MHF 4U

COMBINED FUNCTIONS I

① CREATING A COMBINED FUNCTION

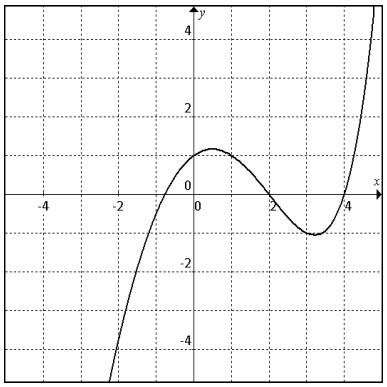
Fill in the table by applying the indicated operation to the given pair of functions.

FUNCTION #1	FUNCTION #2	OPERATION	SIMPLIFIED EQUATION	PROPERTIES
$f(x) = x + 1$	$g(x) = x^2 + 3x + 2$	$h = f + g$		
$f(x) = x^2 + 3$	$g(x) = x^3 - x$	$h = f - g$		
$f(x) = x^2 - 7$	$g(x) = 2 - x^3$	$h = fg$		
$f(x) = x^2 - 4$	$g(x) = x^2 - 3x + 2$	$h = \frac{f}{g}$		
$f(x) = sinx$	$g(x) = cosx$	$h = f - g$		
$f(x) = 2^x$	$g(x) = x - 2$	$h = \frac{f}{g}$		
$f(x) = 2^x$	$g(x) = x^2$	$h = f - g$		
$f(x) = cosx$	$g(x) = 2^x$	$h = fg$		
$f(x) = x^2$	$g(x) = log_2 x$	$h = \frac{g}{f}$		
$f(x) = x^2 - 1$	$g(x) = 2^x$	$h = \frac{g}{f}$		

② SOLVING INEQUALITIES/EQUATIONS GIVEN THE GRAPH OF A COMBINED FUNCTION

Solve the equation/inequality using the graph provided.

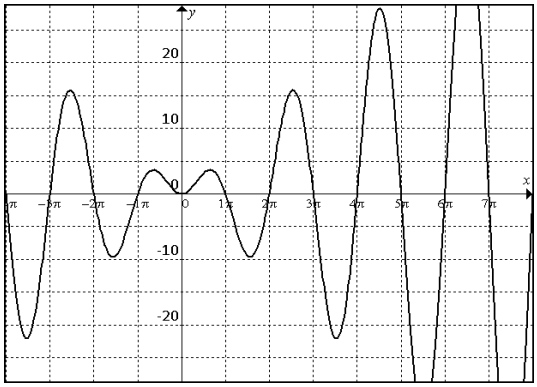
A)



$y = 2^x - x^2$

Solve $2^x > x^2$

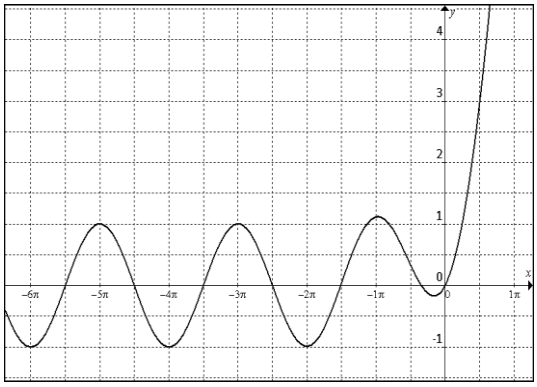
B)



$h(x) = 2xsinx$

Solve $h(x) = 0$

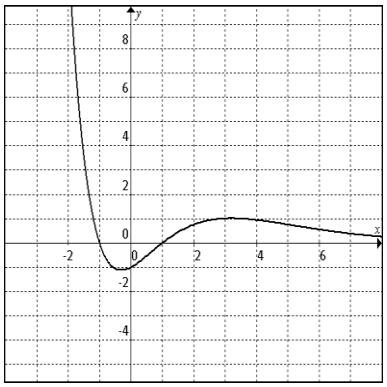
C)



$h(x) = 2^x - cosx$

Locations of maximums

D)



$h(x) = \frac{x^2-1}{2^x}$

$h(x) > 0 \; and \; h(x) \leq 0$

③ DESCRIBING & CATEGORIZING THE COMBINED FUNCTIONS

A) Describe properties of the combined function and name the type of function it is.

$f(x)$	$g(x)$	operation	properties	type
linear	quadratic	$f+g$		
linear	quadratic	fg		
linear	quadratic	$\frac{f}{g}$		
linear	quadratic	$\frac{g}{f}$		
quadratic	quadratic	$f+g$		
quadratic	quadratic	$\frac{f}{g}$		
quadratic	quadratic	fg		

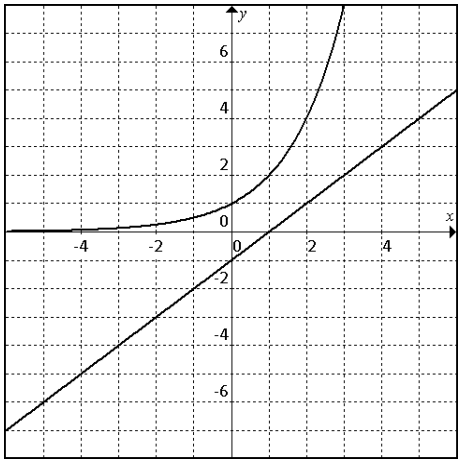
B) What do the zeros of $f(x)$ become in the combined function of $h=\frac{f}{g}$.

C) What do the zeros of $g(x)$ become in the combined function of $h=\frac{f}{g}$.

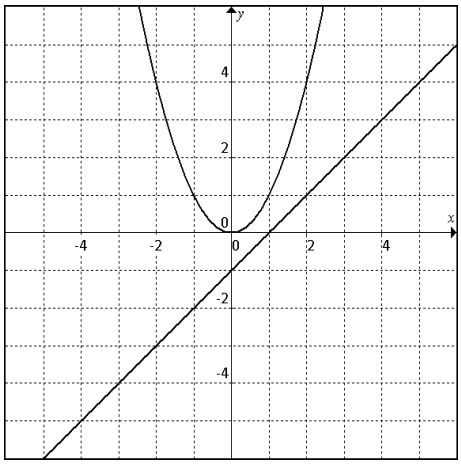
④ GIVEN GRAPHS OF PARENT FUNCTIONS, SKETCH COMBINED FUNCTIONS

For each graph of parent functions, choose an operation to combine the functions in a new graph.

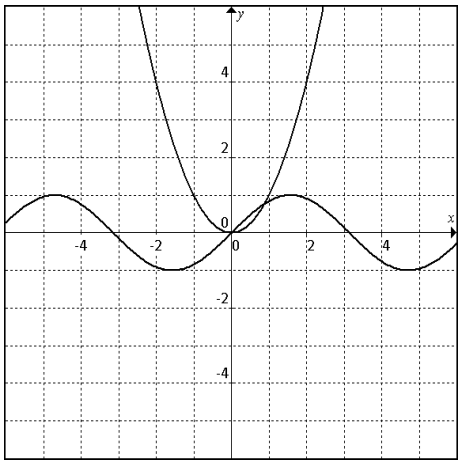
A)



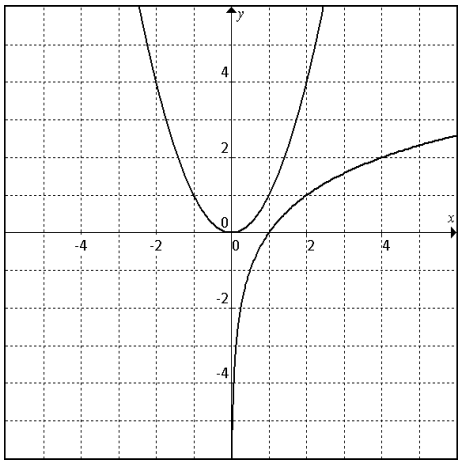
B)



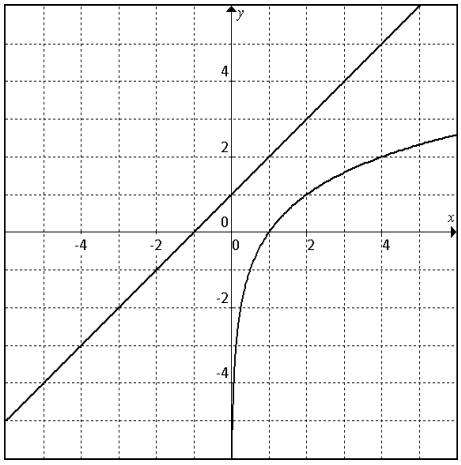
C)



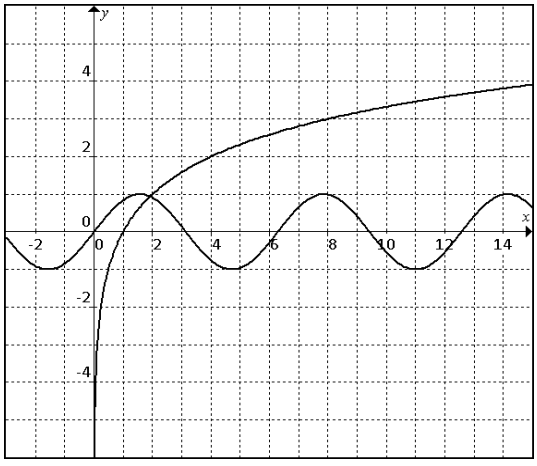
D)



E)

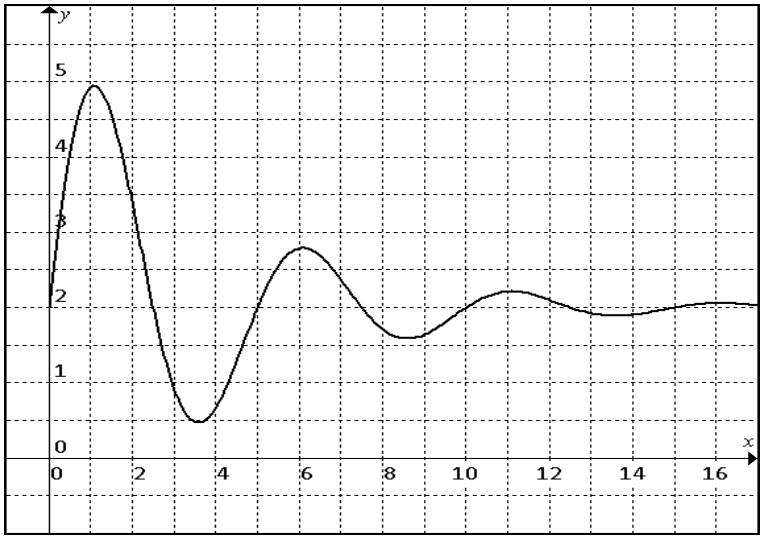


F)



⑤ APPLICATIONS

A) The height, h, in metres, of a weight on a spring after t seconds is shown in the graph. Determine approximately how long the weight is higher than 2.5 metres.



B) What is the amplitude and period of the graph of a heartbeat?