

## 2.4.5 Trig Graphs

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**KEY WORDS** period

<!-- Session 2 native-skill companion -->

### Objective

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Practise trig graphs within the labelled native lessons. Public original tasks; locally authored answer guidance.

### 1 Key knowledge and worked examples

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#### ■ Exponential and degree-based trigonometric graphs · Higher

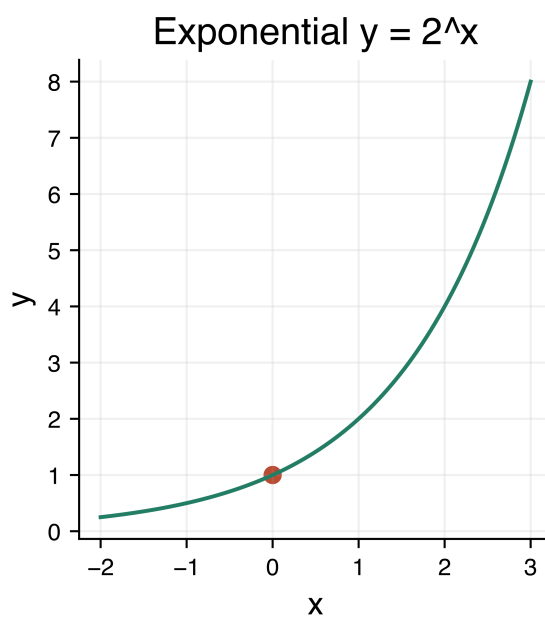
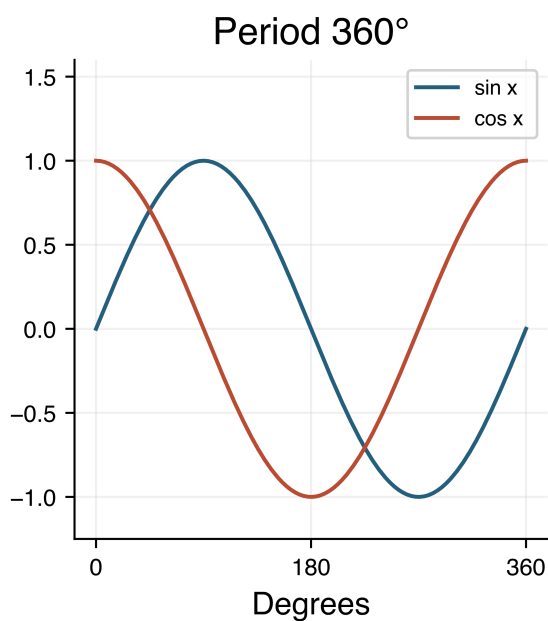
For  $y=k^x$  with  $k>0, k \neq 1$ , the y-intercept is 1;  $k>1$  gives growth and  $0<k<1$  gives decay. In degrees, sine and cosine repeat every  $360^\circ$  with range  $[-1,1]$ ; tangent repeats every  $180^\circ$  and is undefined at  $90^\circ+180^\circ n$ . Label axes in degrees.

$$\sin 270^\circ = -1, \quad \tan 45^\circ = 1$$

For  $y=2^x$ ,  $x=-1,0,1,3$  give  $1/2,1,2,8$ . Sine has values  $0,1,0,-1,0$  at  $0^\circ,90^\circ,180^\circ,270^\circ,360^\circ$ . Cosine starts at 1;  $\cos 180^\circ = -1$ . Tangent has  $\tan 45^\circ = 1$  but no finite value at  $90^\circ$ . For  $k=1/2$ , increasing  $x$  produces decay, never a negative output.

Degrees and radians are different units. A steep tangent branch is not a finite point at its asymptote. Exponential growth is not repeated addition of a constant amount.

AQA A12 Higher requires exponential functions with positive bases and sine/cosine/tangent for angles of any size in degrees. No differentiation or radian sector formula is introduced here.



*Original native-lesson illustration; labels belong to its worked example.*

## 2 Practice

**2.1** (Higher) Find  $2^3$ .

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**2.2** (Higher) Find  $\sin 270^\circ$ .

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**2.3** (Higher) Find  $\tan 45^\circ$ .

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### 3 Exam-style questions

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**3.1** Decide whether this claim is true. Justify with a concrete calculation or counterexample: The sine graph and tangent graph both have period  $360^\circ$  as their smallest positive period.

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## Solutions

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**2.1** Three factors of 2 give 8.

**2.2** The unit-circle ordinate at  $270^\circ$  is -1.

**2.3** The right triangle has equal opposite and adjacent lengths.

**3.1** False. Sine has smallest positive period  $360^\circ$ , while tangent repeats after  $180^\circ$  wherever it is defined:  $\tan(\theta+180^\circ)=\tan \theta$ .

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.