MATHEMATICS

TOPIC: TRIGONOMETRY
GRADE 10

CAPS ALIGNED

TRIGONOMETRY – SPECIAL ANGLES

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TRIGONOMETRY– Grade 10

1. Trigonometry

1. Define the trigonometric ratios sin θ, cos θ and tan θ using the right – angled triangle
2. Extend the definitions of sin θ, cos θ and tan θ for $0° \leq \theta \leq 360°$
3. Define the reciprocal of the trigonometric ratios cosec θ, sec θ and cot θ, using the right-angled triangles (these three reciprocals should be examined in Grade 10 only)
4. Derive values of the trigonometric ratios for the special cases (without using a calculator) $\theta \in \{0°, 30°, 45°, 60°, 90°\}$
5. Solve two-dimensional problems involving right-angled triangles (See Term 3)
6. Solve simple trigonometric equations for angles between 0° and 90°
7. Use a diagram to determine the numerical values of ratios for angles from 0° to 360°

2. Trigonometry (2D)

1. Solve two-dimensional problems involving right- angled triangles
2. Problems in two dimensions

3. Examination Guideline

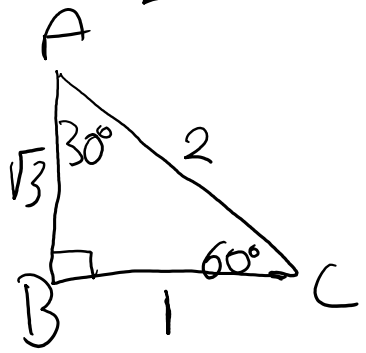
1. The reciprocal ratios cosec θ, sec θ and cot θ will be explicitly tested in all aspects: definitions, function values and equations.
2. While the focus of trigonometric graphs is on the relationships, the characteristics of the graphs will also be examined.

Trigonometry (Special Angles) - GRADE 10

Notes: Toolbox

$0°, 30°, 45°, 60°, 90°$

SohCahToa



$\sin 30° = \frac{1}{2}$

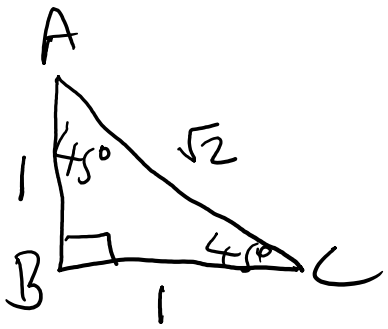
$\cos 30° = \frac{\sqrt{3}}{2}$

$\tan 30° = \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

$\sin 60° = \frac{\sqrt{3}}{2}$

$\cos 60° = \frac{1}{2}$

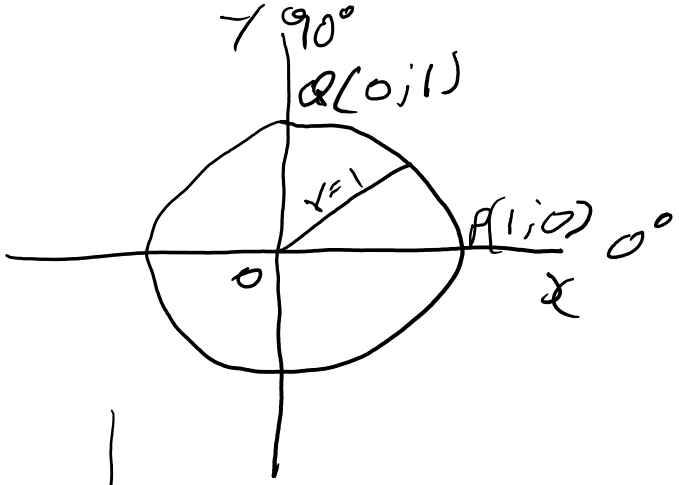
$\tan 60° = \sqrt{3}$



$\sin 45° = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan 45° = 1$



$\sin 0° = 0$

$\cos 0° = 1$

$\tan 0° = 0$

$\sin 90° = 1$

$\cos 90° = 0$

$\tan 90° = \text{undefined}$

Trigonometry (Special Angles) - GRADE 10
Exercises - A

Exercise A

4.3 Simplify fully, WITHOUT the use of a calculator:

$$\frac{\sin 45^\circ . \tan^2 60^\circ}{\cos 45^\circ}$$

Solution

$$\frac{\sin 45^\circ . \tan^2 60^\circ}{\cos 45^\circ}$$

$$= \frac{\frac{\sqrt{2}}{2} \cdot (\sqrt{3})^2}{\frac{\sqrt{2}}{2}}$$

$$= 3$$

Trigonometry (Special Angles) - GRADE 10
Exercises - B

Exercise B

4.2 Simplify the following expression WITHOUT using a calculator:

$$\cos 30^\circ \tan 60^\circ + \text{cosec}^2 45^\circ \sin^2 60^\circ$$

Solution

$$\cos 30^\circ \cdot \tan 60^\circ + \text{cosec}^2 45^\circ \cdot \sin^2 60^\circ$$

$$= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{1} + \left(\frac{2}{\sqrt{2}}\right)^2 \cdot \left(\frac{\sqrt{3}}{2}\right)^2$$

$$= \frac{3}{2} + \frac{4}{2} \cdot \frac{3}{4}$$

$$= \frac{3}{2} + \frac{3}{2}$$

$$= \frac{3+3}{2}$$

$$= \frac{6}{2} = 3$$

Trigonometry (Special Angles) - GRADE 10
Exercises - C

Exercise C

3.3 Determine the value of the following WITHOUT using a calculator:

$$\frac{\text{cosec } 45^\circ}{\sin 90^\circ . \tan 60^\circ}$$

Solution

$$\frac{\text{cosec } 45^\circ}{\sin 90^\circ . \tan 60^\circ}$$

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

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

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

$$= \frac{2}{\sqrt{6}}$$

$$= \frac{2}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}}$$

$$= \frac{2\sqrt{6}}{6_3}$$

$$= \frac{\sqrt{6}}{3}$$

END

$$e^{i\pi}+1=0$$

Euler's Identity

SOURCES

1. *FET CAPS DOCUMENT*
2. *GRADE 10 EXAMINATION GUIDELINES*
3. *GRADE 10 DBE/NOVEMBER 2015 -2018*