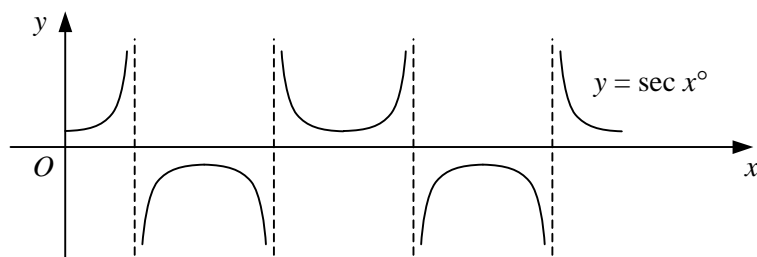


C3 TRIGONOMETRY

Worksheet A

- 1 Find to 2 decimal places the value of
a $\sec 23^\circ$ **b** $\operatorname{cosec} 185^\circ$ **c** $\cot 251.9^\circ$ **d** $\sec(-302^\circ)$
- 2 Find the exact value of
a $\operatorname{cosec} 30^\circ$ **b** $\cot 45^\circ$ **c** $\sec 150^\circ$ **d** $\operatorname{cosec} 300^\circ$
e $\cot 90^\circ$ **f** $\sec 225^\circ$ **g** $\operatorname{cosec} 270^\circ$ **h** $\cot 330^\circ$
i $\sec 660^\circ$ **j** $\operatorname{cosec}(-45^\circ)$ **k** $\cot(-240^\circ)$ **l** $\sec(-315^\circ)$
- 3 Find to 2 decimal places the value of
a $\cot 0.56^\circ$ **b** $\operatorname{cosec} 1.74^\circ$ **c** $\sec(-2.07^\circ)$ **d** $\cot 9.8^\circ$
- 4 Find in exact form, with a rational denominator, the value of
a $\sec 0$ **b** $\operatorname{cosec} \frac{\pi}{4}$ **c** $\cot \frac{3\pi}{4}$ **d** $\sec \frac{4\pi}{3}$
e $\operatorname{cosec} \frac{2\pi}{3}$ **f** $\cot \frac{7\pi}{2}$ **g** $\sec \frac{5\pi}{4}$ **h** $\operatorname{cosec}(-\frac{5\pi}{6})$
i $\cot \frac{11\pi}{6}$ **j** $\sec(-4\pi)$ **k** $\operatorname{cosec} \frac{13\pi}{4}$ **l** $\cot(-\frac{7\pi}{3})$
- 5 Given that $\sin x = \frac{4}{5}$ and that $0 < x < 90^\circ$, find without using a calculator the value of
a $\cos x$ **b** $\tan x$ **c** $\operatorname{cosec} x$ **d** $\sec x$
- 6 Given that $\cos x = -\frac{5}{13}$ and that $90^\circ < x < 180^\circ$, find without using a calculator the value of
a $\sin x$ **b** $\sec x$ **c** $\operatorname{cosec} x$ **d** $\cot x$

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The graph shows the curve $y = \sec x^\circ$ in the interval $0 \leq x \leq 720$.

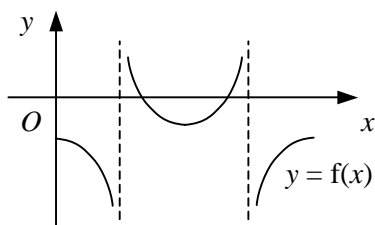
- a** Write down the coordinates of the turning points of the curve.
b Write down the equations of the asymptotes.
- 8 Sketch each pair of curves on the same set of axes in the interval $-180^\circ \leq x \leq 180^\circ$.
a $y = \sin x$ and $y = \operatorname{cosec} x$ **b** $y = \tan x$ and $y = \cot x$
- 9 Sketch each of the following curves for x in the interval $0 \leq x \leq 2\pi$. Show the coordinates of any turning points and the equations of any asymptotes.
a $y = 3 \sec x$ **b** $y = 1 + \operatorname{cosec} x$ **c** $y = \cot 2x$
d $y = \operatorname{cosec}(x - \frac{\pi}{4})$ **e** $y = \sec \frac{1}{3}x$ **f** $y = 3 + 2 \operatorname{cosec} x$
g $y = 1 - \sec 2x$ **h** $y = 2 \cot(x + \frac{\pi}{2})$ **i** $y = 1 + \sec(x - \frac{\pi}{6})$

C3 TRIGONOMETRY

Worksheet A continued

- 10** Solve each equation for x in the interval $0 \leq x \leq 2\pi$, giving your answers in terms of π .
- a** $\cot x = 1$ **b** $\sec x = 2$ **c** $\operatorname{cosec} x = \sqrt{2}$ **d** $\cot x = 0$
e $\sec x = -1$ **f** $\operatorname{cosec} x = -2$ **g** $\cot x = -\sqrt{3}$ **h** $\sec x = -\sqrt{2}$
- 11** Solve each equation for θ in the interval $0 \leq \theta \leq 360^\circ$, giving your answers to 1 decimal place.
- a** $\sec \theta = 1.8$ **b** $\operatorname{cosec} \theta = 2.57$ **c** $\cot \theta = 1.06$ **d** $\sec \theta = -2.63$
e $\operatorname{cosec} \theta = 3$ **f** $\cot \theta = -0.94$ **g** $\sec \theta = 1.888$ **h** $\operatorname{cosec} \theta = -1.2$
- 12** Solve each equation for x in the interval $-180 \leq x \leq 180$
Give your answers to 1 decimal place where appropriate
- a** $\operatorname{cosec} (x + 30)^\circ = 2$ **b** $\cot (x - 57)^\circ = 1.6$ **c** $\sec 2x^\circ = 2.35$
d $5 - 2 \cot x^\circ = 0$ **e** $\sqrt{3} \sec (x - 60)^\circ = 2$ **f** $2 \operatorname{cosec} \frac{1}{2}x^\circ - 7 = 0$
g $\sec (2x - 18)^\circ = -1.3$ **h** $\operatorname{cosec} 3x^\circ = -3.4$ **i** $\cot (2x + 135)^\circ = 1$
- 13** Solve each equation for θ in the interval $0 \leq \theta \leq 360$.
Give your answers to 1 decimal place where appropriate.
- a** $\operatorname{cosec}^2 \theta^\circ - 4 = 0$ **b** $\sec^2 \theta^\circ - 2 \sec \theta^\circ - 3 = 0$
c $\cot \theta^\circ \operatorname{cosec} \theta^\circ = 6 \cot \theta^\circ$ **d** $\operatorname{cosec} \theta^\circ = 4 \sec \theta^\circ$
e $2 \cos \theta^\circ = \cot \theta^\circ$ **f** $5 \sin \theta^\circ - 2 \operatorname{cosec} \theta^\circ = 3$
- 14** Solve each equation for x in the interval $-\pi \leq x \leq \pi$.
Give your answers to 2 decimal places.
- a** $2 \operatorname{cosec}^2 x + 5 \operatorname{cosec} x - 12 = 0$ **b** $\sec x = 3 \tan x$
c $3 \sec x = 2 \cot x$ **d** $4 + \tan x = 5 \cot x$
e $\operatorname{cosec} x + 5 \cot x = 0$ **f** $6 \tan x - 5 \operatorname{cosec} x = 0$
- 15** Prove each identity.
- a** $\sec x - \cos x \equiv \sin x \tan x$ **b** $(1 + \cos x)(\operatorname{cosec} x - \cot x) \equiv \sin x$
c $\frac{\cot x - \cos x}{1 - \sin x} \equiv \cot x$ **d** $(\sin x + \tan x)(\cos x + \cot x) \equiv (1 + \sin x)(1 + \cos x)$

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The diagram shows the curve $y = f(x)$, where

$$f(x) \equiv 2 \cos x - 3 \sec x - 5, \quad x \in \mathbb{R}, \quad 0 \leq x \leq 2\pi.$$

- a** Find the coordinates of the point where the curve meets the y -axis.
b Find the coordinates of the points where the curve crosses the x -axis.