The trigonometric functions

The graph of $y = \sin x$ (1)

QUESTION **1**   Complete:
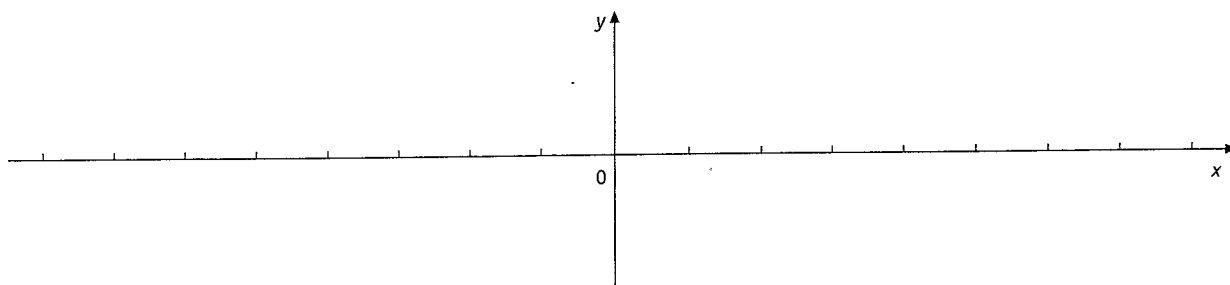
a   The domain of the function $y = \sin x$ is _____

b   The range of the function $y = \sin x$ is _____

c   The graph of $y = \sin x$ has period _____ and amplitude _____

d   The graph of $y = a \sin nx$ has period _____ and amplitude _____
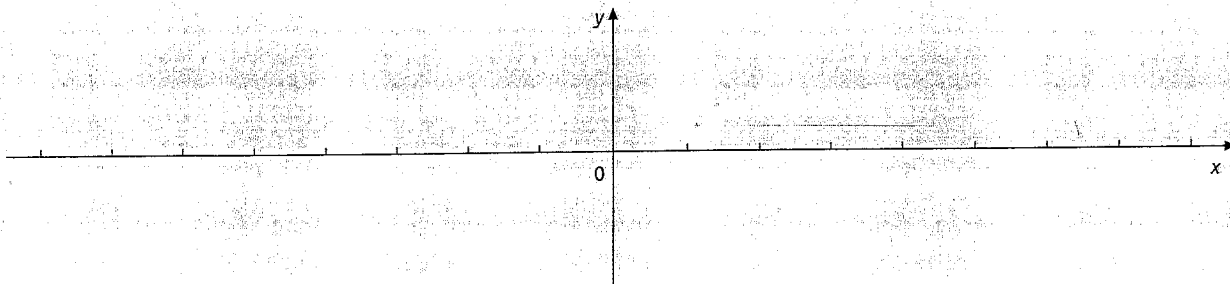
QUESTION **2**   Write down the period and amplitude:

a $y = \sin 4x$

Period

_____

Amplitude

_____

b $y = 4 \sin x$

Period

_____

Amplitude

_____

c $y = \dfrac{1}{2} \sin 2x$

Period

_____

Amplitude

_____

d $y = -2 \sin \dfrac{x}{4}$

Period

_____

Amplitude

_____

QUESTION **3**   Sketch the graph of:

a $y = 2 \sin x$

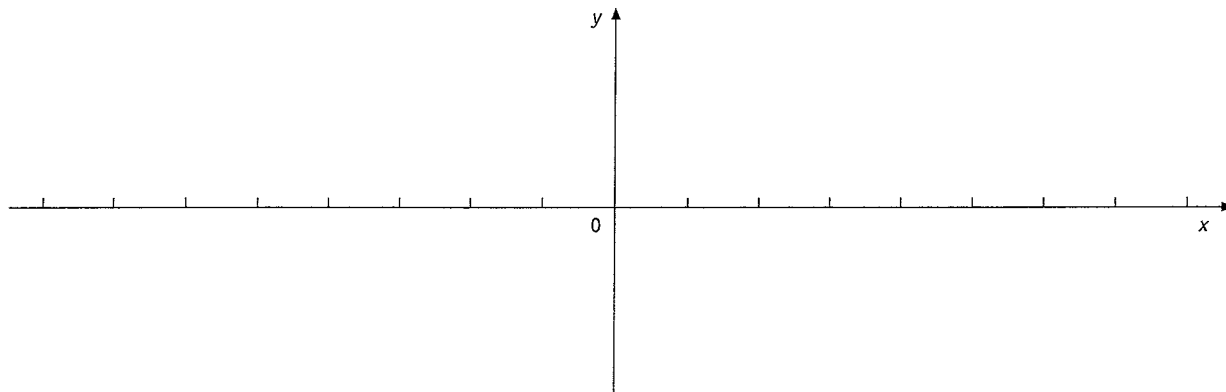b $y = \sin 2x$

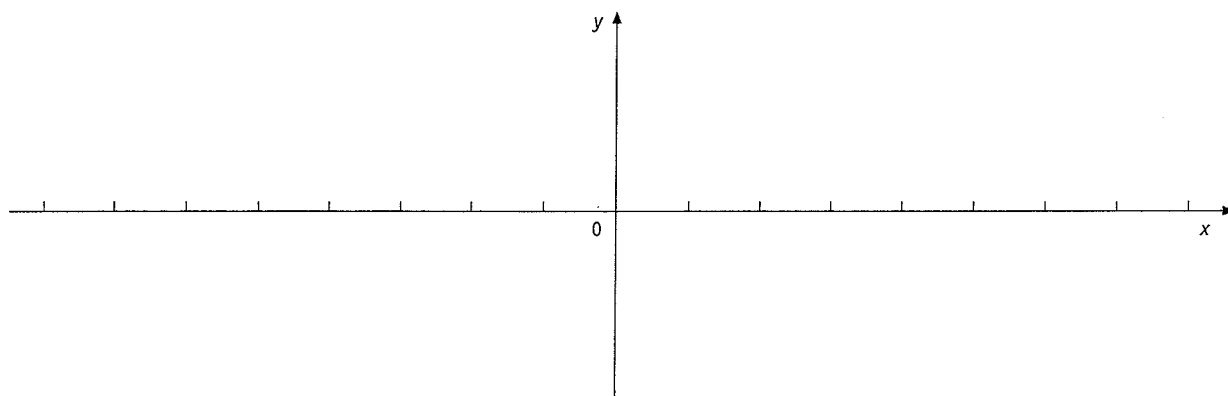# The trigonometric functions

The graph of $y = \sin x$ (2)

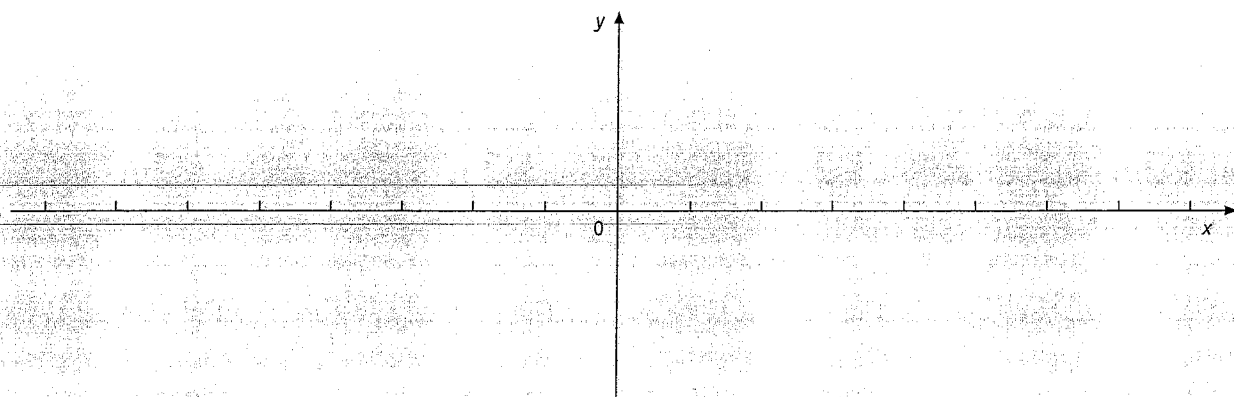QUESTION **1**   Sketch the graph of:

a $y = \sin \pi x$

b $y = 4 \sin \dfrac{x}{2}$

c $y = 3 \sin \left(x - \dfrac{\pi}{4} \right)$

The trigonometric functions

The graph of $y = \cos x$ (1)

QUESTION **1**   Complete:

a   The domain of the function $y = \cos x$ is _____

b   The range of the function $y = \cos x$ is _____

c   The graph of $y = \cos x$ has period _____ and amplitude _____

d   The graph of $y = a \cos nx$ has period _____ and amplitude _____

QUESTION **2**   Write down the period and amplitude:

a $y = \cos 2x$

Period

_____

Amplitude

_____

b $y = 2 \cos x$

Period

_____

Amplitude

_____

c $y = \frac{1}{4} \cos 4x$

Period

_____

Amplitude

_____

d $y = -4 \cos \frac{x}{4}$
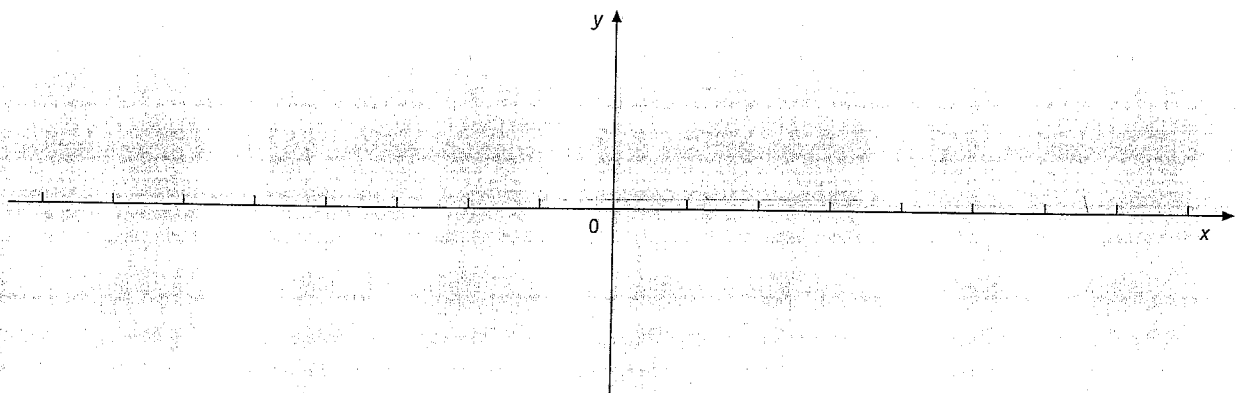
Period

_____

Amplitude

_____

QUESTION **3**   Sketch the graph of:

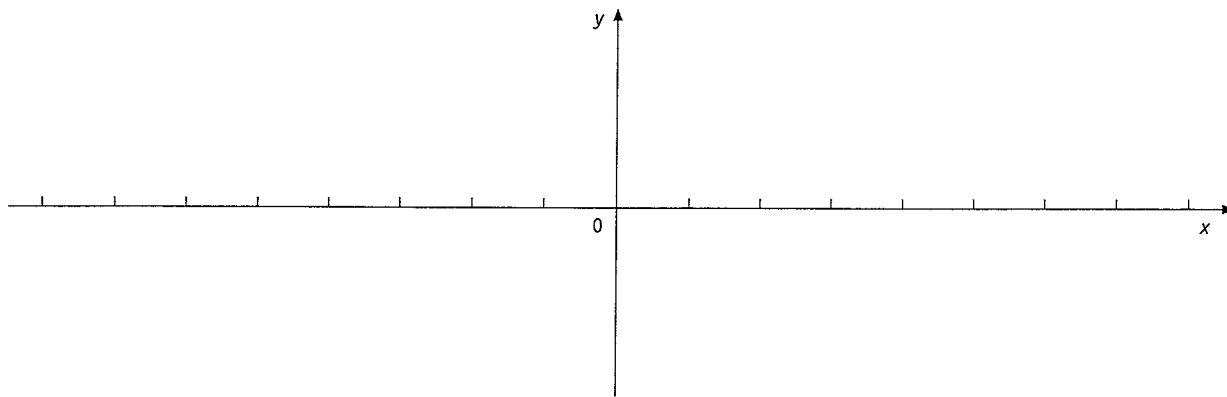**a** $y = 3 \cos x$

b $y = \cos 3x$
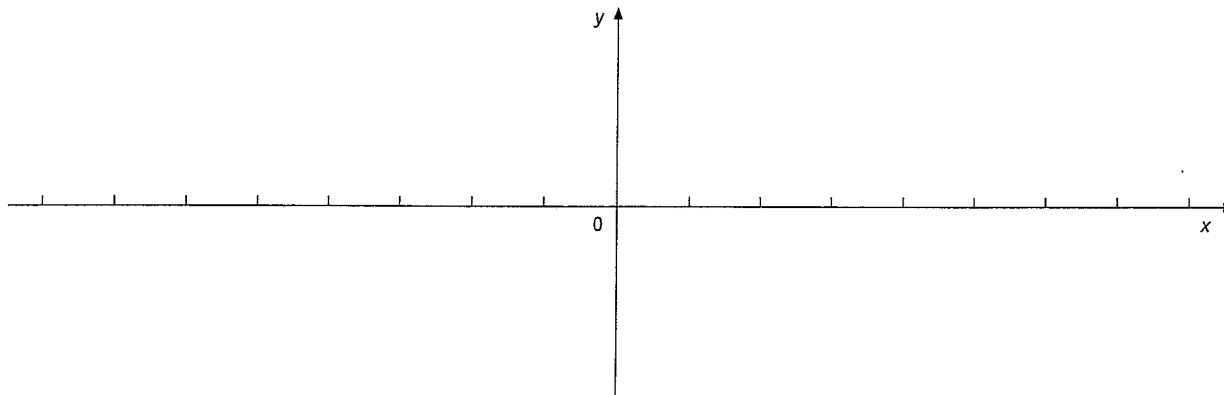
The trigonometric functions

The graph of $y = \cos x$ (2)

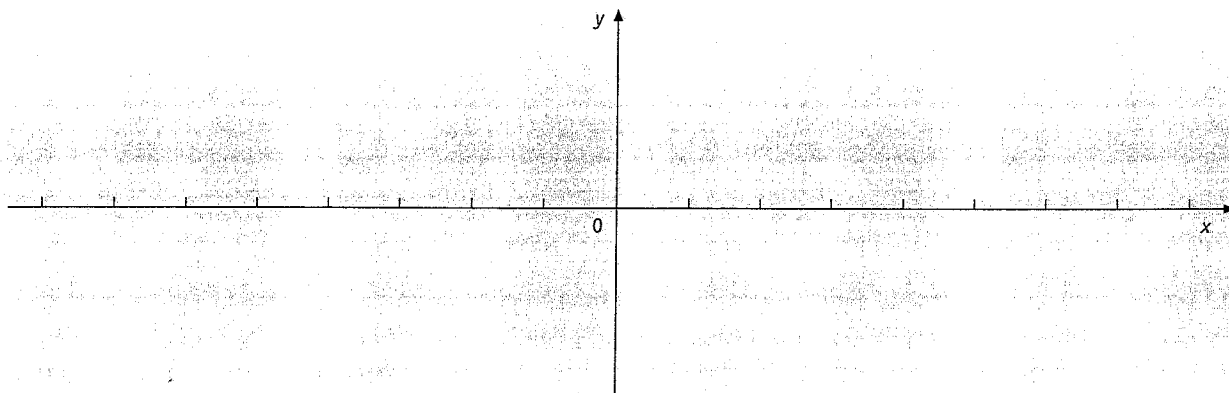QUESTION **1**   Sketch the graph of:

a $y = 2\cos 2x$

b $y = \dfrac{1}{2}\cos\dfrac{x}{4}$

c $y = 1 - \cos x$

The trigonometric functions

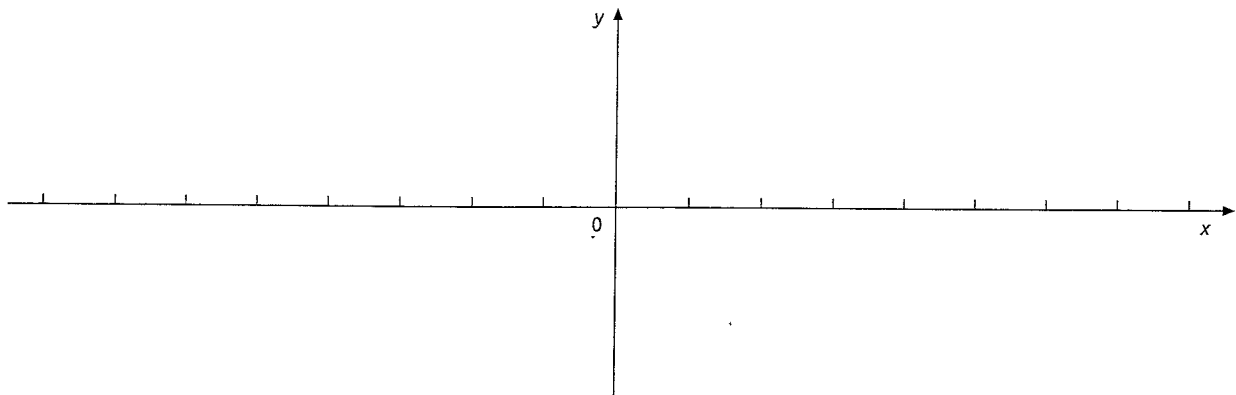## The graph of $y = \tan x$ (1)

QUESTION **1**   Complete:

a   For what values of x is $y = \tan x$ undefined? _____

b   The range of the function $y = \tan x$ is _____

c   The graph of $y = \tan x$ has period _____

d   The graph of $y = a \tan nx$ has period _____
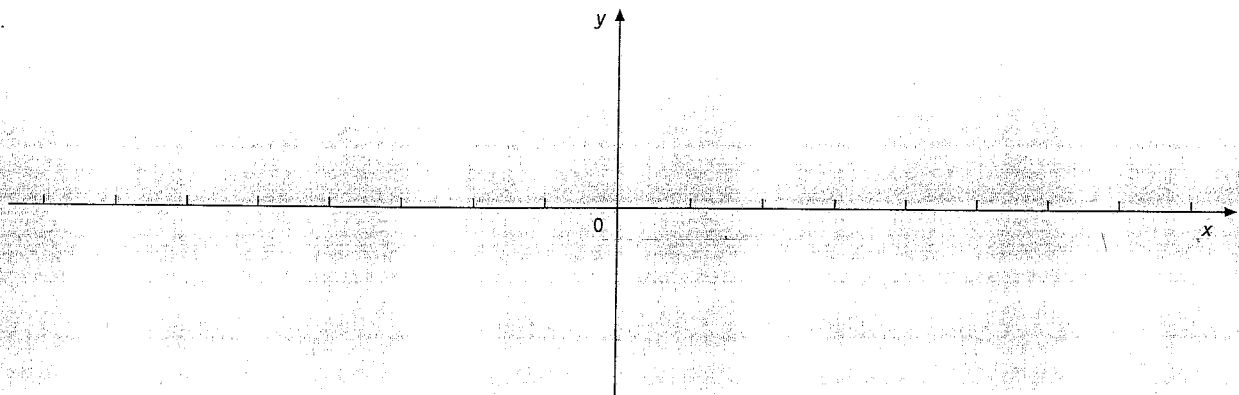
QUESTION **2**   Write down the period:

a $y = \tan 4x$

b $y = 3 \tan x$

c $y = -\tan \pi x$

d $y = 2 \tan \dfrac{x}{2}$

QUESTION **3**   Sketch the graph of:

a $y = \tan x$
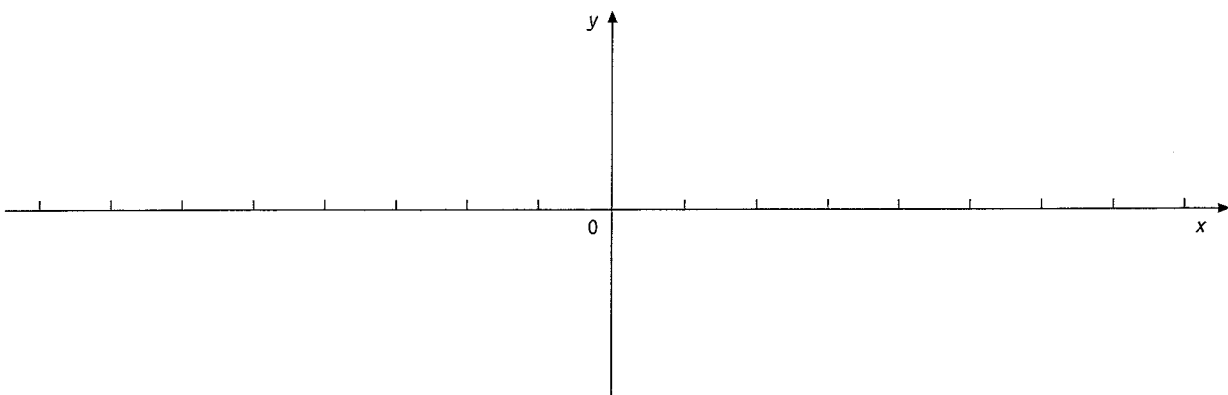

b $y = \tan 2x$

The trigonometric functions

The graph of $y = \tan x$ (2)

QUESTION **1**   Sketch the graph of:
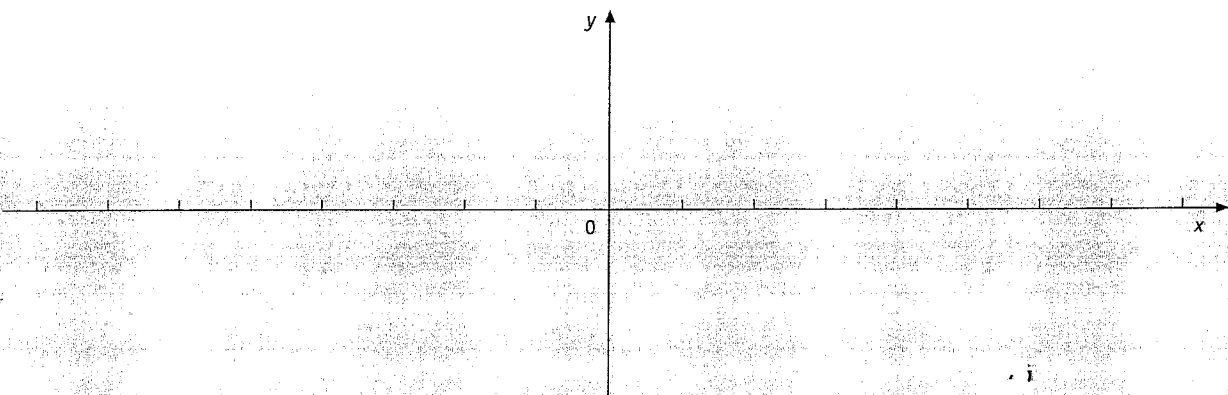
a $y = 3 \tan x$
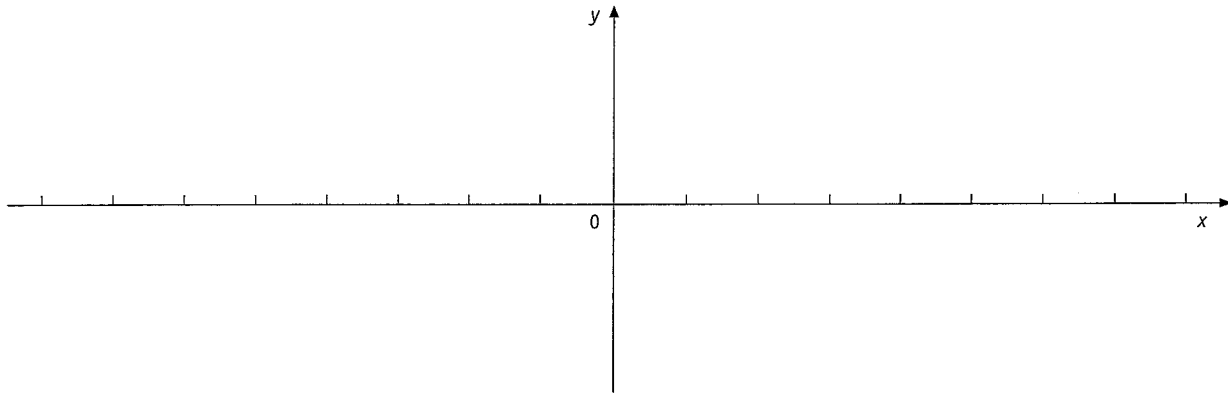
b $y = -\tan x$
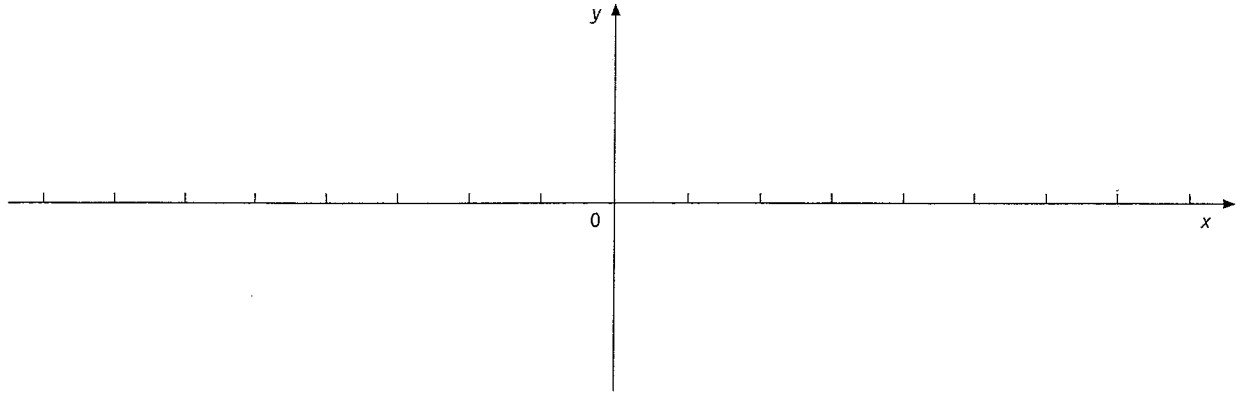

c $y = 2 \tan \dfrac{x}{2}$
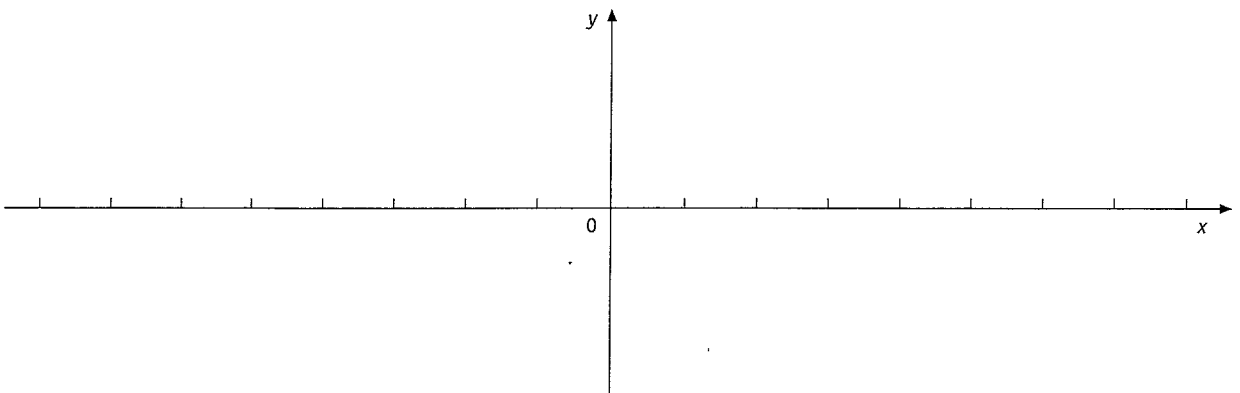
The trigonometric functions

The graphs of $y = \operatorname{cosec} x$, $y = \sec x$, $y = \cot x$

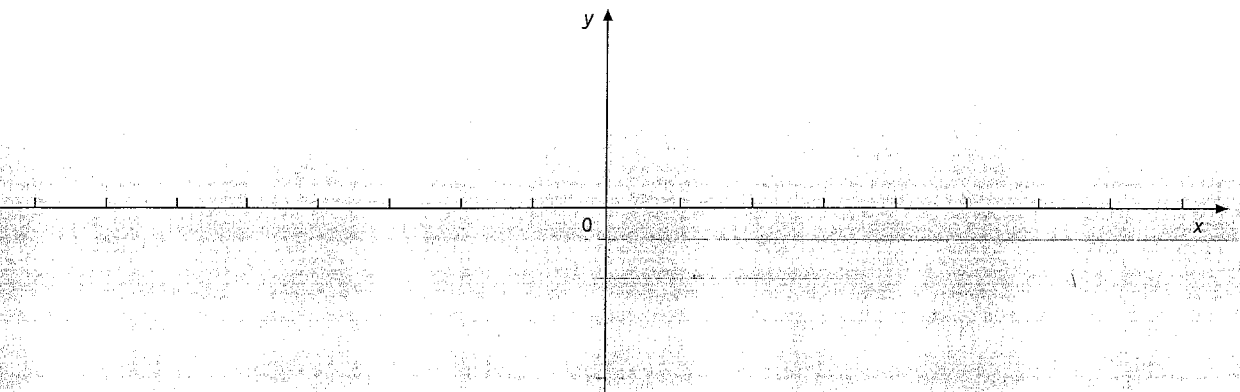QUESTION **1**   Sketch the graph of:

a $y = \operatorname{cosec} x$

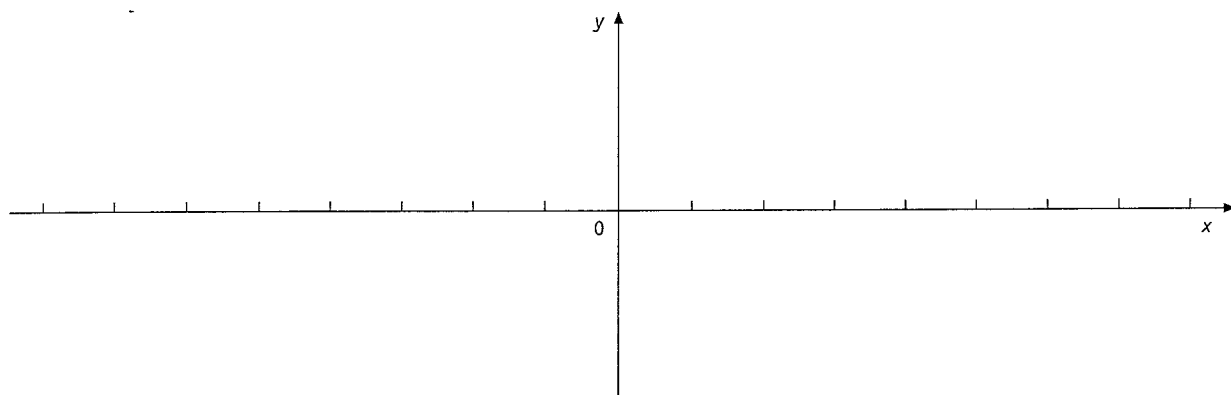**b** $y = \sec x$

c $y = \cot x$

The trigonometric functions
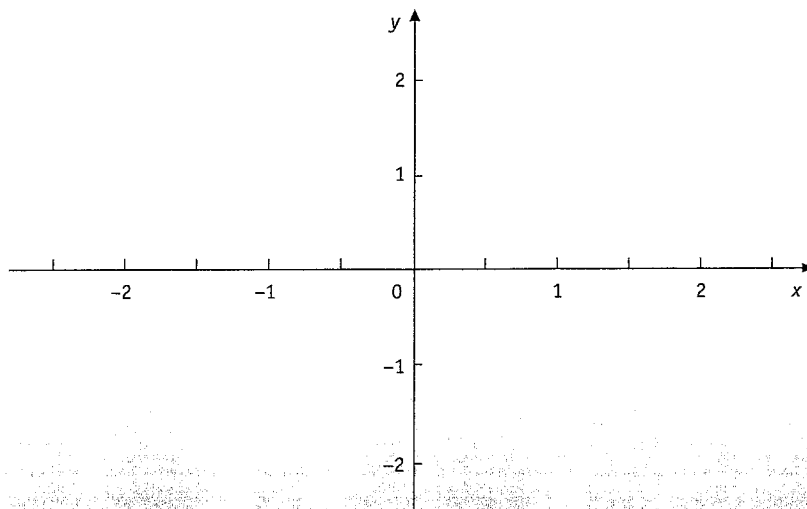
Using graphs to solve equations (1)

QUESTION **1**

a   On the same diagram sketch the graphs of $y = 2 \cos x$ and $y = \sin 2x$ for $-2\pi \le x \le 2\pi$

b   Write down all solutions of the equation $2 \cos x = \sin 2x$, $-2\pi \le x \le 2\pi$

QUESTION **2**

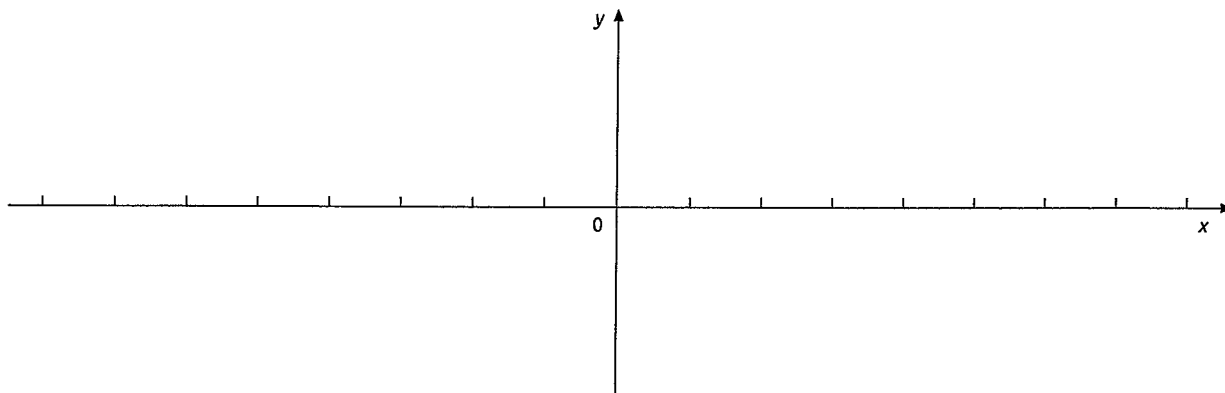a   On the given diagram sketch the graphs of $y = \sin \pi x$ and $y = 2x$

b   Write down all solutions of the equation $\sin \pi x = 2x$

The trigonometric functions
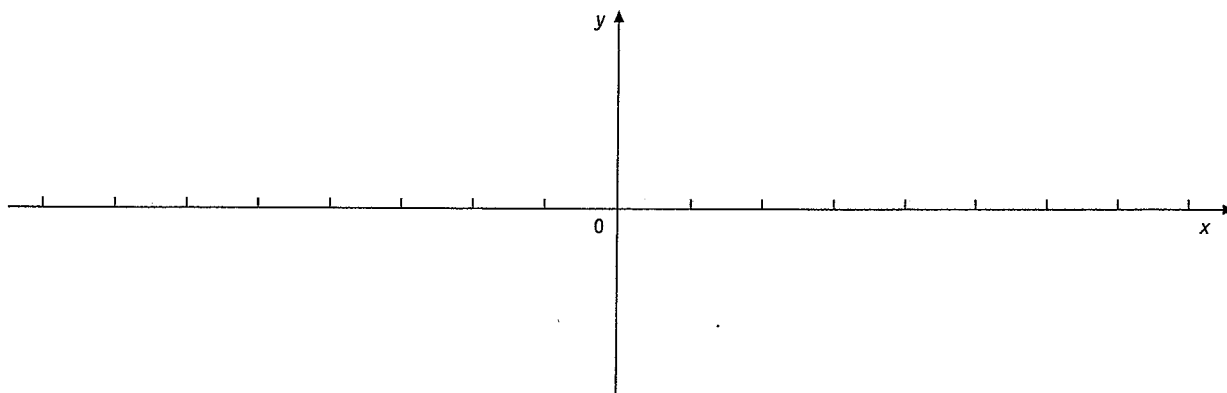
Using graphs to solve equations (2)

QUESTION **1**

a Sketch the graph of $y = \cos\left(x + \dfrac{3\pi}{2}\right)$

b For what values of x does $\cos\left(x + \dfrac{3\pi}{2}\right) = \sin x$?
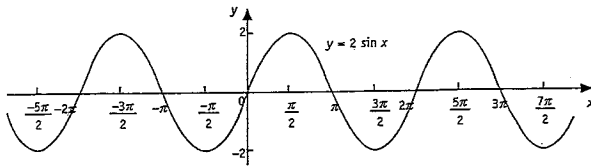
QUESTION **2**

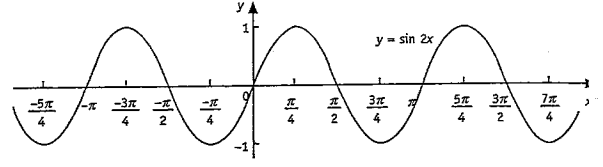**a** On the given diagram sketch $y = \tan x$ and $y = \cot x$

b For what values of x does $\tan x = \cot x$?

Page 72 1 a all real x b $-1 \le y \le 1$ c 2π, 1 d $\dfrac{2\pi}{n}$, a 2 a $\dfrac{\pi}{2}$, 1 b 2π, 4 c π, $\dfrac{1}{2}$ d 8π, 2
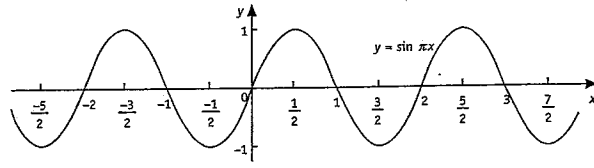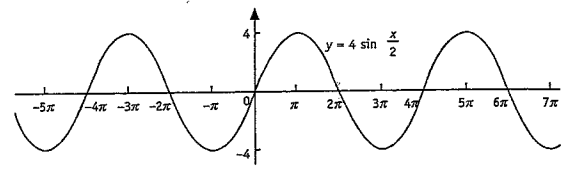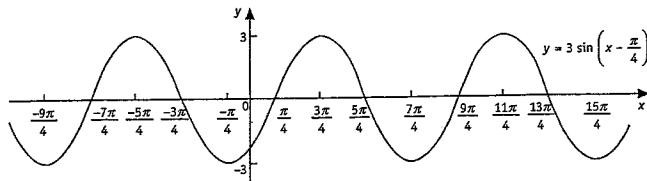
3 a

b

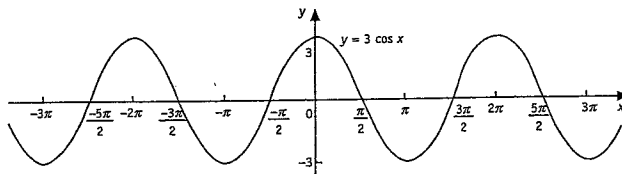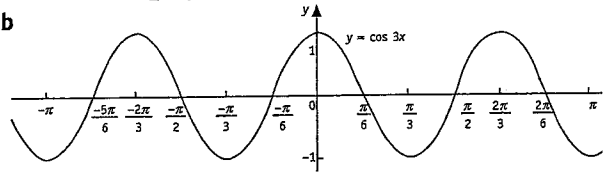**Page 73**

1 a

b

c

Page 74 1 a all real x b $-1 \le y \le 1$ c 2π, 1 d $\dfrac{2\pi}{n}$, a 2 a π, 1 b 2π, 2 c $\dfrac{\pi}{2}$, $\dfrac{1}{4}$ d 8π, 4
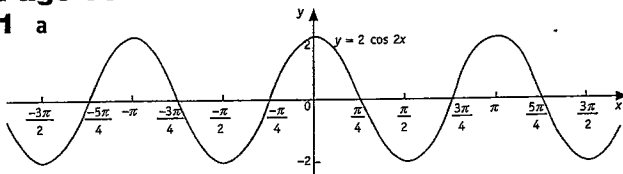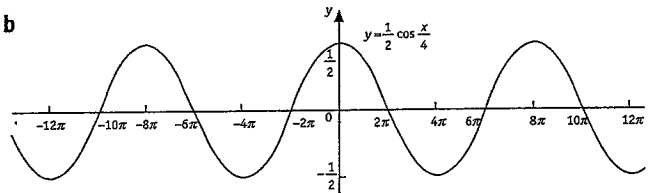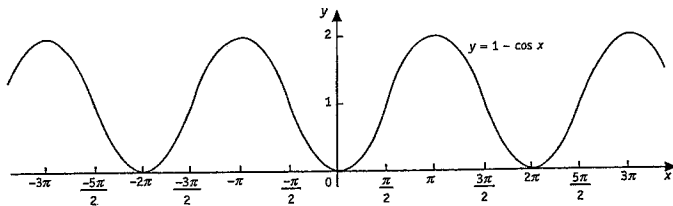
3 a

b
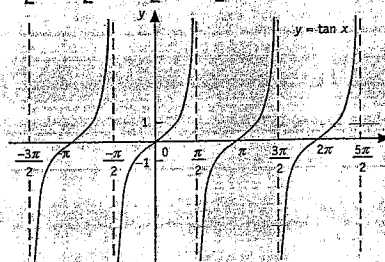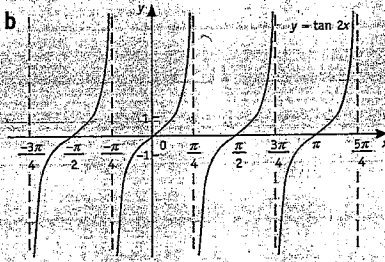

Page 75

1 a

b

c

Page 76 1 a $x = \pm\dfrac{\pi}{2}, \pm\dfrac{3\pi}{2}, \pm\dfrac{5\pi}{2}, \pm\dfrac{7\pi}{2}, \ldots$ b all real y c π d $\dfrac{\pi}{n}$ 2 a $\dfrac{\pi}{4}$ b π c 1 d 2π
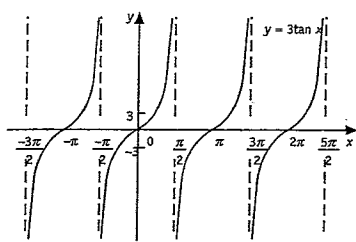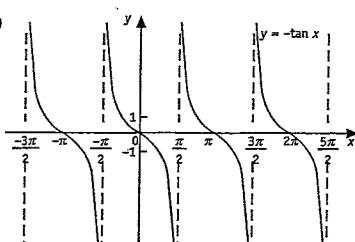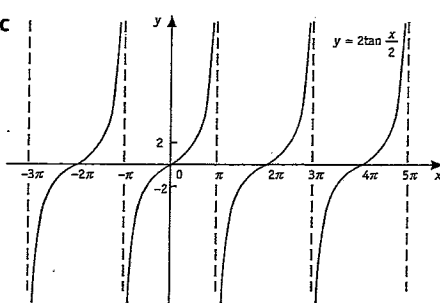
3 a

b

ANSWERS – PG 1

Page 77

1 **a**

$y = 3\tan x$

b

$y = -\tan x$

c

$y = 2\tan \dfrac{x}{2}$

Page 78

1 **a**

$y = \operatorname{cosec} x$

b

$y = \sec x$

c

$y = \cot x$
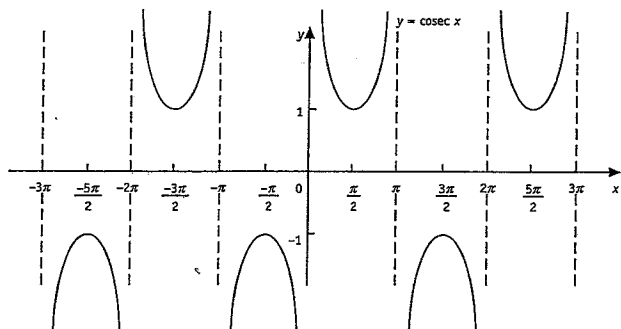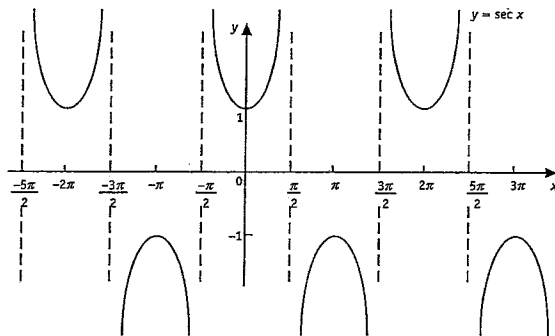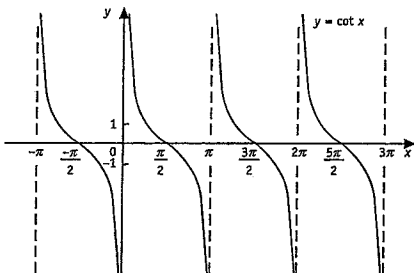
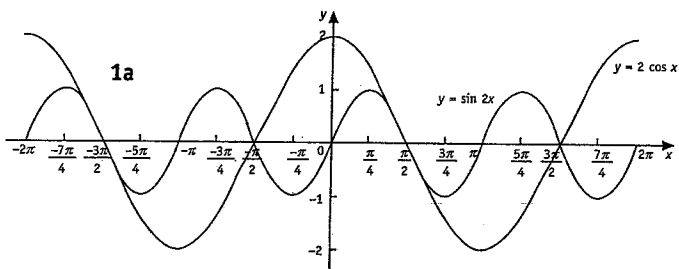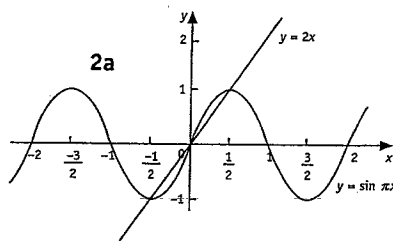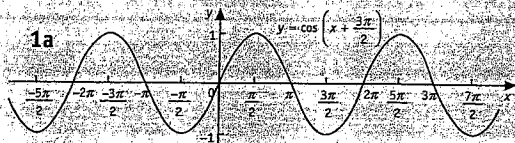**Page 79** **1** **a** (below) **b** $x = -\dfrac{3\pi}{2}, -\dfrac{\pi}{2}, \dfrac{\pi}{2}$ or $\dfrac{3\pi}{2}$

2 **a** (below) **b** $x = -\dfrac{1}{2}, 0$ or $\dfrac{1}{2}$

1a

$y = 2\cos x$

$y = \sin 2x$

2a

$y = 2x$

$y = \sin \pi x$

Page 80 **1** **a** (below) **b** all values of x

2 **a** (below) **b** $x = \pm\dfrac{\pi}{4}, \pm\dfrac{3\pi}{4}, \pm\dfrac{5\pi}{4}, \pm\dfrac{7\pi}{4}, \cdots$

1a

$y = \cos\left(x + \dfrac{3\pi}{2}\right)$

2a

$y = \cot x$

$y = \tan x$