cdot \frac{\sqrt{x^2+x}+\sqrt{x^2-x}}{\sqrt{x^2+x}+\sqrt{x^2-x}}$$

$$\frac{(x^2+x)-(x^2-x)}{\sqrt{x^2+x}+\sqrt{x^2-x}}$$

$$\frac{x^2+x-x^2+x}{\sqrt{x^2+x}+\sqrt{x^2-x}}$$

$$\frac{2x}{\sqrt{x^2+x}+\sqrt{x^2-x}}$$

$$2. a) \frac{1}{\sqrt{x+1}-1} \cdot \frac{\sqrt{x+1}+1}{\sqrt{x+1}+1}$$

$$\frac{\sqrt{x+1}+1}{x+1-1}$$

$$\frac{\sqrt{x+1}+1}{x}$$

$$b) \frac{4}{\sqrt{x+2}+\sqrt{x}} \cdot \frac{\sqrt{x+2}-\sqrt{x}}{\sqrt{x+2}-\sqrt{x}}$$

$$\frac{4(\sqrt{x+2}-\sqrt{x})}{x+2-x}$$

$$\frac{4(\sqrt{x+2}-\sqrt{x})}{2}$$

$$2(\sqrt{x+2}-\sqrt{x})$$

$$c) \frac{x}{\sqrt{x^2+1}+x} \cdot \frac{\sqrt{x^2+1}-x}{\sqrt{x^2+1}-x}$$

$$\frac{x(\sqrt{x^2+1}-x)}{x^2+1-x^2}$$

$$\frac{x(\sqrt{x^2+1}-x)}{1}$$

$$d) \frac{x^2}{\sqrt{x+1}-\sqrt{x-1}} \cdot \frac{\sqrt{x+1}+\sqrt{x-1}}{\sqrt{x+1}+\sqrt{x-1}}$$

$$\frac{x^2(\sqrt{x+1}+\sqrt{x-1})}{(x+1)-(x-1)}$$

$$\frac{x^2(\sqrt{x+1}+\sqrt{x-1})}{x+1-x+1}$$

$$\frac{x^2(\sqrt{x+1}+\sqrt{x-1})}{2}$$