1. Find the following rules for the given triangle by using

 $\cos ec\theta = \frac{1}{\sin \theta}, \sec \theta = \frac{1}{\cos \theta} \text{ and } \cot \theta = \frac{1}{\tan \theta}$:

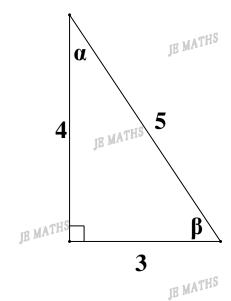
- (a) $\sin \alpha$
- (g) $\cos ec\alpha$

JE MATHS



- (b) $\cos \alpha$
- (h) $\sec \alpha$
- (c) $\tan \alpha$
- (i) $\cot \alpha^{HS}$

- (d) $\sin \beta$
- (j) $\cos ec\beta$



- (e) $\cos \beta$
- JE MATHS (k) $\sec \beta$

JE MATHS

JE MATHS

- (f) $\tan \beta$
- (l) $\cot \beta$

JE MATHS



- 2. Use your calculator to find the following trigonometric ratio in 4 decimal places:
 - (a) sin 37°

(b) sin 37°35'

(c) $\cos 37.5^{\circ}$

(d) $\cos 37^{\circ}5'$

(e) tan 1°

(f) tan1' (in sci) MATHS

JE MATHS

- 3. Use a calculator to find the following missing **acute** angle to the nearest degree if necessary:
 - (a) $\sin \theta = 0.777$

(b) $\cos \theta = 7$

JE MATHS





(c) $\tan \theta = 7$

(d) $\sin \theta = \frac{7}{7}$

- 4. Use a calculator to find the following missing **acute** angle to the nearest minute if necessary:
 - (a) $\sin \theta = 0.666$

(b) $\cos \theta = \frac{2}{3}$

IE MATHS

JE MATHS

JE MATHS

(c) $\tan \theta = 1.5$

(d) $\cos \theta = \frac{0}{1}$

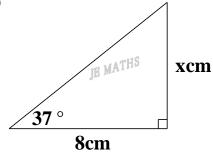
aur.

JE MATHS

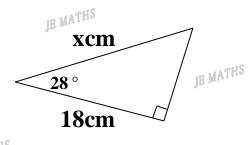
JE MATHS

5. Find the value of the missing side to one decimal place:

(a)



(b)



JE MATHS

JE MATHS

JE MATHS

JE MATHS

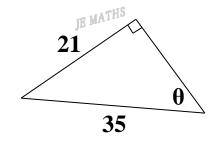
- 6. Find the value of the missing angle
 - (a) to the nearest degree.

1cm

JB MATHS

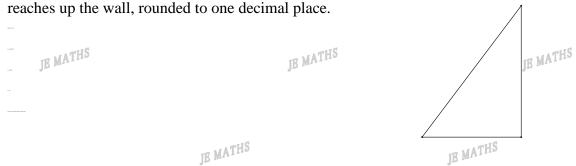
JB MATHS

(b) to the nearest minute.



JE MATHS

1. A single straight ladder, measuring 2.4 meters in length, is positioned against a wall with an angle of inclination of 42 degrees relative to the ground. Calculate the approximate height it



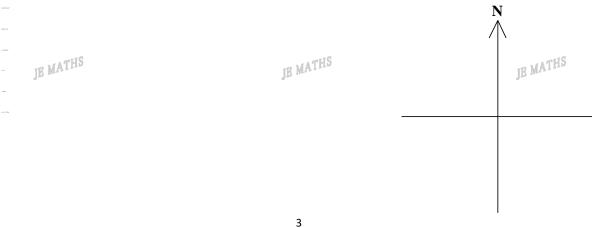
2. Determine the nearest degree of the angle of elevation when viewing a 12-meter distance from the base of an 18-meter tall building located on level ground.



3. A man in a building spots a car on the ground below. When he measures the angle of depression to be 72°5' degrees and the distance along his line of sight to the car is 20 meters. Find the approximate distance that the car is away from the base of the building, to one decimal place.



4. A yacht travels x kilometers on a bearing of 100 T. Afterward, it changes course to the west and continues until it is directly south of its initial position. If the eastward distance the yacht has traveled is 9.8km, calculate the approximate value of x, to the nearest kilometer.



- 1. Given that the following rectangular prism.
 - (a) Find the length of:
 - (i) HF.

JE MATHS

JE MATHS

 \boldsymbol{C} D В \boldsymbol{A} 4cm \boldsymbol{G} 6cm \boldsymbol{E} \boldsymbol{F} 10cmTHS

(ii) DF.

JE MATHS

(iii) ∠ HFD, correct to the nearest degree.

JE MATHS

JE MATHS

JE MATHS

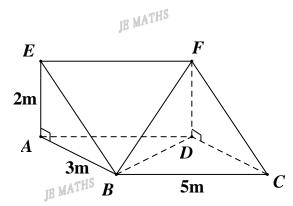
JE MATHS

- 2. Given that the following triangular prism.
 - (a) Find the length of:
 - (i) BD.

JE MATHS

(ii) FB.

JE MATHS

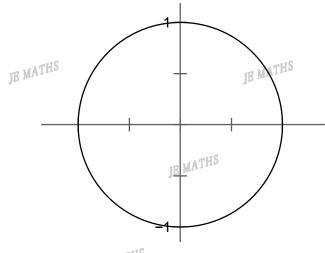


(iii) ∠ HFD, correct to the nearest minute.

JE MATHS

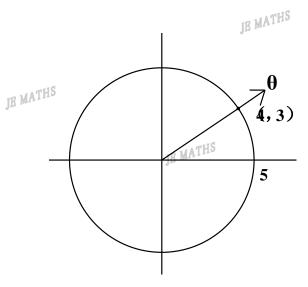
JE MATHS

- 1. Find the following angles on the given number plane with unit circle given:
 - (a) 30°
- (e) -330°
- (b) $120^{\circ}_{JB MATHS}$
- (f) -240°
- (c) 225°
- (g) 585°
- (d) 300°
- JE MATHS (h) 660°



- 2. Use $\sin \theta = \frac{y}{r}$, $\cos \theta = \frac{x}{r}$ and $\tan \theta = \frac{x}{y}$ to find the six trigonometric ratio of the given θ :
 - (a)
- JE MATHS
- $\sin \theta =$
- $\cos ec\theta =$
- $\cos \theta =$ $\int_{\mathbb{R}} MATHS$
- $sec\theta =$

- $\tan \theta =$
- $\cot \theta =_{\text{JB MATHS}}$



(b)

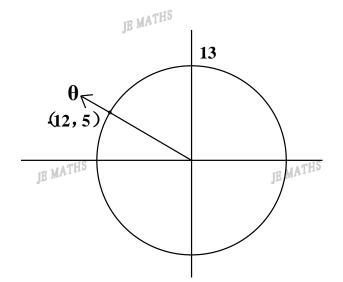
- $\sin \theta =$
- $_{\text{JB}} \text{MATI}\cos ec\theta =$





 $sec\theta =$

- $\tan \theta =$
- $\cot \theta =$



(c) r =

 $\sin \theta =$

 $\cos ec\theta =$

JE MATHS

 $\cos\theta =$

 $sec\theta =$

 $\tan \theta =$

 $\cot \theta = \int_{\mathbb{R}} MATHS$

(d) r =

.

 $\sin \theta =$

 $\int_{\mathbb{R}} MATHS \\
\cos ec\theta =$

 $\cos\theta =$

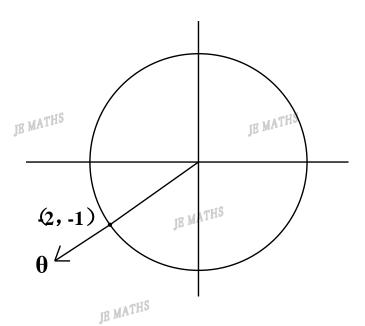
 $sec\theta =$

JE MATHS

 $\tan \theta =$

 $\cot \theta =$

JE MATHS



JE MATHS

JE MATHS

1, -1)

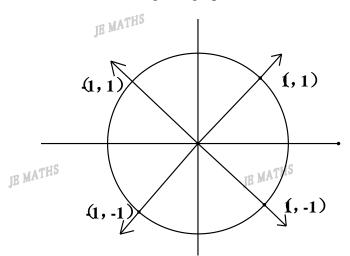
0

- 3. Find the exact value of the following trigonometric ratio from the given graph:
 - (a) $\sin 45^{\circ} =$
- (b) $\sin 135^{\circ} =$

JE MATHS

- (c) $\cos 45^{\circ} =$
- (d) $\cos 315^{\circ} =$

- (e) $\tan 45^{\circ} =$
- (f) $\tan 225^{\circ} =$



1. Use ASTC rule to determine the sign (+ or -) of the following trigonometric ratio:

Angle location	1 st	2 nd	3 rd	4th
sin	-	-	4	-
cos				
tan	-			

JE MATHS

JE MATHS

2. Find the related (acute) angle of each angle:

JE MATHS

(a) 20°

(b) 140°



JE MATHS

(c) 250°

(d) 310°

3. Rewrite the following trigonometric ratio in the related angle with correct sign:

(a) sin130°

(b) sin 230°

(c) cos140°

(d) cos 340°

JE MATHS

JE MATHS

(e) tan 220°

(f) tan 320°

JE MATHS

4. Find the boundary angle:

	0 °	90°	180°	270°	360°
sin				4	
cos					
tan		-			



5. Find the exact value of the following 30 °and 60 °special trigonometric ratio:

TR MATHS			IR MATHS			IR MATHS		
	30°	60°	120	150°	210°	240°	300°	330°
sin	10	dat.	-		a		-00	4
cos	-		44	-to	-det	-	at .	
tan	-		*	-86	-			-80

1. Use Pythagoras' theorem and $\sin \theta = \frac{y}{r}$, $\cos \theta = \frac{x}{r}$ and $\tan \theta = \frac{x}{y}$

to find the value of the basic trig ratio:



 $\cos \theta =$

 $\tan \theta =$

(b)... $\sin \theta =$

JE MATHS

 $\cos \theta =$

 $\tan \theta =$

JE MATHS

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

 $\cos\theta =$

 $\tan \theta =$

JE MATHS

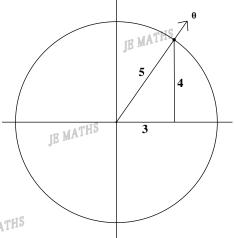
(d) ... $\sin \theta =$

 $\cos\theta$ = MATHS

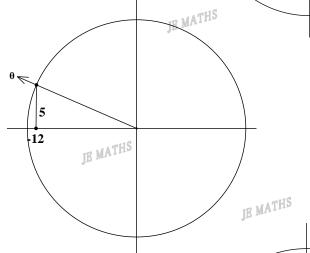
 $\tan \theta =$

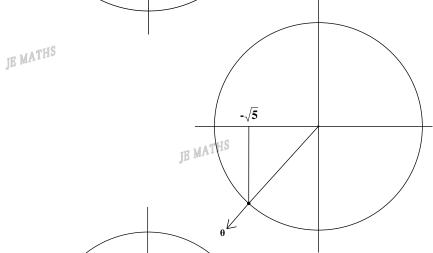


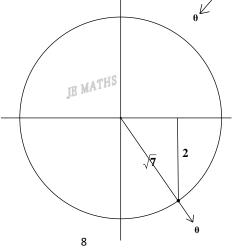




JE MATHS







0 0' 1'0 1 0 11 ' . ' 1 10 1	C , 1 .
Simplify the following trigonometry reduced formula	tor an acute angle of
2. Simplify the following trigonometry reduced formula	Tot all acute aligne a.

(a)
$$\sin(180^{\circ} - 15^{\circ}) =$$

(b)
$$\cos(180^{\circ} - 25^{\circ}) =$$

-

(c)
$$\tan(180^{\circ} - 35^{\circ}) =$$

(d)
$$\sin(180^{\circ} + 15^{\circ}) =$$

JE MATHS

...

(e)
$$\cos(180^{\circ} + 25^{\circ}) =$$

$$_{\text{IB MATHS}}$$
 (f) $\tan(180^{\circ} + 35^{\circ}) =$

JE MATHS

(g)
$$\sin(360^{\circ}-15^{\circ}) =$$

(h)
$$\cos(360^{\circ} - 25^{\circ}) =$$

JE MATHS

(i)
$$\tan(360^{\circ} - 35^{\circ}) = ^{ATHS}$$

JE MATHS

_

3. Simplify the following trigonometry reduced formula for an acute angle α :

(a)
$$\sin(180^{\circ} - \alpha) =$$

(b)
$$\cos(180^{\circ} - \alpha) =$$

JE MATHS

JE MATHS

(c)
$$\tan(180^{\circ} - \alpha) =$$

 $\int_{\mathbb{R}} MATHS \quad (d) \quad \sin(180^\circ + \alpha) =$

- -

(e)
$$\cos(180^{\circ} + \alpha) =$$

(f)
$$\tan(180^{\circ} + \alpha) =$$

-

IE MATHS

(g) $\sin(360^{\circ} - \alpha) =$

(h)
$$\cos(360^{\circ} - \alpha) =$$

-

(i)
$$\tan(360^{\circ} - \alpha) =$$

JE MATHS

JE MATHS

4. Simplify: $\frac{\sin(360^{\circ} - \alpha)}{\cos(180^{\circ} - \alpha)}$

-

- 5. Let $\sin \theta = -\frac{3}{5}$, where $90^{\circ} \le \theta \le 270^{\circ}$, use trigonometry reduced formula to find:
 - (a) the quadrant of θ .

JE MATHS

JE MATHS

JE MATHS

(b) $\cos \theta$

(c) $\tan \theta$

JE MATHS

JE MATHS

JE MATHS

JE MATHS

JE MATHS

- 6. Let $\cos \theta = \frac{\sqrt{3}}{3}$, where $180^{\circ} \le \theta \le 360^{\circ}$, use trigonometry reduced formula to find:
 - (a) the quadrant of θ .

JE MATHS

JE MATHS

JE MATHS

(b) $\sin \theta$

(c) $\tan \theta$

JE MATHS

JE MATHS

JE MATHS

7. Given that $\tan \theta = -\frac{1}{3}$, find possible values of:

(a) $\cos \theta$.

(b) $\sin \theta$

JE MATHS

JE MATHS

Foundation stage 1: (g) 1. (a) 3/5 5/3 (b) (h) 4/5 5/4 JE MATHS JE MATHS (i) (c) 4/3 3/4 JE MATHS JE MATHS (d) (j) 4/5 5/4 (k) (e) 3/5 5/3 JE MATHS (f) (1) JE MATHS 4/3 3/4 2. (a) (b) 0.6099 0.6018 JE MATHS (c) (d) 0.7934 0.7976 JE MATHS JE MATHS (e) (f) 2.9089×10⁻⁴ 0.0175 JE MATHS 3. (a) (b) 50.9...=51° n.a. (c) (d) JE MATHS 81.8...=82° 90°

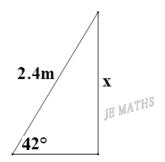
JE.Maths

5. (a) (b) tan37 \(\frac{6}{2} \text{x} / 8 cos28 \(\frac{18}{x} x=18/cos28 ° x=8tan37 ° x=6.02... x=20.38... x = 6.0x = 20.46. (a) JE MATHS (b) JE MATHS JE MATHS $\tan\theta = 4/5$ $\sin\theta = 21/35 = 3/5$ $\theta = tan^{-1}(4/5)$ $\theta = \sin^{-1}(3/5)$ *θ*=38.6...° θ =36°52'11.63" JE MATHS JE MATHS θ=39° $\theta = 36^{\circ}52'$ JE MATHS JE MATHS

- 1. $\sin 42 = x/2.4$
 - $x=2.4\sin 42^{\circ}$
 - x=1.605...
 - x = 1.6

ans: it can reach 1.6m up the wall

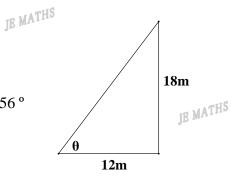




JE MATHS

- 2. $\tan\theta = 18/12 = 3/2$
 - $\theta = tan^{-1}(3/2)$
 - $\theta = 56.3...^{\circ}$
 - θ =56 °

ans: the angle of elevation is 56 $^{\circ}$

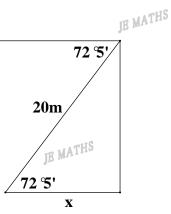


3. cos72°5'=x/20

- $x = 20\cos 72^{\circ}5$
- x=6.15...

ans: the car is 6.2m away from the base of the building

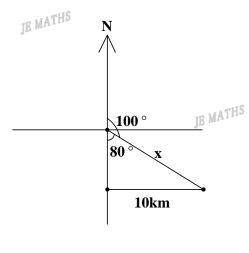




- 4. 180 °100 °=80 °
 - sin80 \(^9.8/x\)
 - x=9.8/sin80°
 - x=9.9...
 - x=10km

ans: x is 10km

JE MATHS



JE MATHS

JE MATHS

JE MATHS

JE MATHS

Foundation stage 3:

- 1. (a)
 - (i)

 $HF = \sqrt{10} + 63$

- =√136
- $=2\sqrt{34}$ cm_{JE MATHS}

(ii)

DF=
$$\sqrt{[4^2+(\sqrt{136})^2]}$$

- $=\sqrt{152}$
- $=2\sqrt{38}$ cm

JE MATHS

V38Cm JB MA

(iii)

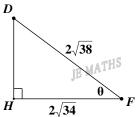
$$\cos \theta = 2\sqrt{34/2}\sqrt{38} = \sqrt{(17/19)}$$

 $\theta = cos^{-1}(\sqrt{(17/19)})$

 $\theta = 18.9...^{\circ}$

θ=19°

JE MATHS



 \boldsymbol{D}

3m

C JE MATHS

S — 2√34

JE MATHS

JE MATHS

B

JE MATHS

- 2. (a)
 - (i)

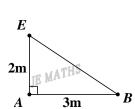
BD= $\sqrt{(BC + DC)}$

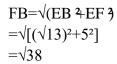
- $=\sqrt{(3 + 5)}$
- $=\sqrt{34}$ m_{JB MATHS}

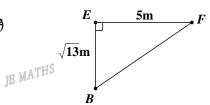
(ii)

$$EB=\sqrt{(EA + AB + 3)}$$

- $=\sqrt{(2+3)}$
- $=\sqrt{13}$

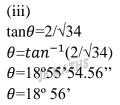


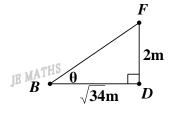




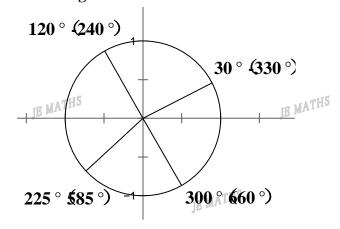


5m





1.



JE MATHS

JE MATHS

2. (a)

 $\sin \theta =$

 $\cos ec\theta =$

3/5

5/3

JE MATHS

 $\cos \theta =$

JE MATHS

5/4

 $sec\theta =$

JE MATHS

 $\tan \theta =$

 $\cot \theta =$

3/4

4/5

4/3

JE MATHS

(b)

 $\sin \theta = \frac{1}{5/13} \sin \theta$

 $\cos ec\theta =$

13/5

JE MATHS

 $\cos\theta =$

-12/13

 $sec\theta =$ JE MATHF3/12

 $\tan \theta =$

 $\cot \theta =$

5/-12=-5/12

-12/5

JE MATHS

JE MATHS

JE MATHS

JE MATHS

	(c) $r = \sqrt{(2^2 + 1)^2}$	12)-2/5			JE.Ma
	$\sin \theta = \frac{1}{\sqrt{5}}$	1-)- ٧3	$\cos ec\theta = -\sqrt{5}$		
	$\cos \theta = -2/\sqrt{5}$ JE MATHS		$\sec \theta = -\sqrt{5/2}$ JE MATI	HS	JE MATHS
	$\tan \theta = $ $-1/-2=1/2$		$\cot \theta = 2$		
	(d) $r = \sqrt{(1^2 + 1^2)}$)=√2	JE MATHS	JB .	MATHS
	$\sin \theta = -1/\sqrt{2}$		$\cos ec\theta = -\sqrt{2}$		
	$\cos\theta = 1/\sqrt{2}$	Plin	$\sec\theta = \sqrt{2}$	JE MATHS	. mIG
	$\tan \theta = -1/1 = -1$	JE MATHS	$\cot \theta =$ -1		JE MATHS
3.	(a) √2/2		(b) $\sqrt{2/2}$ JB MAT		
	(c) $\sqrt{\frac{18 \text{ MATHS}}{\sqrt{2/2}}}$		(d) $\sqrt{2/2}$	JE :	MATHS
	(e) 1		JE MAT(f)		
				JE MATHS	
		JE MATHS		J.	

16

JE MATHS

JE MATHS

1.

Angle location	1 st	2 nd	3 rd	4th
sin	+	+	-	-
cos	+	-	-	+
tan	+	-	-	+

JE MATHS

JE MATHS

2. (a)

20°

(b) 180 °140 °40 °

JE MATHS

JE MATHS

(d)

(c)

250 °180 °=70 °

360 ° 310 ° = 50 °

3. (a)

 $= \sin(180^{\circ}130^{\circ})$

 $= \sin 50^{\circ}$

(b)

 $=-\sin 50^{\circ}$

(c)

 $= -\cos(180^{\circ}140^{\circ})$

= -cos40 $^{\circ}$

(d)

 $= \cos(360^{\circ}340^{\circ})$

 $=\cos 20^{\circ}$ JE MATHS

(e)

= tan(220 ° 180 °)

 $= \tan 40^{\circ}$

(f)

= -tan(360 - 320)

= -tan40 $^{\circ}$

JE MATHS

JE MATHS

4.

360° 90° 180° 0° 270° 0 -1 0 sin 1 -1 0 1 0 cos 0 0 0 tan ∞ ∞

JE MATHS

5.

	30°	60°	120	150°	210°	240°	300°	330°
sin	1/2	$\sqrt{3/2}$	$\sqrt{3/2}$	1/2	-1/2	$-\sqrt{3/2}$	$-\sqrt{3/2}$	-1/2
cos	$\sqrt{3/2}$	1/2	-1/2	$-\sqrt{3/2}$	-√3/2	-1/2	1/2	$\sqrt{3/2}$
tan	$\sqrt{3/3}$	√3	-√3	$-\sqrt{3/3}$	$\sqrt{3/3}$	$\sqrt{3}$	-√3	-√3/3

1. (a)
$$(3, 4)$$

 $\sin \theta =$

4/5

$$\cos \theta = 3/5$$
 JB MATHS

JE MATHS

JE MATHS

$$\tan \theta =$$

4/3

JE MATHS

JE MATHS

(b)
$$(-12, 5)$$

 $\sin \theta =$ 5/13

 $\cos\theta =$

JE MATHS

-12/13

JE MATHS $\tan \theta =$

JE MATHS

5/-12=-5/12

JE MATHS

(c)
$$(-\sqrt{5}, -\sqrt{5})$$

 $\sin \theta = \frac{1}{\sqrt{5}} - \frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$

JE MATHS

 $\cos\theta =$

 $-\sqrt{5}/\sqrt{10} = -1/\sqrt{2} = -\sqrt{2}/2$

JE MATHS

 $\tan \theta =$

1

(d) $(\sqrt{3}, -2)$

 $\sin \theta =$ $-2/\sqrt{7}$

JE MATHS

JE MATHS

 $\cos \theta =$

 $\sqrt{3}/\sqrt{7} = \sqrt{21/7}$

 $\tan \theta_{\text{J}} = MATHS$

 $-2/\sqrt{3}$

JE MATHS

							JE.Maths
2.	(a) sin15°			(b) -cos25°			
	(c) -tan35°			(d) -sin15°			
	(e) JE MATHS -cos15°			(f) JE MATHS tan 25°			JE MATHS
	(g) -sin15°		JE MATHS	(h) cos25°		JE MATHS	
	(i) -tan35°						
3.	(a) sinα	JE MATHS		(b) -cosα	JE MATHS		JE MATHS
	(c) -tanα	JE MATTE		(d) -sinα			JE MATTE
	(e) -cosα			(f) JE MATHS tanα			
	(g) J_{BMATHS} - $\sin \alpha$			(h) cosα		JE MATHS	
	(i) -tanα		JE MATHS				
4.	$-\sin\alpha/-\cos\alpha = 1$	tanα					
		JE MATHS			JE MATHS		
	JE MATHS			JE MATHS			JE MATHS

5. (a)

since $\sin\theta < 0$ and 90 ° $\leq \theta \leq 270$ ° then θ in the 3^{rd} quadrant

(b)

$$\cos\theta < 0$$

$$\sin\theta = \sin(180 \, ^{\circ}+\alpha)$$

$$= -\sin\alpha = -3/5$$

 $\sin\alpha = 3/5$

From the acute $Rt\Delta$,

$$\cos \alpha = 4/5$$
 and $\tan \alpha = 3/4$
 $\cos \theta = \cos(\alpha + 180^{\circ})$

 $= -\cos\alpha = -4/5$

6. (a)

since $\cos\theta > 0$ and $180^{\circ} \le \theta \le 360^{\circ}$ then θ in the 4^{th} quadrant

JE MATHS

(b) $\sin \theta$

 $\sin\theta < 0$

$$\cos\theta = \cos(360 - \alpha)$$

$$=\cos\alpha=\sqrt{3/3}$$

 $\cos\alpha = \sqrt{3/3}$

From the acute $Rt\Delta$,

$$\sin\alpha = \sqrt{6/3}$$
 and $\tan\alpha = \sqrt{6/\sqrt{3}} = \sqrt{2}$

$$\sin\theta = \sin(360^{\circ}\alpha)$$

 $=-\sin\alpha = -\sqrt{6/3}$

7. (a)

 $\theta \,$ could be in the 2^{nd} and 4^{th} quadrant $\cos\theta$ could be positive and negative $\cos\theta = \pm 3/\sqrt{10}$

JE MATHS

JE MATHS

(c)

$$\tan\theta > 0$$

 $\tan\theta = \tan(180 \, ^{\circ}+\alpha)$
 $= \tan\alpha = 3/4$

JE MATHS

JE MATHS

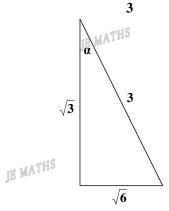
JE MATHS

(c)

 $\tan\theta < 0$

$$\tan\theta = \tan(360 \text{ }^{\circ}\alpha)$$

 $JB MA = -\sqrt{2}$



(b)

JE MATHS

 $\sin\theta$ could be positive and negative

 $\sin\theta = \pm 1/\sqrt{10}$

JE MATHS

