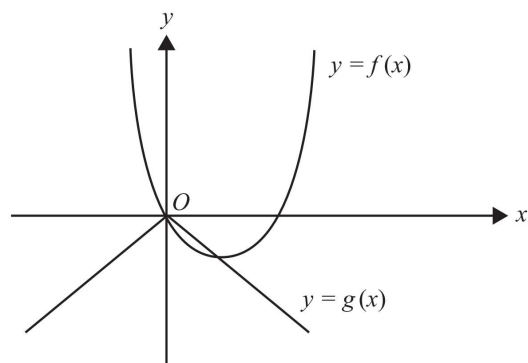# Graphs of Combined and Hybrid Functions
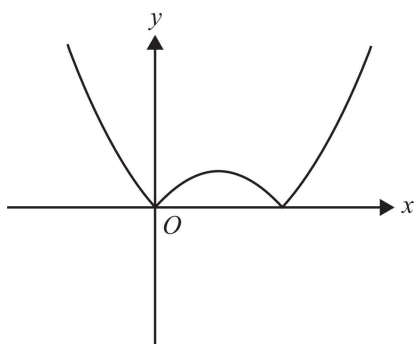
2016 Sample Exam 2 Question 20 /
2007 Exam 2 Question 22
The graphs of $y = f(x)$ and $y = g(x)$ are shown below.
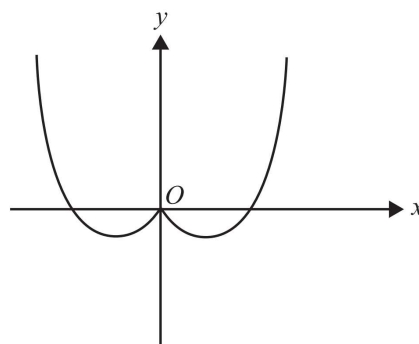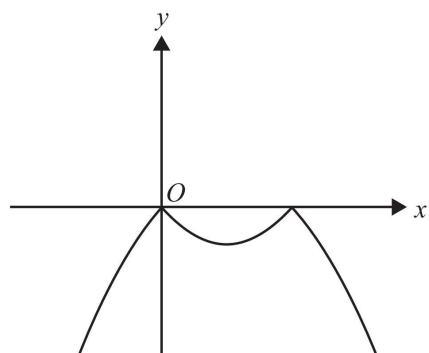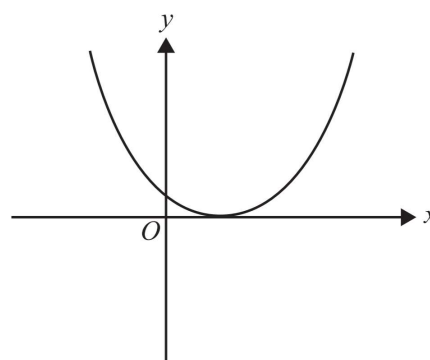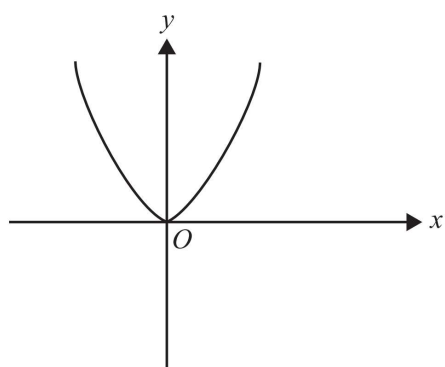The graph of $y = f(g(x))$ is best represented by
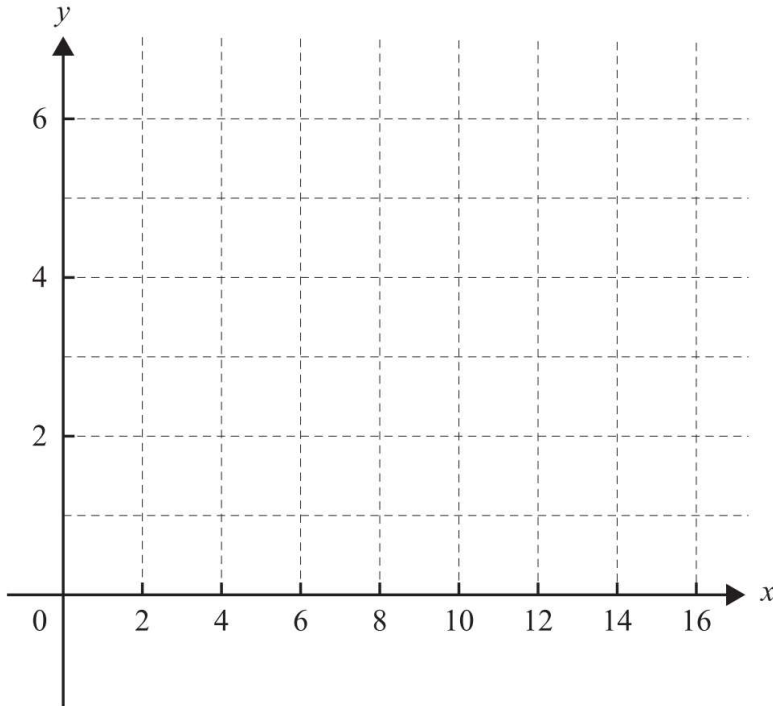

$y = f(x)$

$y = g(x)$

A.

B.

C.

D.

E.

2017 NHT Exam 2 Question 4

Let $f: [0,16] \to R, f(x) = 4\sqrt{x} - x$. f has a maximum at $(4,4)$

b. Sketch the graph of $y = f(x)$ on the axes below. 1 mark

2017 Exam 2 Question 3

The time Jennifer spends on her homework each day varies, but she does some homework every day. The continuous random variable T, which models the time, t, in minutes, that Jennifer spends each day on her homework, has a probability density function f, where

$$f(t) = \begin{cases} \dfrac{1}{625}(t - 20) & 20 \le t < 45 \\ \dfrac{1}{625}(70 - t) & 45 \le t \le 70 \\ 0, & \text{elsewhere} \end{cases}$$

a. Sketch the graph of f on the axes provided below. 3 marks
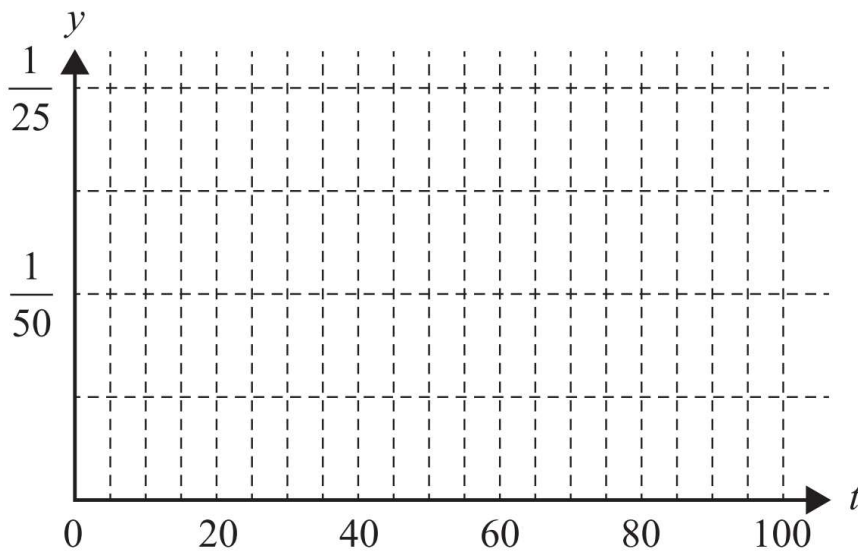
2018 Exam 2 Question 2

A drug, X, comes in 500 milligram (mg) tablets. The amount, b, of drug X in the bloodstream, in

milligrams, t hours after one tablet is consumed is given by the function $b(t) = \dfrac{4500}{7}\left(e^{\left(-\frac{t}{5}\right)} - e^{\left(-\frac{9t}{10}\right)}\right)$

d. Six hours after one 500 milligram tablet of drug X is consumed (Tablet 1), a second identical tablet is consumed (Tablet 2). The amount of drug X in the bloodstream from each tablet consumed independently is shown in the graph below.
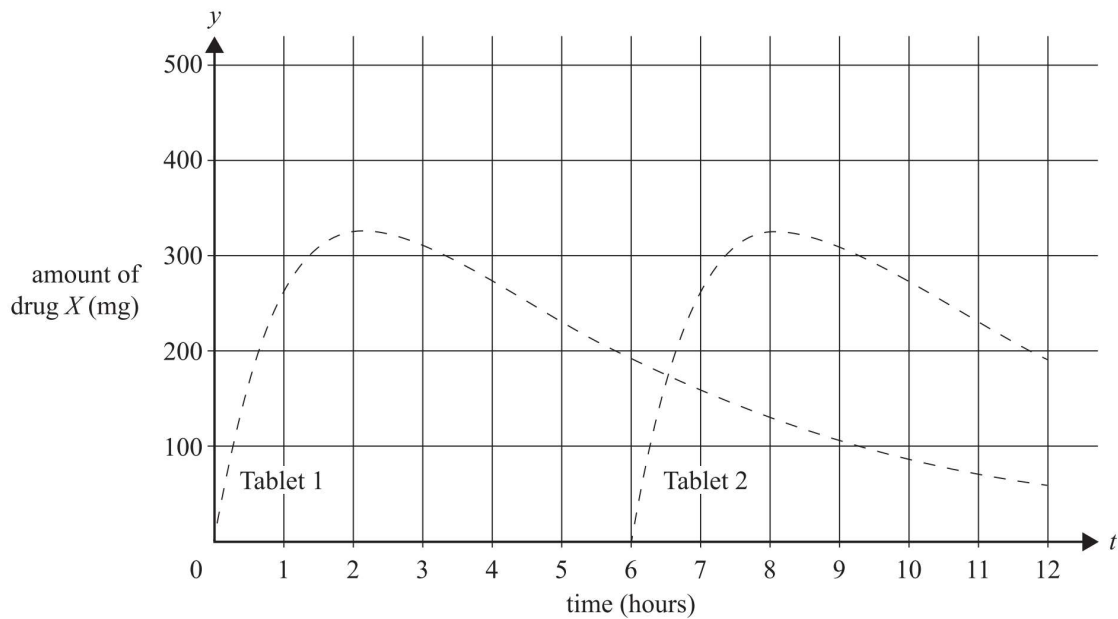
i. On the graph above, sketch the total amount of drug X in the bloodstream during the first 12 hours after Tablet 1 is consumed. 2 marks

2019 NHT Exam 2 Question 16

Parts of the graphs of $y = f(x)$ and $y = g(x)$ are shown below. The corresponding part of the graph of $y = g(f(x))$ is best represented by

A.

B.

C.

D.

E.
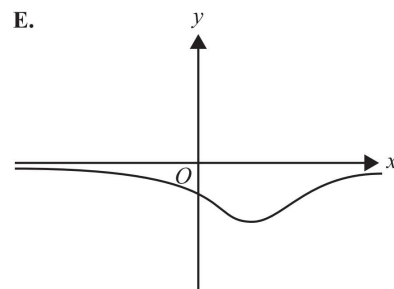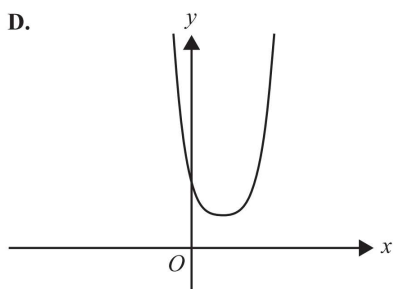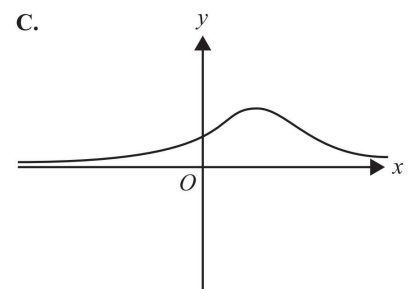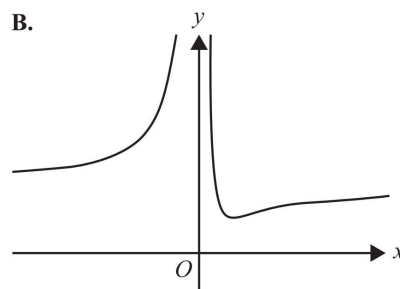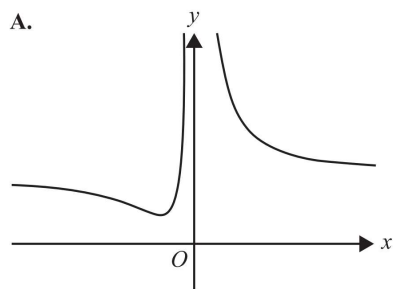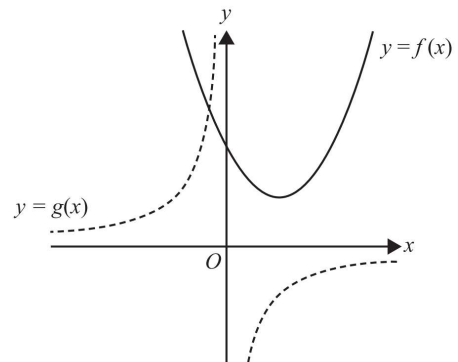
2019 Exam 2 Question 10

Which one of the following statements is true for $f: R \to R, \ f(x) = x + \sin(x)$?

**A.** The graph of f has a horizontal asymptote   **B.** There are infinitely many solutions to $f(x) = 4$

C. f has a period of 2π **D.** $f'(x) \geq 0$ for $x \in R$ **E.** $f'(x) = \cos(x)$

2019 Exam 2 Question 2

An amusement park is planning to build a zip-line above a hill on its property.

The hill is modelled by $y = \dfrac{3x(x-30)^2}{2000}, \ x \in [0, 30]$, where x is the horizontal distance, in metres, from an origin and y is the height, in metres, above this origin, as shown in the graph below.

The cable for the zip-line is connected to a pole at the origin at a height of 10 m and is straight for $0 \leq x \leq a$, where $10 \leq a \leq 20$. The straight section joins the curved section at $A(a, b)$. The cable is then exactly 3 m vertically above the hill from $a \leq x \leq 30$, as shown in the graph below.
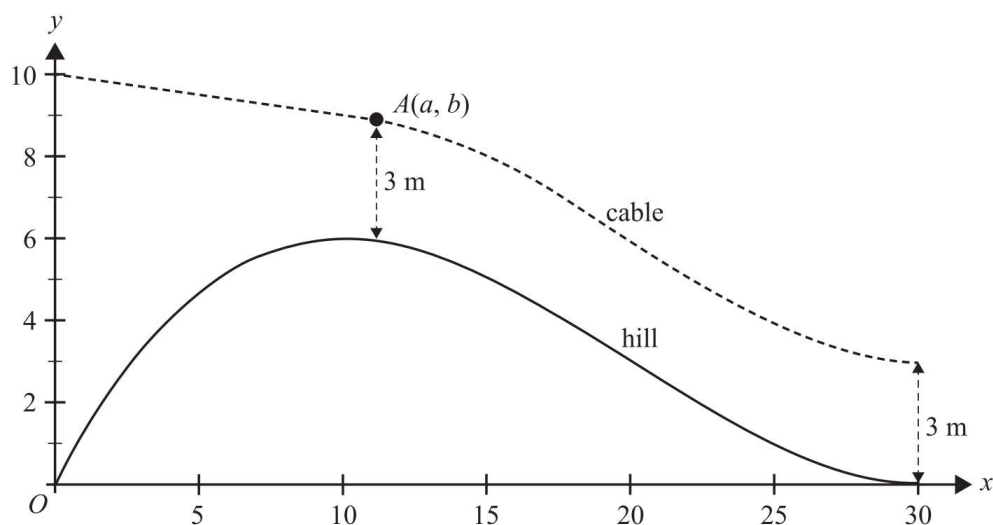
c. State the rule, in terms of x, for the height of the cable above the horizontal axis for $x \in [a, 30]$.
1 mark

_____

_____

2021 Exam 2 Question 10

Consider the functions $f(x) = \sqrt{x+2}$ and $g(x) = \sqrt{1-2x}$, defined over their maximal domains.
The maximal domain of the function $h = f + g$ is

A. $\left(-2, \dfrac{1}{2}\right)$ **B.** $[-2, \infty)$ **C.** $(-\infty, -2) \cup \left(\dfrac{1}{2}, \infty\right)$ **D.** $\left[-2, \dfrac{1}{2}\right]$ **E.** $[-2, 1]$