

# SEKOLAH BUKIT SION

AY 2021-2022

0606 ADDITIONAL MATHEMATICS

## CHAPTER 2 QUADRATIC FUNCTIONS

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

### Problem 1

Solve the inequality  $(2x + 1)(3x - 1) < 14$ . [3]

### Problem 2

Solve  $|x^2 - 4| = 2x - 1$ . [4]

### Problem 3

The equation  $4x^2 - kx + (k - 3) = 0$  where  $k$  is a constant, has real roots.  
Find the set of possible values of  $k$ . [3]

### Problem 4

Given  $f(x) = 2x^2 + 8x + 2$ .

(a) Express  $f(x)$  in the form of  $A(x + B) + C$  where  $A$ ,  $B$  and  $C$  are positive constants. [3]

(b) Find the minimum value of  $f(x)$ . [1]

(c) Find the solutions of the equation  $f(x) = 0$ , giving your solutions in the form  $p \pm \sqrt{q}$ , where  $p$  and  $q$  are integers. [3]

### Problem 5

The line  $x + y = 23$  intersects the curve  $y = 25 - (x - 4)^2$  at the points  $A$  and  $B$ .  
The  $x$  coordinate of  $A$  is less than that of  $B$ .

(a) Find the coordinates of  $A$  and  $B$ . [4]

(b) Find the distance of  $AB$ . [2]

(c) Write down the coordinates of midpoint of  $AB$ . [2]

(d) Write down the equation of the perpendicular bisector of  $AB$ . [2]

**Problem 6**

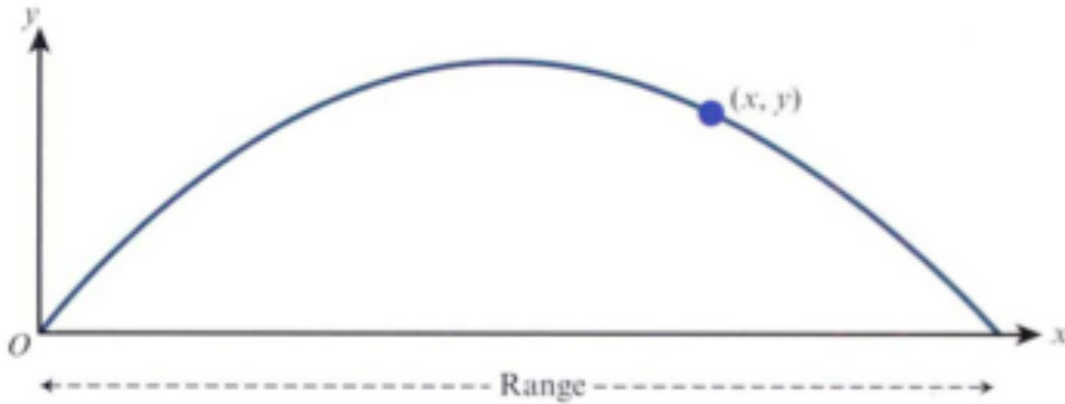
Find the set of values of  $k$  for which the roots of the equation  $x^2 - 4kx + (5 + k) = 0$  are distinct.

[3]

**Problem 7**

As shown below, the parabolic path of a projectile is given in by the equation  $y = \sqrt{3}x - \frac{49x^2}{9000}$ , where  $x$  and  $y$  are measured in metres.

*You may write your answer in exact form or correct to 2 decimal places.*



(a) Find the range of this projectile.

[3]

(b) Find the maximum height reached by this projectile.

[2]

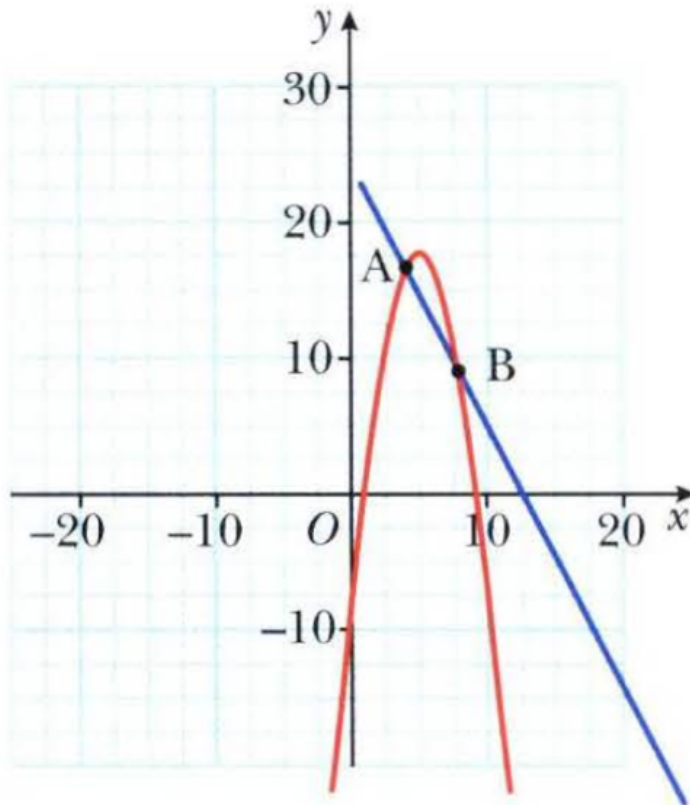
**EITHER**

**Problem 8**

The figure shows part of the curve with the equation  $y = p + 10x - x^2$  (where  $p$  is a constant) and a straight line with equation  $y = qx + 25$  (where  $q$  is a constant). The  $x$  coordinates of  $A$  and  $B$  are 4 and 8 respectively.

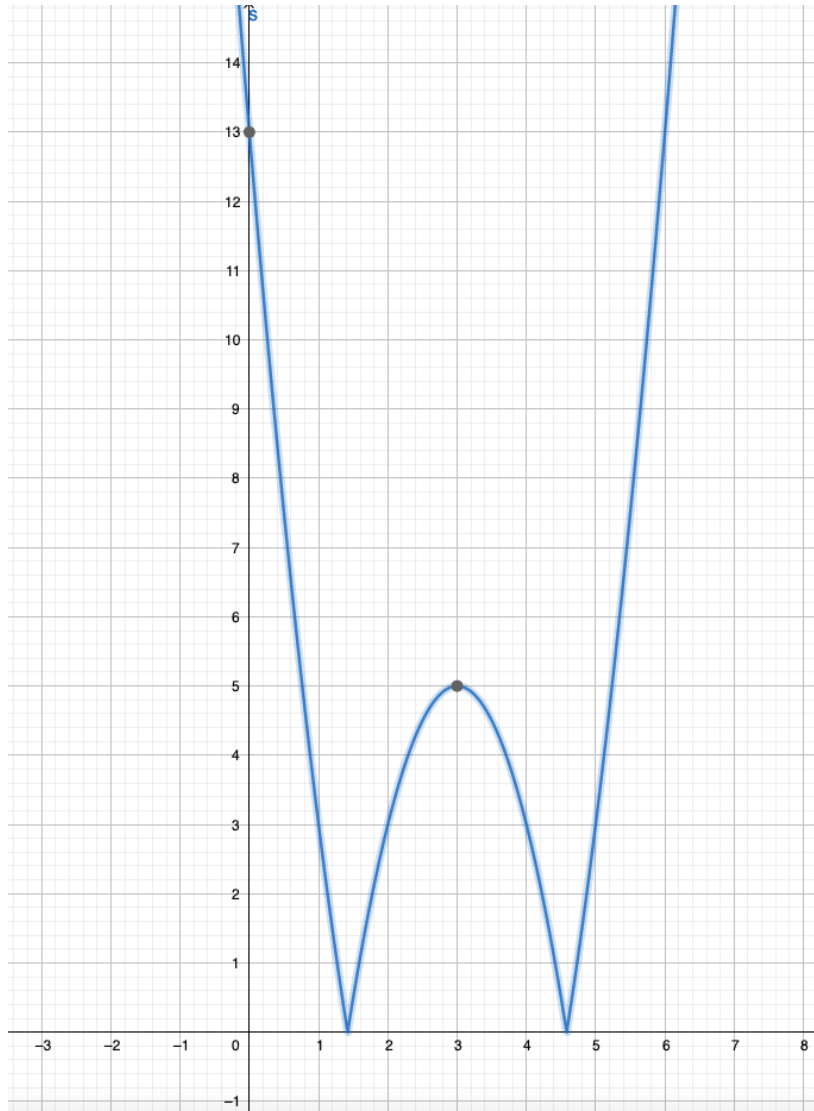
Find the values of  $p$  and  $q$ .

[5]



**OR**  
**Problem 8**

- (i) Write down the equation of the function as shown in the graph below in the form of  $f(x) = |a(x + b)^2 + c|$ , where  $a$ ,  $b$  and  $c$  are constants. [3]



- (ii) Write down the values of  $x$  such that the function  $f(x) > 3$ . [2]