Foundation stage 1:

1. Check the following trigonometric identities by using a calculator:

(a)
$$\sin 23^\circ = \frac{1}{\cos ec 23^\circ}$$

(b)
$$\cos 123^{\circ} = \frac{1}{\sec 123^{\circ}}$$

(c)
$$\tan 23^\circ = \frac{1}{\cot 23^\circ}$$

JB MATHS
(d)
$$\cos ec 223^{\circ} = \frac{1}{\sin 223^{\circ}}$$

JE MATHS

JE MATHS

JE MATHS

2. Simplify the following **reciprocal** identities:

JE MATHS

(a)
$$\frac{1}{\sin \theta} =$$

(b)
$$\frac{1}{\cos ec\theta} =$$

(c)
$$\frac{1}{\cos\theta} =$$

(d)
$$\frac{1 \int_{\sec \theta}^{\mathbf{MATRS}} =$$

(f)
$$\frac{1}{\cot \theta} =$$

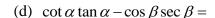
- (e) $\frac{1}{\tan \theta}$ =
- 3. Use the reciprocal identities to simplify the followings:

(a)
$$\sin\theta\cos ec\theta =$$

wings:
(b)
$$\cos \theta \sec \theta =$$
 $\int_{\mathbb{R}} MATHS$



(c) $\tan \alpha \cot \alpha =$





4. Simplify the following **ratio identities**:

(a)
$$\frac{\sin \theta}{\cos \theta} =$$

(c)
$$\frac{\cos\theta}{\sin\theta} =$$

5. Use the reciprocal identities and the ratio identities to simplify the followings:

(a)
$$\tan \alpha \cos \alpha =$$

(b)
$$\cot \beta \sin \beta =$$

(c)
$$\sin\theta \sec\theta =$$

(d)
$$\cos\theta \csc\theta =$$

6. Check the following complementary identities by using a calculator:

(a)
$$\sin 23^\circ = \cos 67^\circ$$

(b)
$$\cos 23^{\circ} - \sin 67^{\circ} = 0$$



(c)
$$\tan 23^\circ = \cot 67^\circ$$

(d)
$$\cos ec 23^\circ = \sec 67^\circ$$



7. Simplify the following **complementary identities**:

(a)
$$\sin(90^{\circ} - \theta) =$$

(b)
$$\cos(90^{\circ} - \theta) =$$

JE MATHS

(c)
$$\sec(90^{\circ} - \theta) = \text{MATHS}$$

(d)
$$\cos ec(90^{\circ} - \theta) =$$



(e) $\tan(90^{\circ} - \theta) =$

$$\begin{array}{ll}
\text{JB MATHS} \\
\text{(d)} & \cot(90^{\circ} - \theta) = \\
\end{array}$$

JE MATHS



8. Use the complementary identities to simplify the followings:

(a)
$$\frac{1}{\sec(90^\circ - \theta)} =$$



(b)
$$\frac{1}{\cos ec(90^{\circ} - \theta)} =$$

(c) $\frac{\sin(90^{\circ} - \theta)}{\cos(90^{\circ} - \theta)} = \frac{1}{\cos(90^{\circ} - \theta)}$

(d)
$$\frac{\sec(90^\circ - \theta)}{\cos ec(90^\circ - \theta)} =$$

(e)
$$\cos(90^\circ - \theta) \tan(90^\circ - \theta) =$$

JB MATHS
(f)
$$\cos(90^{\circ} - \theta) \csc(90^{\circ} - \theta) \stackrel{\text{IB MATHS}}{=}$$

JE MATHS

9. Simplify the following Pythagorean identities by using a calculator:

(a)
$$\sin^2 43^\circ + \cos^2 43^\circ =$$

(b)
$$\sin^2 143^\circ + \cos^2 143^\circ =$$

(c)
$$\sec^2 43^\circ - \tan^2 43^\circ =$$

$$^{\text{IB MA}}$$
 (d) $\sec^2 243^{\circ} - \tan^2 243^{\circ} =$ $^{\text{IB MATH}}$

(e)
$$\cos \sec^2 43^\circ - \cot^2 43^\circ = \frac{\cos 43^\circ}{\cos 43^\circ}$$

(f)
$$\cos^2 343^\circ - \cot^2 343^\circ =$$

10. Simplify the following **Pythagorean identities**:

(a)
$$\sin^2 \theta + \cos^2 \theta =$$

(b)
$$1 - \cos^2 \theta = 0$$

JE MATHS (c) $1 + \tan^2 \theta =$

(d)
$$\sec^2 \theta - \tan^2 \theta =$$

JE MATHS

(e)
$$1 + \cot^2 \theta =$$

JE MATHS

(f)
$$\cos ec^2\theta - \cot^2\theta =$$

JE MATHS

11. Use the Pythagorean identities to simplify the followings: JE MATHS

(a)
$$(1-\sin^2\theta)\times\sec^2\theta$$

(b)
$$(\sec^2 \theta - 1) \times \cot^2 \theta$$

(c)
$$1 - \tan^2 \theta + \sec^2 \theta$$

JE MATHS

(d)
$$\cot^2 \theta + 1 - \cos ec^2 \theta$$

12. Prove that:

(a)
$$(\sin \theta - \cos \theta)^2 = 1 - 2\sin \theta \cos \theta$$

(b)
$$2\sec^2\theta - 3 = 2\tan^2\theta - 1$$

[B MATHS]

Foundation stage 2:

- 1. Solve the following trigonometric equations involving special trig for $0^{\circ} \le \theta \le 360^{\circ}$.
 - (a) $\sin \theta = \frac{\sqrt{3}}{2}$

(b) $\sin \theta = -\frac{1}{2}$

JE MATHS

JE MATHS

JE MATHS

(c) $\cos \theta = \frac{1}{\sqrt{2}}$

JE MATHS

(d) $\cos \theta = -\frac{\sqrt{3}}{2}$

IE MATHS

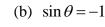
(e) $\tan \theta = \sqrt{3}$

(f) $\tan \theta = \frac{MA}{3} \frac{\sqrt{3}}{3}$

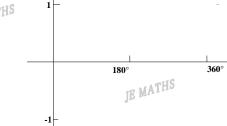
JE MATHS

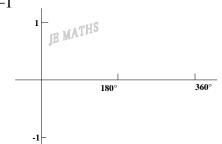
- JE MATHS
- 2. Solve the following trigonometric equations involving boundary angles for $0^{\circ} \le \theta \le 360^{\circ}$ with the help of a trigonometric graph.

(a) $\sin \theta = 1$



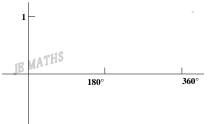


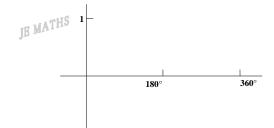




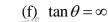
(c) $\cos \theta = 0$



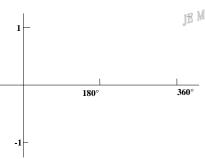


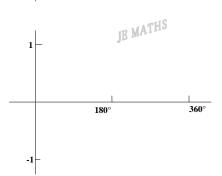


(e) $\tan \theta = 0$



JE MATHS



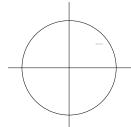


3. Solve the following trigonometric equations involving random angles by using a related acute angle in a unit circle for $0^{\circ} \le \theta \le 360^{\circ}$. (1dp)

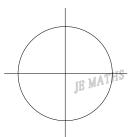
JE MATHS

(a) $\sin x = \frac{1}{3}$

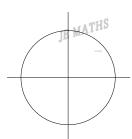
JE MATHS



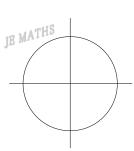
(b) $\sin x = -0.6$



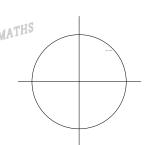
(b) $\cos x = 0.1$



(d) $\cos x = -\frac{2}{5}$

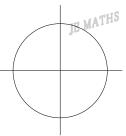


(e) $\tan x = \frac{7}{3}$



(f) $\tan x = -6.6$

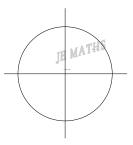
JE MATHS



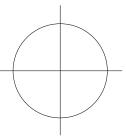
4. Solve the following trigonometric equations involving special angles for $0^{\circ} \le \theta \le 360^{\circ}$, to the nearest minute.

JE MATHS

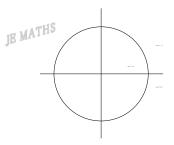
(a) $2\sin x + 1 = 0$



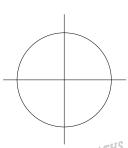
(b) $\sqrt{3} \tan x + 1 = 0$



(c) $\sec x = 2$



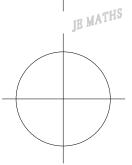
(d) $\cos ecx + \sqrt{2} = 0$



(e) $\cot x + 1 = 0$



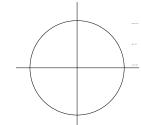
 $\begin{array}{ll}
\text{IB MATHS} \\
\text{(f)} & 2 - \sqrt{3} \sec x = 0
\end{array}$



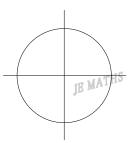
5. Solve the following trigonometric equations involving random angles by using a related acute angle in a unit circle for $-180^{\circ} \le \theta \le 180^{\circ}$, to the nearest degree.

JE MATHS

(a) $4\sin x = 1$



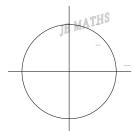
(b) $2\cos ecx = -3$



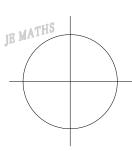
(b) $3\cos x - 2 = 1$

JE MATHS



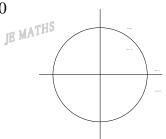


(d) $2 \sec x - 5 = -2$



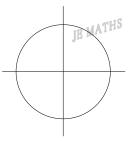
(e) $-\tan x = 100$





(f) $3-4\cot x = 5$

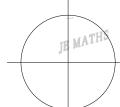
JE MATHS



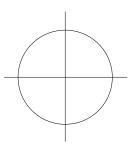
6. Solve the following trigonometric equations involving random angles by using a related acute angle in a unit circle for $0^{\circ} \le \theta \le 540^{\circ}$, to the nearest degree.

JE MATHS

(a) $4 \sin x = 1$

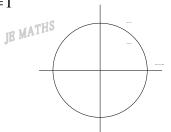


(b) $2\cos ecx = -3$

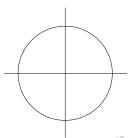


(b) $3\cos x - 2 = 1$



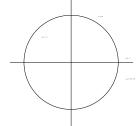


(d) $2\sec x - 5 = -2$

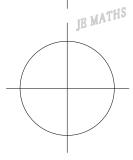


(e) $-\tan x = 100$





 $(f)^{1/3} - 4 \cot x = 5$



Fo	undation stage 1:				
1.	(a) T		(b) T		
	(c) T _{JE MATHS}	IR W	(d) ATIS		JE MATHS
2.	(a) $\csc\theta$		(b) $\sin\theta$		
	(c) secθ	JE MATHS	(d) $\cos\theta$	JE MATHS	
	(e) $\cot \theta$		(f) $\tan \theta$ JE MATHS		
3.	(a) $\sin\theta \times 1/\sin\theta$ =1 JB MATHS		(b) $\cos\theta \times 1/\cos\theta$ =1		JE MATHS
	(c) $\tan \alpha \times 1/\tan \theta$ =1	JE M	(d) 1-1 =0		
4.	(a) $\frac{\text{JB MATHS}}{\text{tan }\theta}$		(c) $\cot \theta$	JE MATHS	
5.	(a) $\sin \alpha / \cos \alpha \times \cos \alpha$ $= \sin \alpha$	JE MATHS	(b) $\cos \alpha / \sin \alpha \times \sin \alpha$ = $\cos \alpha$		
	(c) $\sin\theta \times 1/\cos\theta$ $=\tan\theta$ JE MATHS		(d) $\cos\theta \times 1/\sin\theta$ = $\cot\theta$		
6.	(a) T		(b) T		
	(c) T IB MATHS	ir M	(d)		IE MATHS

JE.Maths

7.	(a) $\cos \theta$		(b) $\sin \theta$		
	(c) $\csc \theta$ (e) $\frac{\text{JB MATHS}}{\cot \theta}$	ј В М∙	(d) $\sec \theta$ ATHS (d) $\tan \theta$		JE MATHS
8.	(a) $\cos(90^{\circ} - \theta)$ $= \sin \theta$	JE MATHS	(b) $\sin(90^{\circ} - \theta)$ $= \cos \theta$	JE MATHS	
	$ \begin{array}{l} \text{(c)} \\ \tan(90^\circ - \theta) \\ =\cot \theta \end{array} $		(d) $cos(90^{\circ} - \theta)/sin(90^{\circ} - \theta)$ $= sin \theta/cos \theta$ $= tan \theta$?- θ)	
	(e) $\sin \theta \times \cot \theta$ $= \sin \theta \times \cos \theta / \sin \theta$ $= \cos \theta$	JB M	(f) $\sin \theta \times 1/\sin(90^{\circ} - \theta)$ $= \sin \theta \times 1/\cos \theta$ $= \tan \theta$)	JE MATHS
9.	(a) 1 JB MATHS		(b) 1	JE MATHS	
	(c) 1	JE MATHS	(d) 1		
	(e) 1		(f) 1		
10	. (a) 1 JE MATHS		(b) JE MATHS $\sin^2 \theta$		
	(c) $\sec^2 \theta$		(d) 1		
	(e) cosec ² θ^{ATHS}	JE M	(f) ATHS		JE MATHS

JE.Maths

		JE.IVI
11. (a) $\cos^2 \theta \times 1/\cos^2 \theta$ = 1	(b) $\tan^2 \theta \times 1/\tan^2 \theta$ = 1	
(c) $1+(\sec^2\theta - \tan^2\theta)$ $= 1+1$ $= 2$	(d) $(\cot^2 \theta - \csc^2 \theta) + 1$ $= -1 + 1$ $= 0$	JE MATHS
12. (a) $LHS = \sin^2 \theta - 2\sin \theta \cos \theta + \cos^2 \theta^{ATHS}$ $= 1 - 2\sin \theta \cos \theta$ $= RHS$	(b) LHS = $2(1+\tan^2\theta)_{7}3 \text{ MATHS}$ = $2+2\tan^2\theta - 3$ = $2\tan^2\theta - 1$	
	JE MATHS	
JB MATHS		JE MATHS
	JE MATHS	
JE MATHS	JE MATHS	
JE MATHS		
. mus	JE MATHS	
JB MATHS		
_{JE MATHS}	JE MATHS	JE MATHS

JE MATHS

Fo	oundation stage	2:				
1.	(a) 60°, 120°			(b) 210°, 330°		
	(c) 45°, 315° JB MATHS			(d) 150°, 210°		JE MATHS
	(e) 60°, 240°			(f) 150°, 330°		
2.	(a) 90°		JE MATHS	(b) 270°	JE MATHS	
	(c) 90°,270°			(d) 180°		
	(e) 0°, 180°	JE MATHS		(f) 90°, 270°		JE MATHS
3.	(a) 19.5°, 160.5°			(b) 216.9°, 323.1° JB MATHS		
	(b) 84.3°, 275.7°			(d) 113.6°, 246.4°	JE MATHS	
	(e) 66.8°, 246.8°		JE MATHS	(f) 98.6°, 278.6°		
4.	(a) sinx=-1/2 x = 210°, 330°		IR w	(b) $tanx = -\sqrt{3/3}$ $x = 150^{\circ}, 330^{\circ}$		
	(c) cosx=1/2 x=60°, 300°	JE MATHS		(d) JE MATHS $ cosecx = -\sqrt{2} $ $ sinx = -\sqrt{2}/2 $ $ x = 225^{\circ}, 315^{\circ} $		

(f)

 $secx=2/\sqrt{3}$

 $\cos x = \sqrt{3/2}$

x=30°, 330°

(e)

cotx=-1

tanx=1 MATHS

x=45°, 225°

JE.Maths

JE MATHS

					JE.Maths
5.	(a) 14°, 166°		(b) cosecx=-3/2 sinx=-2/3 x=42°, 222°		
	(b) $\cos x = 1$ MATHS $x=0^{\circ}$		(d) secx=3/2 cosx=2/3 x=-48°, 312°		JE MATHS
	(e) tanx=-100 x=-89°, 91°	JE MATHS	(f) $-2 = 4\cot x$ $\cot x = -1/2$ $\tan x = -2$ $x=-63^{\circ}$, 117°	JE MATHS	
6.	(a) x=14°, 166°, 374° MATHS		(b) cosecx=-3/2 sinx=-2/3 x=222°, 318°		JE MATHS
	(b) cosx=1 x=0°, 360° JB MATHS		secx=3/2 cosx=2/3 x=48°, 312°, 408°	JE MATHS	
	(e) $-\tan x = 100$ $\tan x = -100$ $x = 91^{\circ}, 271^{\circ}, 451^{\circ}$	JE MATHS	(f) -2 = 4cotx cotx = -1/2 tanx = -2 x=117°, 297°, 477°		
	JE MATHS		JE MATHS		

JE MATHS

JE MATHS