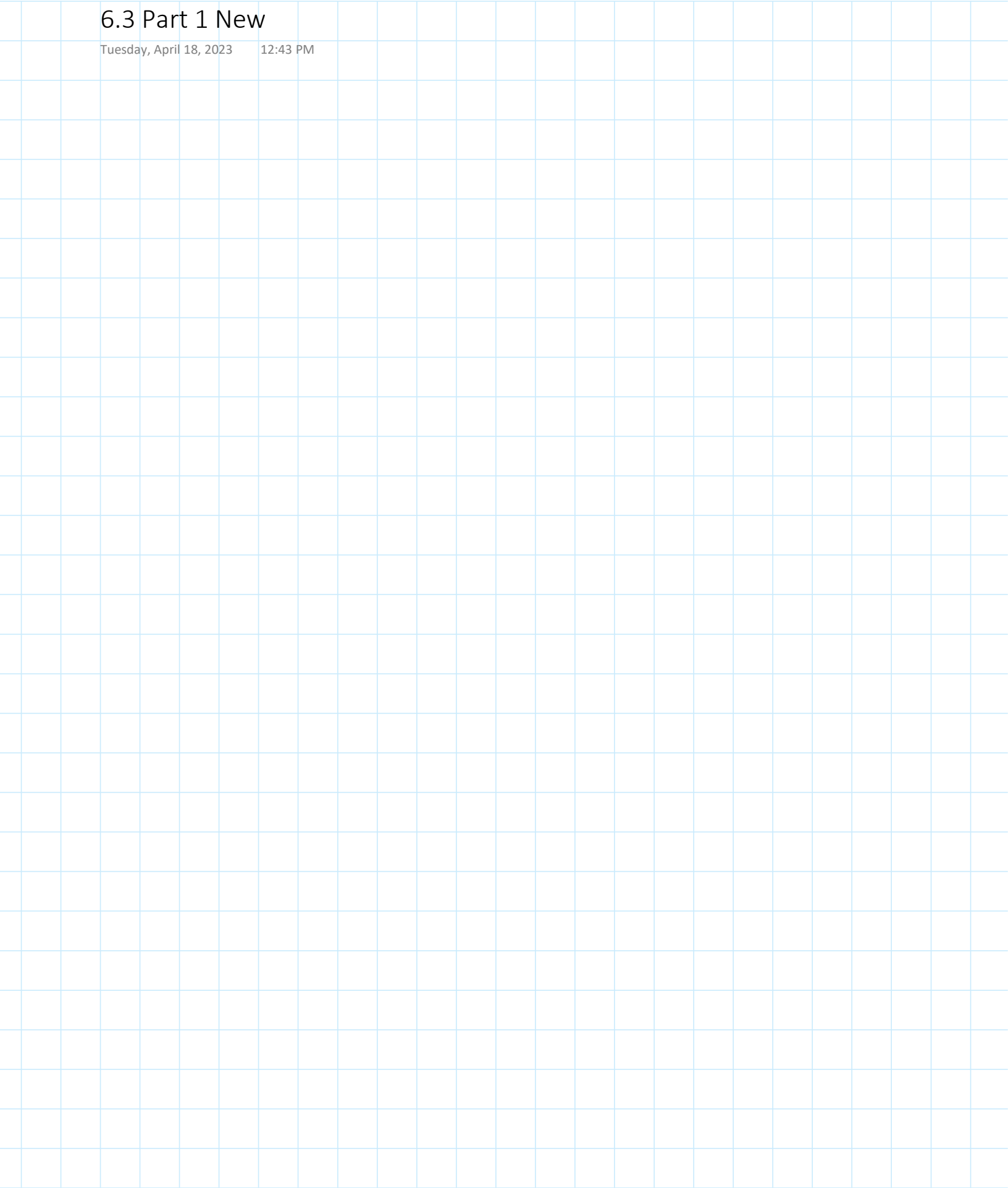


6.3 Part 1 New

Tuesday, April 18, 2023 12:43 PM



6.3 Part 1 Proving Identities

Review

a) $\frac{3}{7} + \frac{2}{5}$

$$\frac{5 \cdot 3}{5(7)} + \frac{2(7)}{5(7)}$$

$$\frac{15}{35} + \frac{14}{35}$$

$$\frac{29}{35}$$

b) expand $5(2x + 3)$

$$5(2x) + 5(3)$$

$$10x + 15$$

c) factor $6x^2 - 12x$

$$\text{GCF} = 6x$$

$$\frac{6x^2}{6x} - \frac{12x}{6x}$$

$$6x(x - 2)$$

Prove the Identities

1. $\sec \theta (1 + \cos \theta) = 1 + \sec \theta$

$$\sec \theta (1) + \sec \theta \cdot \cos \theta = \text{R.S.}$$

$$\sec \theta + \frac{1}{\cos \theta} \cdot \cos \theta = \text{R.S.}$$

$$\sec \theta + 1 = 1 + \sec \theta$$

- Work on more complicated side
- Expand $\sec \theta = \frac{1}{\cos \theta}$

2. $\tan \theta + \cot \theta = \sec \theta \csc \theta$

$$\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} = \text{R.S.}$$

$$\frac{\sin \theta \sin \theta}{\sin \theta \cos \theta} + \frac{\cos \theta \cos \theta}{\sin \theta \cos \theta} = \text{R.S.}$$

$$\frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta \cos \theta} = \text{R.S.}$$

$$\frac{1}{\sin \theta \cos \theta} = \text{R.S.}$$

$$\frac{1}{\sin \theta} \cdot \frac{1}{\cos \theta} = \text{R.S.}$$

$$\csc \theta \sec \theta = \sec \theta \csc \theta$$

- change trig functions into terms of $\sin \theta$ and $\cos \theta$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

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$$3. \sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$$

$$\text{GCF left} = \sec^2\theta$$

$$1 + \tan^2\theta = \sec^2\theta$$

$$\sec^2\theta (\sec^2\theta - 1) = \text{R.S.}$$

$$(1 + \tan^2\theta) (1 + \tan^2\theta - 1) = \text{R.S.}$$

$$(1 + \tan^2\theta) (\tan^2\theta) = \text{R.S.}$$

$$\tan^2\theta + \tan^4\theta = \tan^4\theta + \tan^2\theta$$

$$4. \frac{1}{1+\cos\theta} + \frac{1}{1-\cos\theta} = 2\csc^2\theta$$

$$\frac{(1-\cos\theta)}{(1-\cos\theta)} \cdot \frac{1}{1+\cos\theta} + \frac{1}{1-\cos\theta} \cdot \frac{(1+\cos\theta)}{(1+\cos\theta)} = \text{R.S.}$$

$$\frac{1 - \cos\theta + 1 + \cos\theta}{1 + \cos\theta - \cos\theta - \cos^2\theta} = \text{R.S.}$$

$$\frac{2}{1 - \cos^2\theta} = \text{R.S.}$$

$$\frac{2}{\sin^2\theta + \cos^2\theta - \cos^2\theta} = \text{R.S.}$$

$$\frac{2}{\sin^2\theta} = \text{R.S.}$$

$$2 \cdot \frac{1}{\sin^2\theta} = \text{R.S.}$$

$$2 \csc^2\theta = 2 \csc^2\theta$$

$$\sin^2\theta + \cos^2\theta = 1$$

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