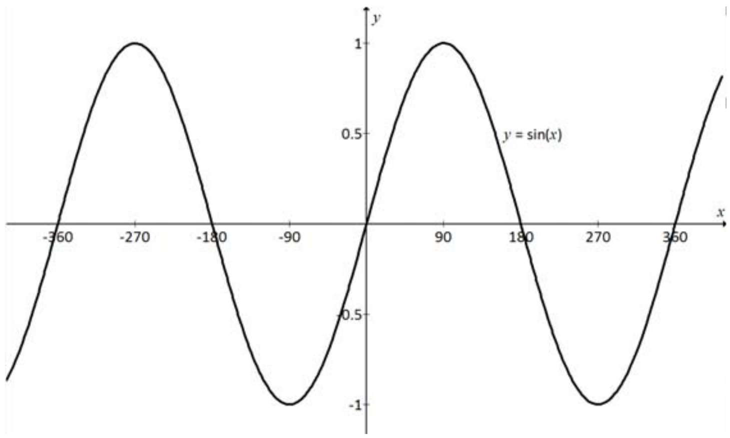
y = sin x

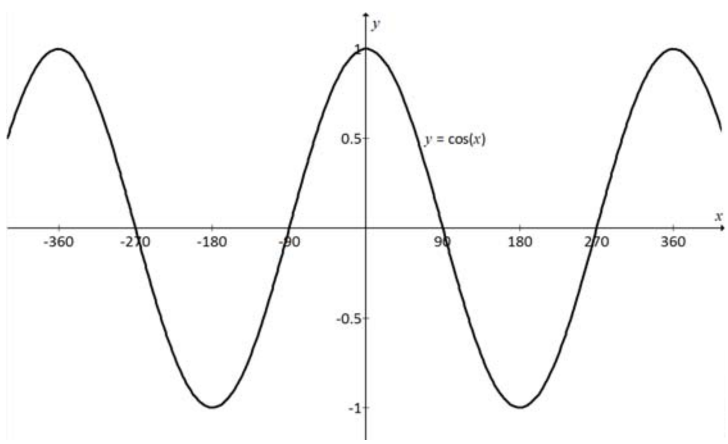


1) What is the **period** of the graph?

2) What is its **amplitude**?

Question *Card A*

y = cos x



1) What is the **period** of the graph?

2) What is its **amplitude**?

Question *Card B*

$y = \sin x$

1) period = 360°

2) amplitude = 1

A handy way to remember the shape of $y = \sin x$ is to note that the graph makes an **S** shape (for **S**ine) around the origin.

Answer *Card A*

$y = \cos x$

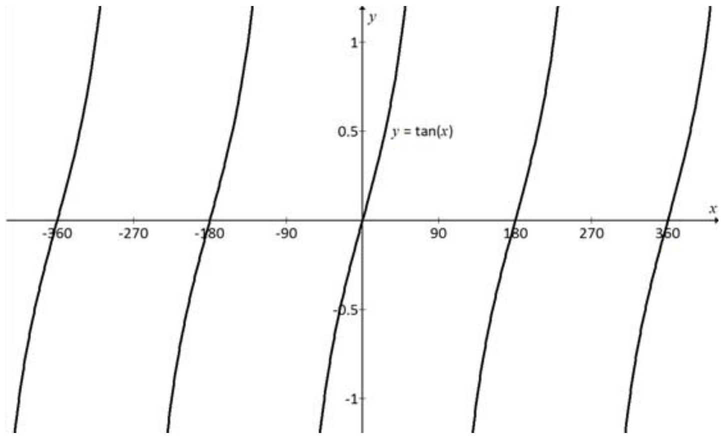
1) period = 360°

2) amplitude = 1

A handy way to remember the shape of $y = \cos x$ is to note that the graph makes an **C** shape (for **C**osine) around the origin.

Answer *Card B*

y = tan x



1) What is the period of the graph?

2) What happens when x is 90°, 270°, 450° and so on?

Question *Card C*

Remembering functions

1) $y = f(x)$ means ... ?

2) $y = f(x)$ is said out loud as ... ?

3) $f(x) = 5x + 1$. What is f(3)?

Question *Card D*

y = tan x

1) period = 180°

2) There are **asymptotes** when x is 90°, 270°, 450°, etc. This is where y shoots off to positive or negative infinity (±∞).

Try putting tan(90) or tan(180) into your calculator. What happens? Can you explain why by thinking about right-angled triangles?

Answer *Card C*

Remembering functions

1) $y = f(x)$ means y is a function of x. Each value of x gives a single value for $f(x)$.

2) $y = f(x)$ is said as 'y equals f of x'.

3) f(3) asks for the value of the function when $x = 3$:

$$\begin{aligned} f(x) &= 5x + 1 \\ f(3) &= 5 \times 3 + 1 \\ &= 16 \end{aligned}$$

Answer *Card D*

$y = \text{f}(x) + \text{a}$

A graph is drawn showing $y = \text{f}(x)$.

1) Describe how you would transform the graph to show $y = \text{f}(x) + \text{a}$.

2) Describe the transformation to show $y = \text{f}(x) + 3$.

3) Describe the transformation to show $y = \text{f}(x) - 4$.

Question *Card E*

$y = \text{f}(x - \text{a})$

A graph is drawn showing $y = \text{f}(x)$.

1) Describe how you would transform the graph to show $y = \text{f}(x - \text{a})$.

2) Describe the transformation to show $y = \text{f}(x - 3)$.

3) Describe the transformation to show $y = \text{f}(x + 2)$.

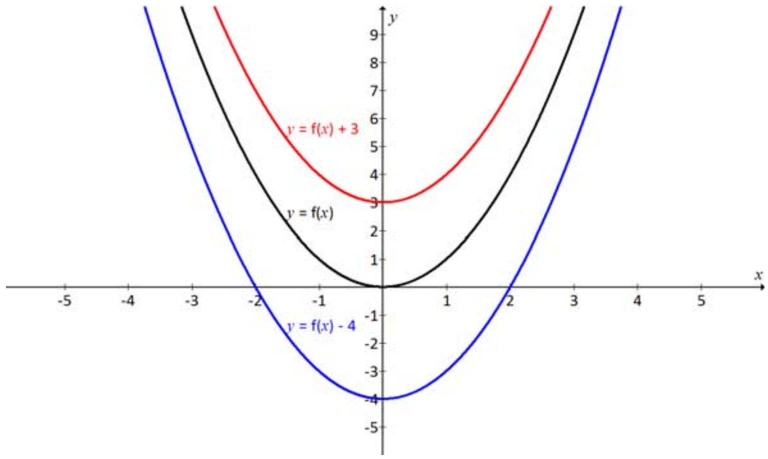
Question *Card F*

y = f(x) + a

1) The graph of y = f(x) + a is the graph of y = f(x) **translated** by the vector $\begin{pmatrix} 0 \\ a \end{pmatrix}$.

2) The graph of y = f(x) + 3 moves the original graph up three units.

3) The graph of y = f(x) – 4 moves the original graph down four units.



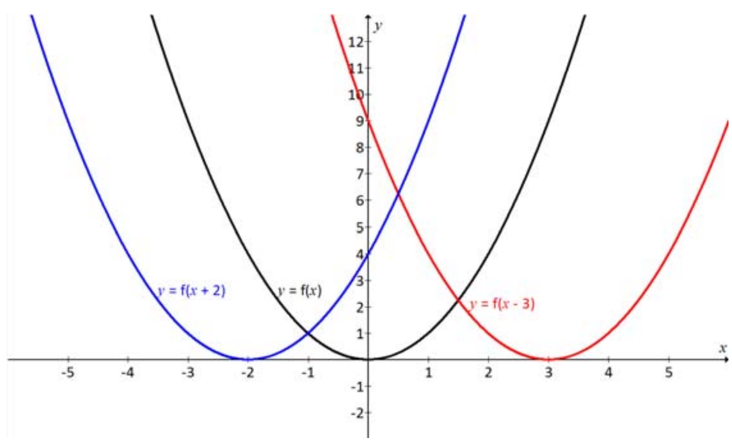
Answer *Card E*

y = f(x – a)

1) The graph of y = f(x – a) is the graph of y = f(x) **translated** by the vector $\begin{pmatrix} a \\ 0 \end{pmatrix}$.

2) The graph of y = f(x – 3) moves the original graph right three units.

3) The graph of y = f(x + 2) moves the original graph left two units.



Answer *Card F*

y = kf(x)

A graph is drawn showing y = f(x).

1) Describe how you would transform the graph to show y =kf(x).

2) Describe the transformation to show y = 3f(x).

3) Describe the transformation to show y = ½f(x).

Question *Card G*

y = f(kx)

A graph is drawn showing y = f(x).

1) Describe how you would transform the graph to show y = f(kx).

2) Describe the transformation to show y = f(3x).

3) Describe the transformation to show y = f(½x).

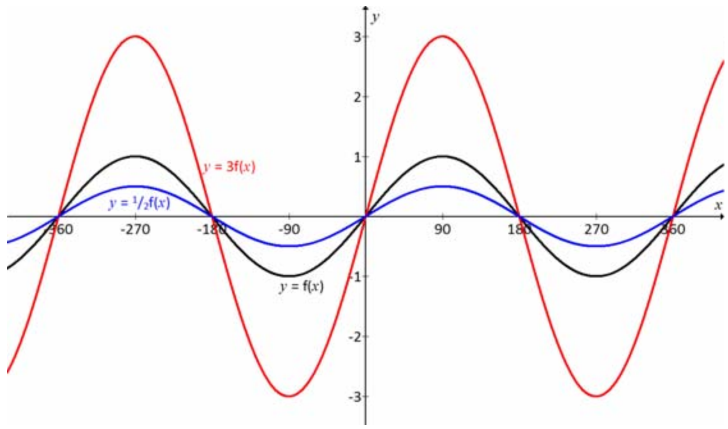
Question *Card H*

y = kf(x)

1) The graph of y = kf(x) is the graph of y = f(x) **stretched vertically** by scale factor k.

2) The graph of y = 3f(x) stretches the original graph vertically by scale factor 3.

3) The graph of y = ½f(x) stretches the original graph vertically by scale factor ½.



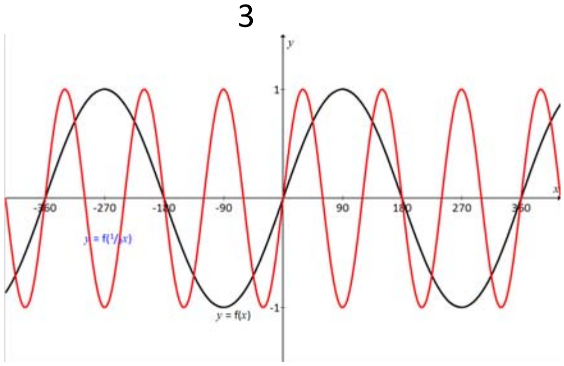
Answer *Card G*

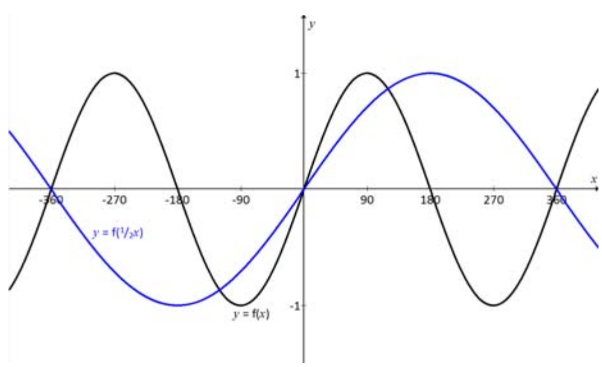
y = f(kx)

1) The graph of y = f(kx) is the graph of y = f(x) **stretched horizontally** by scale factor $\frac{1}{k}$.

2) The graph of y = f(3x) stretches the original graph horizontally by scale factor $\frac{1}{3}$.

3) The graph of y = f(½x) stretches the original graph horizontally by scale factor 2.





Answer *Card H*

y = -f(x)

A graph is drawn showing y = f(x).

1) Describe how you would transform the graph to show y =-f(x).

2) Describe the transformation to show y = -kf(x).

3) Describe the transformation to show y = -2f(x).

Question *Card I*

y = f(-x)

A graph is drawn showing y = f(x).

1) Describe how you would transform the graph to show y = f(-x).

2) Describe the transformation to show y = f(-kx).

3) Describe the transformation to show y = f(-4x).

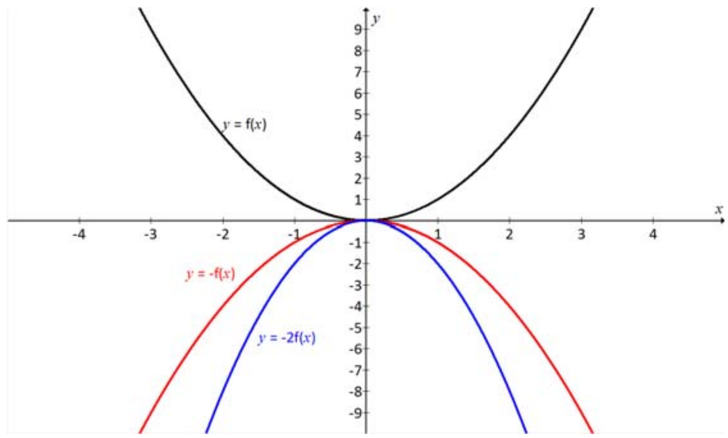
Question *Card J*

y = -f(*x*)

1) The graph of y = -f(x) is the graph of y = f(x) **reflected vertically** in the x-axis.

2) The graph of y = -kf(x) stretches the original graph vertically by scale factor -k.

3) The graph of y = -2f(x) stretches the original graph vertically by scale factor -2.



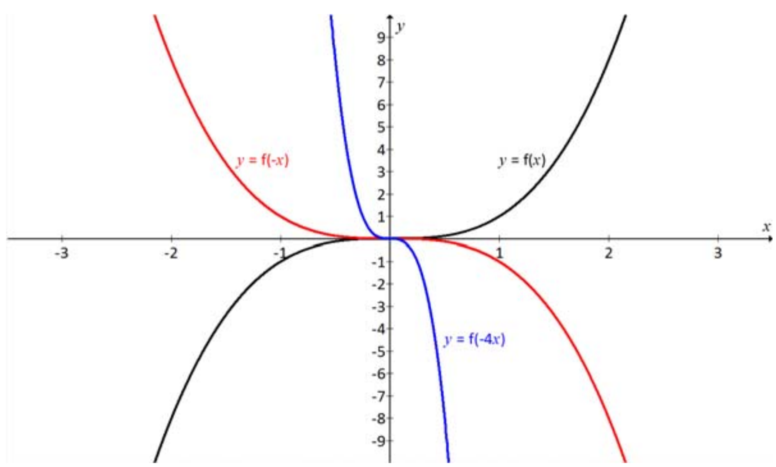
Answer *Card I*

y = f(-*x*)

1) The graph of y = f(-x) is the graph of y = f(x) **reflected horizontally** in the x-axis.

2) The graph of y = f(-kx) stretches the original graph horizontally by scale factor -k.

3) The graph of y = f(-4x) stretches the original graph horizontally by scale factor -4.



Answer *Card J*

Teaching notes

This pack contains 10 flash cards (two per double-sided sheet), ideal for independent revision or to test a friend.

Print or photocopy the sheets back to back, so the questions match up with the answers on the other side. You may wish to print onto thin scrap paper first to check alignment, before printing onto thicker card or coloured paper. Once cut out, collect the cards together into a set with a treasury tag, paper clip, envelope, etc.

Students could take ownership of their cards by adding notes, colour, or their own cards.