

Principles of Mathematics 12

Review Sheets

Trigonometric Identities

1. Prove the identity.

(3 marks)

$$\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$$

| Left side | Right side |
|-----------|------------|
| | |

2. Prove the identity.

(2 marks)

$$\frac{\sec \theta - \cos \theta}{\tan \theta} = \sin \theta$$

| Left side | Right side |
|-----------|------------|
| | |

3. Prove the identity.

(2 marks)

$$\frac{\cos \theta + \sin \theta \tan \theta}{\sin \theta \sec \theta} = \csc \theta$$

Left side

Right side

4. Prove the identity.

(2 marks)

$$\frac{1}{1 + \sin \theta} = \sec^2 \theta - \frac{\tan \theta}{\cos \theta}$$

| Left Side | Right Side |
|-----------|------------|
| | |

5. Prove the following identity:

(2 marks)

$$\sin \theta + \cos \theta \cot \theta = \csc \theta$$

Left side

Right side

6. Prove the following identity:

(3 marks)

$$\frac{\cot \theta}{\csc \theta - 1} = \frac{\csc \theta + 1}{\cot \theta}$$

LEFT SIDE

RIGHT SIDE

7. Prove the identity:

(3 marks)

$$\frac{\sin \theta + \tan \theta}{1 + \cos \theta} = \frac{\sin 2\theta}{2 \cos^2 \theta}$$

LEFT SIDE

RIGHT SIDE

8. Prove the identity:

(2 marks)

$$\frac{\csc \theta}{\tan \theta + \cot \theta} = \cos \theta$$

Left Side

Right Side

9. Prove the identity.

(2 marks)

$$\frac{1 - \cos \theta}{\sin^2 \theta} = \frac{1}{1 + \cos \theta}$$

Left Side

Right Side

10. Prove the identity:

(3 marks)

$$\frac{\sin 2\theta}{\cos \theta} + \frac{\cos 2\theta}{\sin \theta} = \csc \theta$$

LEFT SIDE

RIGHT SIDE

11. Prove:

$$\frac{\sin 2\theta}{2 - 2 \cos^2 \theta} = \cot \theta$$

(3 marks)

| Left side | Right side |
|-----------|------------|
| | |

12. Prove:

(4 marks)

$$\frac{\sin \theta \cos \theta}{1 + \cos \theta} = \frac{1 - \cos \theta}{\tan \theta}$$

LEFT SIDE

RIGHT SIDE

13. Prove the identity:

(3 marks)

$$\csc^2 x + \sec^2 x = \csc^2 x \sec^2 x$$

LEFT SIDE

RIGHT SIDE

14. Prove the identity:

(3 marks)

$$\frac{1}{\sec \theta + \tan \theta} = \frac{1 - \sin \theta}{\cos \theta}$$

LEFT SIDE

RIGHT SIDE

15. Prove the identity:

(3 marks)

$$\frac{\cos 2\theta}{\sin \theta} = \frac{\cot^2 \theta - 1}{\csc \theta}$$

LEFT SIDE

RIGHT SIDE

16. Prove the identity:

(4 marks)

$$\frac{\cot \theta - 1}{1 - \tan \theta} = \frac{\csc \theta}{\sec \theta}$$

LEFT SIDE

RIGHT SIDE

17. Prove the identity:

(4 marks)

$$(1 - \sin \theta)(\sec \theta + \tan \theta) = \frac{1}{\sec \theta}$$

LEFT SIDE

RIGHT SIDE

18. Prove the identity:

(5 marks)

$$\sin 2x(\tan x + \cot x) = 2$$

LEFT SIDE

RIGHT SIDE

19. Prove the identity:

(5 marks)

$$\frac{\cot \theta}{\sin \theta - \csc \theta} = -\sec \theta$$

LEFT SIDE

RIGHT SIDE

20. Prove:

(5 marks)

$$\frac{\sin 2x}{1 + \cos 2x} = \frac{\sec^2 x - 1}{\tan x}$$

LEFT SIDE

RIGHT SIDE

21. Prove:

(5 marks)

$$\frac{2 \cos x + 2 \cos^2 x}{\sin 2x} = \frac{\sin x}{1 - \cos x}$$

LEFT SIDE

RIGHT SIDE

7. Prove the identity:

(4 marks)

$$\frac{\cos x + \cot x}{\sec x + \tan x} = \cos x \cot x$$

LEFT SIDE

RIGHT SIDE

7. Prove the identity:

(4 marks)

$$\tan \theta \cos 2\theta + \tan \theta = \sin 2\theta$$

LEFT SIDE

RIGHT SIDE

7. Prove the identity:

$$\csc \theta \sin 2\theta - \sec \theta \cos 2\theta = \sec \theta$$

(4 marks)

LEFT SIDE

RIGHT SIDE

7. Prove the identity:

(4 marks)

$$\frac{1 - \cos 2x}{\sin 2x} = \frac{1 + \tan x}{1 + \cot x}$$

LEFT SIDE

RIGHT SIDE

8. Prove the identity:

(5 marks)

$$(\csc \theta - \sin \theta) \tan \theta = \frac{\sin 2\theta}{2 \sin \theta}$$

| LEFT SIDE | RIGHT SIDE |
|-----------|------------|
| | |

8. Prove the identity:

(5 marks)

$$\frac{\sin x}{1 - \sin x} - \frac{\sin x}{1 + \sin x} = 2 \tan^2 x$$

LEFT SIDE

RIGHT SIDE

8. Prove the identity:

(5 marks)

$$\frac{\cos \theta + \cot \theta}{1 + \sin \theta} = \cot \theta$$

LEFT SIDE

RIGHT SIDE

9. Prove the identity.

(5 marks)

$$\cos 2x = \frac{\cot x - \sin 2x}{\cot x}$$

LEFT SIDE

RIGHT SIDE

6. Prove the identity:

(5 marks)

$$\frac{\tan x(\cos x + \cot x)}{\sec x + \tan x} = \frac{\sin x \sin 2x}{2 - 2\cos^2 x}$$

LEFT SIDE

RIGHT SIDE

8. Prove the identity:

(5 marks)

$$\frac{\tan x}{\sec x + 1} = \frac{2 \cos x - 2 \cos^2 x}{\sin 2x}$$

| LEFT SIDE | RIGHT SIDE |
|-----------|------------|
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