

33°

52'

37''S

151°

06'

04''E

10

ADV

JE
MATHS

- Find the exact missing angles and sides.

1. Find the **exact** missing side x in the $Rt\triangle ABC$, with $\angle B = 90^\circ$.

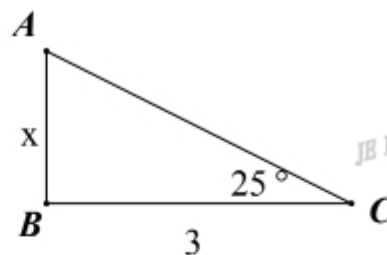
(a)

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JE MATHS

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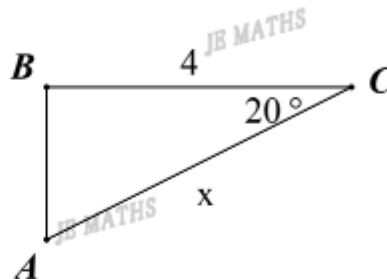


(b)

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JE MATHS

JE MATHS

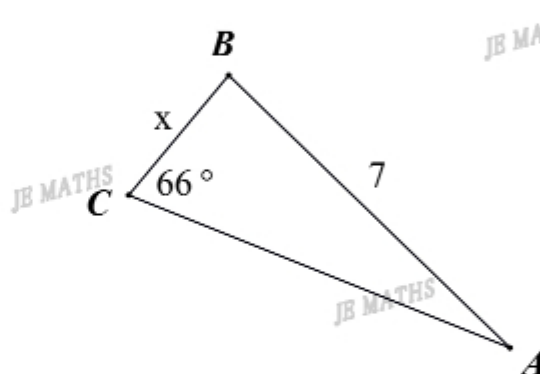


(c)

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JE MATHS

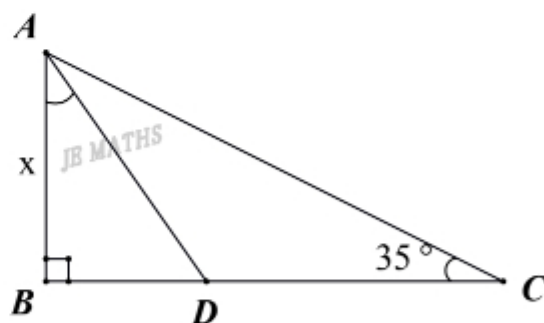
JE MATHS



2. Given that $\angle BAD = \angle ACB = 35^\circ$ in the $Rt\triangle ABC$.

(a) Find CB in terms of x .

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(b) Find BD in terms of x .

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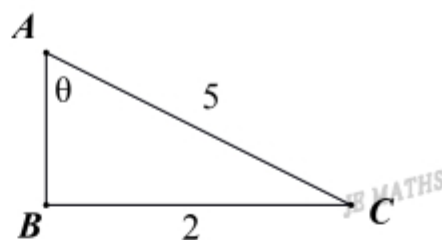
(c) Hence, find CD in terms of x .

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3. Find the exact missing angle θ in the $Rt\triangle ABC$, with $\angle B = 90^\circ$.

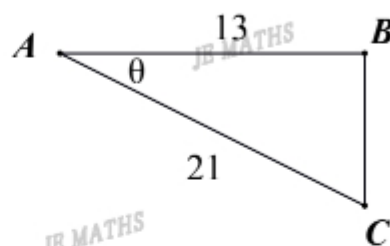
(a)

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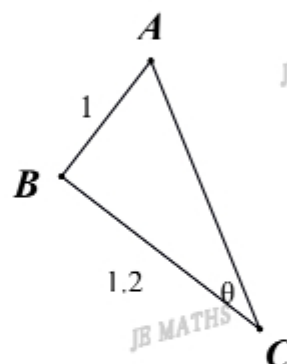
(b)

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(c)

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4. Given that $AD = DB$ in the $Rt\triangle ABC$, with $\angle B = 90^\circ$.

(a) Find $\angle BCD$ in the **exact** form.

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(b) Find $\angle BCA$ in the **exact** form.

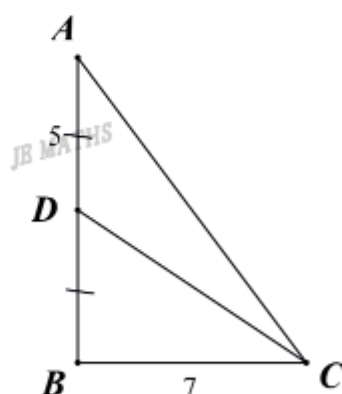
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(c) Hence, find $\angle ACD$, to the nearest minutes.

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5. Given that α is an acute angle and $\tan \alpha = \frac{1}{2\sqrt{2}}$.

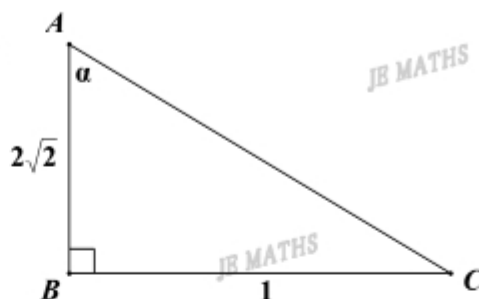
(a) Find the missing side.

(b) Find the exact value of

(i) $\cos \alpha$

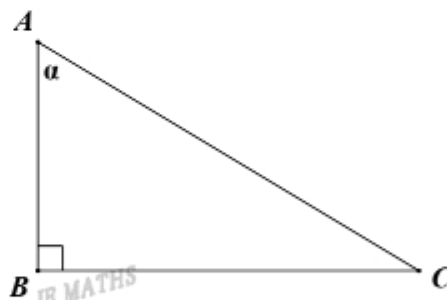
(ii) $\sin \alpha$

(c) Hence, show that $\sin^2 \alpha + \cos^2 \alpha = 1$.



6. Given that α is an acute angle and $\sec \alpha = \frac{2\sqrt{3}}{3}$.

(a) Show all the information in $\text{Rt}\triangle ABC$ and find the missing side.



(b) Find the exact value of:

(i) $\cos \theta$

(ii) $\cot \theta$

(c) Hence, show that $1 + \cot^2 \alpha = \sec^2 \alpha$.

7. Use a calculator to evaluate: (4sigs)

(a) $\frac{6.7}{\cos 67^{\circ}13'}$

(b) $13\cot 13.5^{\circ}$

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- **Special angles for 6 trig ratios:** 30° , 45° , 60° .

8. Evaluate the following without using the calculator:

(a) $\sin^2 45^{\circ} + \cos^2 45^{\circ}$

(b) $\sin 30^{\circ} \cos 60^{\circ} - \cos 30^{\circ} \sin 60^{\circ}$

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—
—

(c) $\frac{2 \tan 60^{\circ}}{1 - \tan^2 60^{\circ}}$

(b) $\operatorname{cosec}^2 60^{\circ} - \cot^2 60^{\circ}$

—
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—

9. Show that

(a) $1 - \sin^2 60^{\circ} = \cos^2 60^{\circ}$

(b) $1 + \tan^2 45^{\circ} = \sec^2 45^{\circ}$

—
—
—

(c) $\cos 60^{\circ} = 1 - 2 \sin^2 30^{\circ}$

(d) $1 + \cot^2 30^{\circ} = \operatorname{cosec}^2 30^{\circ}$

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- Six trig ratios in the unit circle:

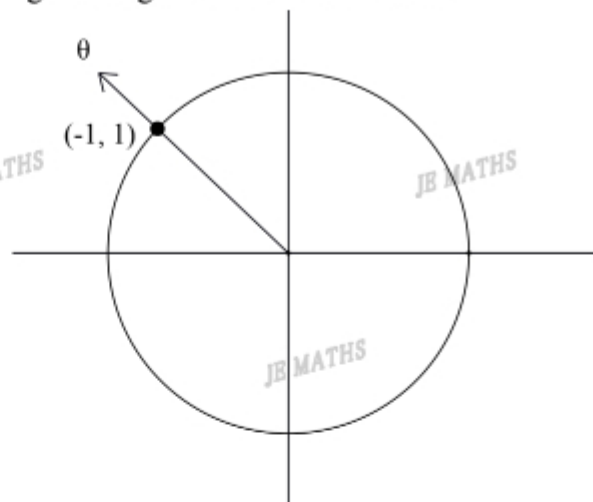
10. Write down the values of the six trig ratios of the given angle θ in each unit circle.

(a) _____

$\sin \theta = \underline{\hspace{2cm}}, \csc \theta = \underline{\hspace{2cm}}$

$\cos \theta = \underline{\hspace{2cm}}, \sec \theta = \underline{\hspace{2cm}}$

$\tan \theta = \underline{\hspace{2cm}}, \cot \theta = \underline{\hspace{2cm}}$

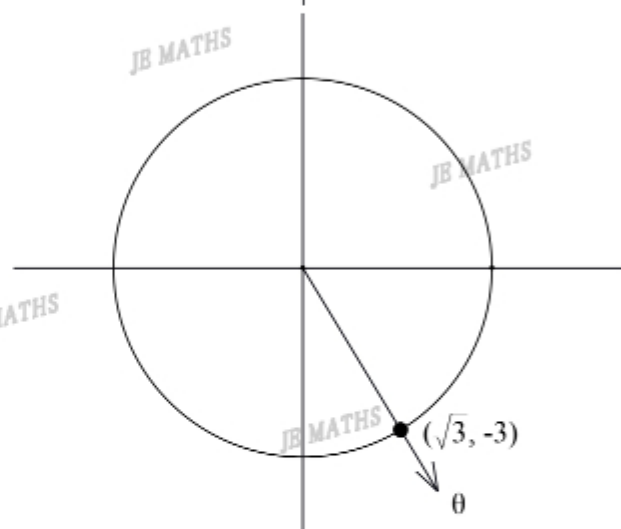


(b) _____

$\sin \theta = \underline{\hspace{2cm}}, \csc \theta = \underline{\hspace{2cm}}$

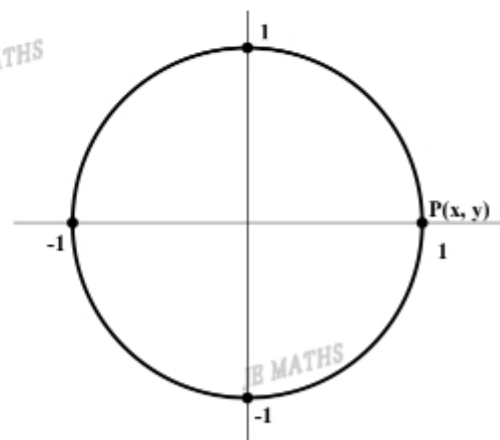
$\cos \theta = \underline{\hspace{2cm}}, \sec \theta = \underline{\hspace{2cm}}$

$\tan \theta = \underline{\hspace{2cm}}, \cot \theta = \underline{\hspace{2cm}}$

**- Boundary angles.**

11. Fill in the **boundary-angle table** of $P(x, y)$ in a **unit circle**.

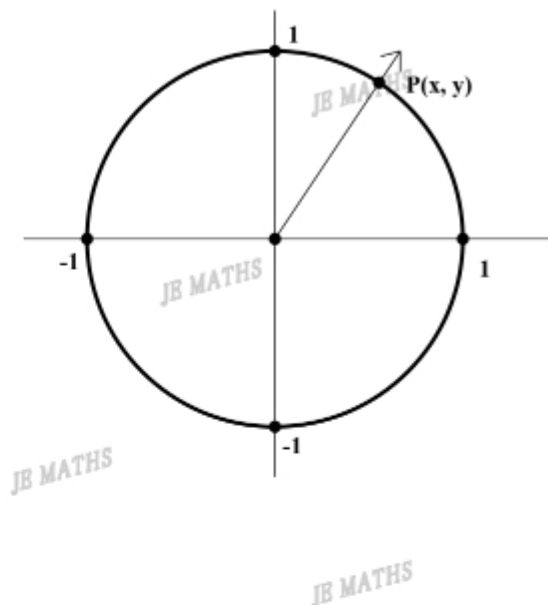
	0°	90°	180°	270°	360°
x	1	0	-1	0	1
y	-	-	-	-	-
r	-	-	-	-	-
$\sin \theta$	-	-	-	-	-
$\cos \theta$	-	-	-	-	-
$\tan \theta$	-	-	-	-	-
$\csc \theta$	-	-	-	-	-
$\sec \theta$	-	-	-	-	-
$\cot \theta$	-	-	-	-	-



- Sign of trig (ASTC):

12. Fill in the **trigsigntable** of $P(x,y)$ in a unit circle.

Quadrant	1 st	2 nd	3 rd	4 th
x	+	-	-	+
y				
r				
$\sin \theta$	-	-	-	-
$\cos \theta$	-	-	-	-
$\tan \theta$	-	-	-	-
$\operatorname{cosec} \theta$	-	-	-	-
$\sec \theta$	-	-	-	-
$\cot \theta$	-	-	-	-



- Find the exact value of a special trig by using the related angle:

13. Find the **exact** value of the following **basic** trig ratio by using the **related angle**:

(a) $\sin(225^\circ)$

(b) $\cos(330^\circ)$

(c) $\tan(-150^\circ)$

(d) $\cos(-315^\circ)$

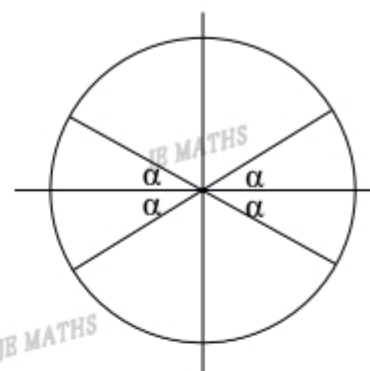
(e) $\sin 690^\circ$

(f) $\tan 600^\circ$

14. Find the **exact** value of the following **reciprocal** trig ratio by using the **related angle**:

(a) $\sec 210^\circ$

(b) $\operatorname{cosec} 135^\circ$



(c) $\operatorname{cosec}(-60^\circ)$

(d) $\cot(-240^\circ)$



(e) $\cot 270^\circ$

(f) $\sec 90^\circ$

- **Trig reduction formulae:**

15. Fill in the following **trig reduction formulae** table for 6 trig ratios with an acute angle A .

	$180^\circ - A$	$180^\circ + A$	$360^\circ - A$
sin	$\sin A$	$-\sin A$	$-\sin A$
cos	-	-	-
tan	-	-	-
cosec	-	-	-
sec	-	-	-
cot	-	-	-

16. Simplify the following basic trig expressions in terms of the acute angle A .

(a) $\frac{\sin(180^\circ - A)}{\sin(360^\circ - A)}$

(b) $\frac{\cos(-A)}{\cos(180^\circ - A)}$

(c) $\frac{\sin(180^\circ + A) \cos A}{\sin A \cos(180^\circ - A)}$

(d) $\frac{\sin(180^\circ + A) \sin(360^\circ + A)}{\sin(-A) \cos(180^\circ - A)}$

17. Simplify the following reciprocal trig expressions in terms of the acute angle A .

(a) $\frac{\sec(180^\circ + A)}{\sec(180^\circ - A)}$

(b) $\frac{\sec(360^\circ - A)}{\csc(180^\circ + A)}$

18. Given that $\sin 15^\circ \approx 0.25$ and $\cos 15^\circ \approx 0.97$, find the approximate value for:

(a) $\sin 165^\circ$

(b) $\cos 195^\circ$

(c) $2 \sin 165^\circ \cos 165^\circ$

(d) $\sec 195^\circ + \csc 195^\circ$ (1dp)

19. If $\alpha = -60^\circ$ and $\beta = -120^\circ$, show that $\sin(A+B) = \sin A \cos B + \cos A \sin B$.

- Find the exact value of a special trig by using the related angle:

20. If $\angle A$ is an **obtuse** angle and $\sin A = \frac{1}{3}$, find, without using a calculator, the value of

(a) $\cos A$

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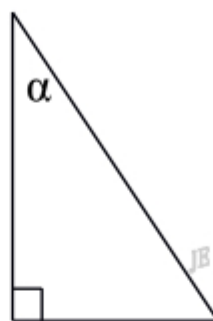
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(b) $\tan A$

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21. If $\angle B$ is in the 4th quadrant and $\tan B = -\frac{\sqrt{7}}{3\sqrt{2}}$, find, without using a calculator, the value of

(a) $\sin B$

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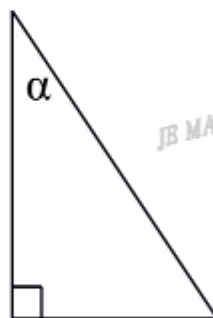
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(b) $\cos B$

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22. Given that $\tan \theta = -\frac{2}{\sqrt{3}}$.

(a) Which quadrants are θ at?

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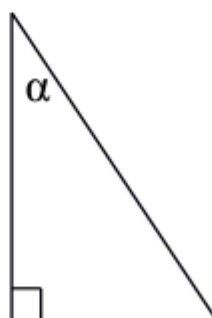
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(b) Hence, find $\sin \theta$.

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23. Given that $\cos \theta = -\frac{5}{6}$ and $\sin \theta > 0$.

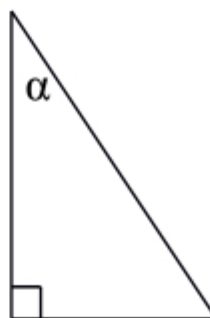
(a) Which quadrant is θ at?

—

(b) Hence, find $\tan \theta$.

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24. If $\cot \theta = \frac{1}{k}$ where $k > 0$, find possible values of $\operatorname{cosec} \theta$.

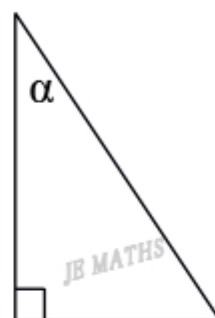
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25. Given that $\operatorname{cosec} \theta = -\frac{3}{2}$ and $90^\circ < \theta < 270^\circ$, find:

(a) $\sec \theta$.

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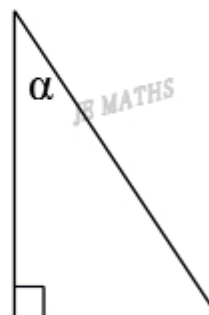
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(b) $\cot \theta$.

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26. Given that $\sec \theta = \frac{q}{p}$, with θ a 4th quadrant angle, p and q are all positive. Find:

(a) $\operatorname{cosec} \theta$.

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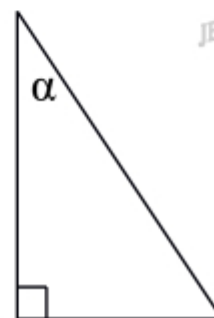
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(b) $\cot \theta$.

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