



S6 MATHEMATICS – 3 Periods PART B

DATE: 19th, December 2018

DURATION OF THE EXAMINATION: 90 minutes

Total: 65 points

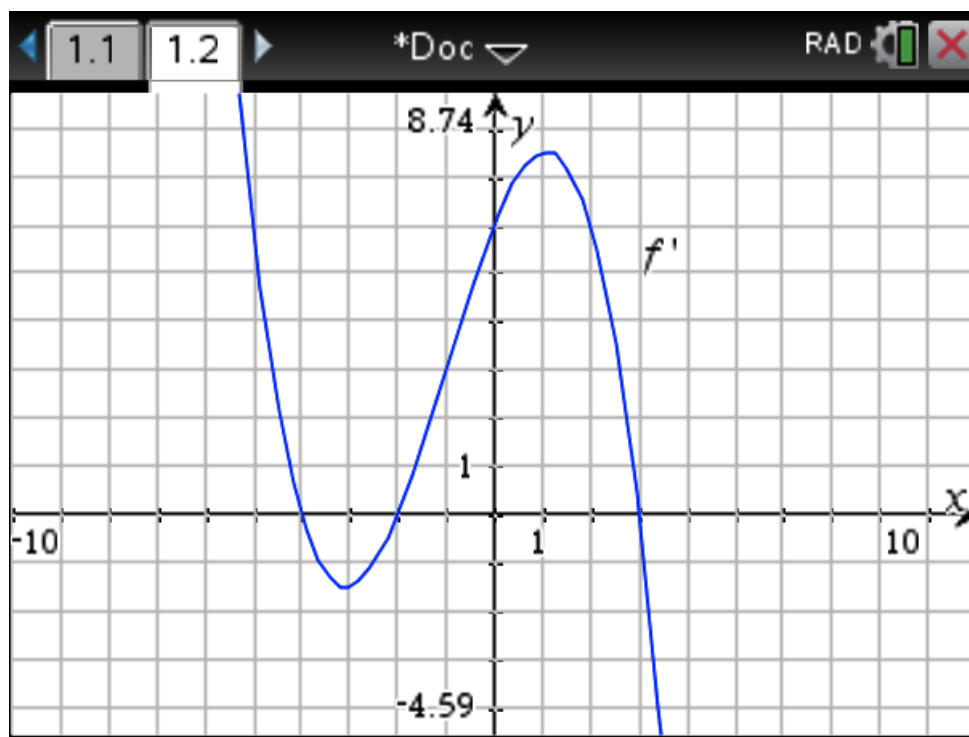
With Calculator



NUMBER OF PUPILS: 9

**INSTRUCTIONS: ANSWER QUESTION 6-B ON THE GRAPH PROVIDED
AND RETURN WITH OTHER ANSWER SHEETS**

The figure represents the graph of a derivate function f' of a function f .



- Give the x -coordinates of the extrema of f and state their nature. [6]
- From the graph of f' find the slope of the tangent to the graph of f at $x = -1$. [2]
- Find the solutions for $f'(x) = 6$. [3]
- The graph of function f passes through point $P(0, 1)$. Find the equation of the tangent to the graph of f at point P . [4]

EXERCISE 2-B:

Consider the function $f(x) = -x^3 - 3x^2 + 5x + 7$ and its graph F .

- Draw a table of signs showing the variations of function f . [6]
- Find the coordinates of the turning points of F and state their nature.
 Give answers correct to 1 d.p. [2]
- Find the equation of the tangent to the graph at $x = -1$. [2]
- Find the coordinates of the points on F where the tangent has slope 5. [2]
- Find the equation of the tangents to F with slope 5. [2]

EXERCISE 3-B:

A volleyball player serves from the back line of the court to send the ball into the adversary camp. The height h of the ball, in meters, is given by the following function :

$$h(t) = -4.9t^2 + 3.8t + 1.7 \quad , \text{ where } t \text{ is in seconds.}$$

(For this exercise give all answers correct to 2 d.p.)

- a) What is the maximum height reached by the ball? [3]
- b) After how long will the ball fall to the ground? [3]
- c) For how long does the ball stay above 1.5 m ? [3]
- d) The ball will reach the net at $t = 0.6$ s. The height of the net is 2.34 m.
Will the ball pass over the net into the adversary camp? Explain. [3]

EXERCISE 4-B:

Consider the function $g(x) = \frac{ax-5}{-3x+1}$ and its graph G .

- a) What is the domain of function g ? [2]
- b) Give the equation of the vertical asymptote to G . [2]
- c) $y = -2$ is an asymptote to G . Determine the value of a . [2]
- d) What is the range of function g ? [2]
- e) Find the coordinates of the intersections points of G with the x and y axis. [2]
- f) Find the intersection points between G and the line $y = x + 1$. [2]

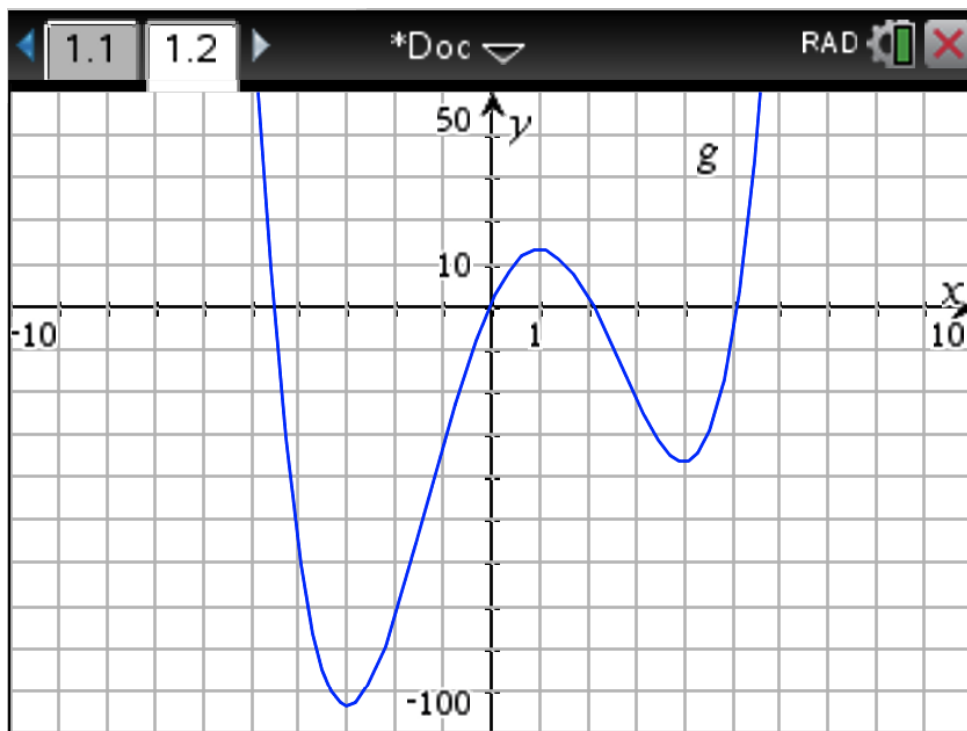
EXERCISE 5-B:

A function $f(x)$ has one local minimum at $(1, -5)$. State the coordinates of the local minimum of the following functions:

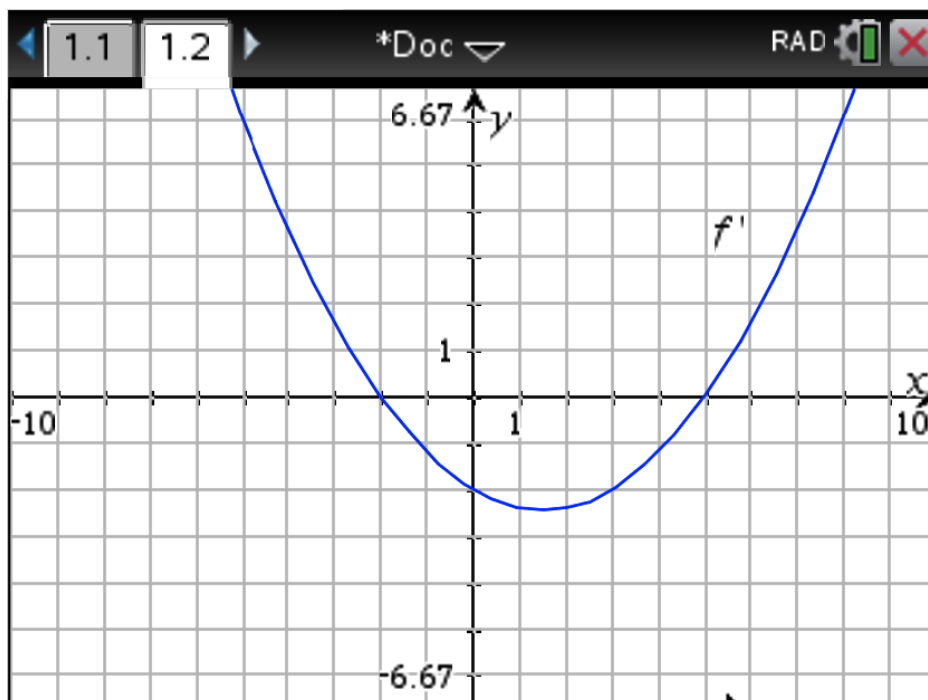
- a) $f(x - 5) + 7$ [2]
- b) $f(x + 4) + 1$ [2]

EXERCISE 6-B: ANSWER ON THIS SHEET AND RETURN WITH OTHER ANSWER SHEETS

- a) The figure represents the graph of a function $g(x)$. Sketch a possible graph for the function $g'(x)$ on the same grid. [4]



- b) The figure represents the graph of a derivate function $f'(x)$. Sketch a possible graph for the function $f(x)$ on the same grid. [4]



--- END OF EXAM ---