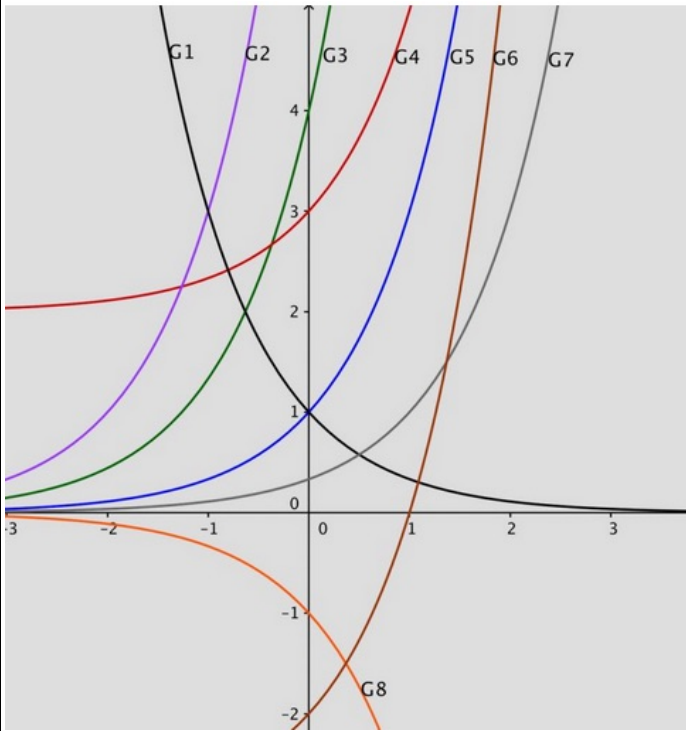


## MATCHING EXPONENTIALS



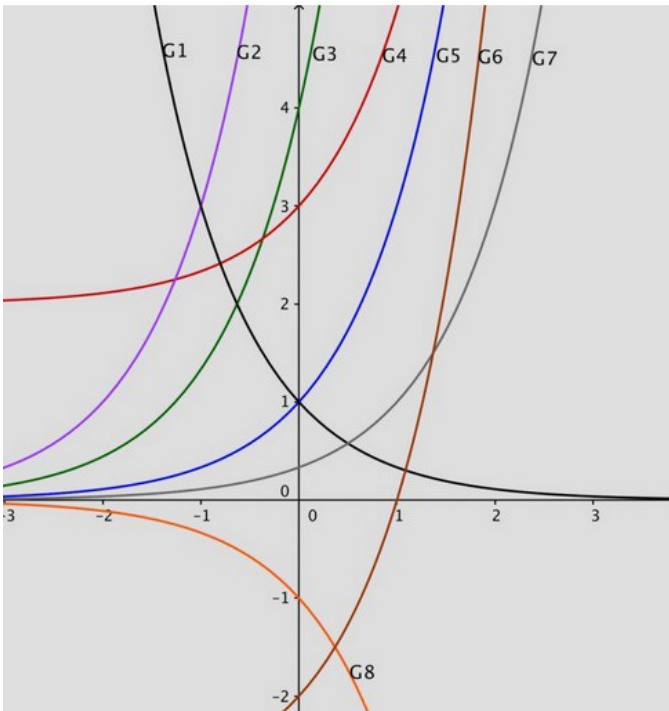
1. Which one of the graphs represents the function  $f(x)=3^x$ ?

Use your knowledge of transformations of other functions (e.g. lines, hyperbolas and parabolas) to match the graphs to their equations and to the descriptions of the transformations of  $f(x)=3^x$ .

Cut up a copy of the table on page 4 and rearrange the pieces into 8 matching sets.

Equations	Graphs	Transformations
1. $y = 4 \cdot 3^x$	<b>G1</b>	<b>A.</b> $f(x)$ shifted 3 units downwards
2. $y = 3^x + 2$	<b>G2</b>	<b>B.</b> $f(x)$ reflected in the $y$ -axis
3. $y = -3^x$	<b>G3</b>	<b>C.</b> $f(x)$ shifted 1 unit to the right
4. $y = 3^{x+2}$	<b>G4</b>	<b>D.</b> $f(x)$ shifted 2 units upwards
5. $y = 3^{x-1}$	<b>G5</b>	<b>E.</b> $f(x)$ reflected in the $x$ -axis
6. $y = 3^{-x}$	<b>G6</b>	<b>F.</b> $f(x)$ shifted 2 units to the left
7. $y = 3^x - 3$	<b>G7</b>	<b>G.</b> $f(x)$
8. $y = 3^x$	<b>G8</b>	<b>H.</b> $f(x)$ intersects $y$ -axis at $(0; 4)$

2. Given:  $f(x) = 5^{-x}$
- 2.1 Write down the coordinates of A if A is the  $y$ -intercept of  $f(x)$ .
  - 2.2 Write down the coordinates of the  $y$ -intercept of  $g(x) = 2 \cdot 5^{-x}$
  - 2.3 Write down the coordinates of the  $y$ -intercept of  $h(x) = 5^{-x} + 3$
  - 2.4 Write down the coordinates of the  $y$ -intercept of  $p(x) = 5^{-x-2} + 3$
  - 2.5 Write down the coordinates of the  $y$ -intercept of  $q(x) = -2 \cdot 5^{-x} - 1$



1. Which one of the graphs represents the function  $f(x)=3^x$ ?

Use your knowledge of transformations of other functions to match the graphs G1 to G8 to their equations numbered 1 to 8 and to the descriptions of the transformations of  $f(x)=3^x$  labelled A to H.

Equation 1 has been done for you.

Equation	Graph	Description/Transformation
1. $y = 4 \cdot 3^x$	G3	H

2. Given:  $f(x) = 5^{-x}$

Write down the coordinates of A if A is the y-intercept of $f(x)$ .	
Write down the coordinates of the y-intercept of $g(x) = 2 \cdot 5^{-x}$	
Write down the coordinates of the y-intercept of $h(x) = 5^{-x} + 3$	
Write down the coordinates of the y-intercept of $p(x) = 5^{-x-2} + 3$	
Write down the coordinates of the y-intercept of $q(x) = -2 \cdot 5^{-x} - 1$	

**HELP**

Start by putting  $x = 0$  in the equations to find the y intercept and then identify the graph from the y intercept.

**NEXT**

Make up a similar activity of your own, perhaps with just 4 graphs and 12 cards altogether. Then exchange your work with another learner and each try to complete the matching activity created by the other learner, but also to spot any errors that they think have been made in creating the problem. The learners should try to resolve issues about errors and come up with a set of 24 cards between them that provide a similar activity to the original one.

Cut the table into 24 cards and rearrange them into 8 matching sets.

Equations	Graphs	Transformations
1. $y = 4 \cdot 3^x$	<b>G1</b>	<b>A.</b> $f(x)$ shifted 3 units downwards
2. $y = 3^x + 2$	<b>G2</b>	<b>B.</b> $f(x)$ reflected in the $y$ -axis
3. $y = -3^x$	<b>G3</b>	<b>C.</b> $f(x)$ shifted 1 unit to the right
4. $y = 3^{x+2}$	<b>G4</b>	<b>D.</b> $f(x)$ shifted 2 units upwards
5. $y = 3^{x-1}$	<b>G5</b>	<b>E.</b> $f(x)$ reflected in the $x$ -axis
6. $y = 3^{-x}$	<b>G6</b>	<b>F.</b> $f(x)$ shifted 2 units to the left
7. $y = 3^x - 3$	<b>G7</b>	<b>G.</b> $f(x)$
8. $y = 3^x$	<b>G8</b>	<b>H.</b> $f(x)$ intersects $y$ -axis at $(0 ; 4)$