

## Unit 1: Quadratics

## Subunit 1.1: Completing the square

### Topical Question No: 1

- 6** The equation of a curve is  $y = 2x^2 + kx + k - 1$ , where  $k$  is a constant.

- (a) Given that the line  $y = 2x + 3$  is a tangent to the curve, find the value of  $k$ . [3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.

It is now given that  $k = 2$ .

- (b) Express the equation of the curve in the form  $y = 2(x + a)^2 + b$ , where  $a$  and  $b$  are constants, and hence state the coordinates of the vertex of the curve. [3]

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### Topical Question No: 2

- 1 (a)** Express  $16x^2 - 24x + 10$  in the form  $(4x + a)^2 + b$ . [2]

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- (b)** It is given that the equation  $16x^2 - 24x + 10 = k$ , where  $k$  is a constant, has exactly one root.

Find the value of this root. [2]

[illegible]

### Topical Question No: 3

- 1 (a)** Express  $x^2 - 8x + 11$  in the form  $(x + p)^2 + q$  where  $p$  and  $q$  are constants. [2]

[illegible]

- (b) Hence find the exact solutions of the equation  $x^2 - 8x + 11 = 1$ . [2]

[illegible]

### Topical Question No: 4

- 3** (a) Express  $4x^2 - 24x + p$  in the form  $a(x+b)^2 + c$ , where  $a$  and  $b$  are integers and  $c$  is to be given in terms of the constant  $p$ . [2]

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- (b)** Hence or otherwise find the set of values of  $p$  for which the equation  $4x^2 - 24x + p = 0$  has no real roots. [1]

[illegible]

### Topical Question No: 5

- 1 (a) Express  $3y^2 - 12y - 15$  in the form  $3(y+a)^2 + b$ , where  $a$  and  $b$  are constants. [2]

[illegible]

- (b) Hence find the exact solutions of the equation  $3x^4 - 12x^2 - 15 = 0$ . [3]

[illegible]