

1. (a) Expand and simplify  $(2x + 1)(x - 4)$  (2)  
(b) Expand and simplify  $(3x - 5y)^2$  (2)

(Total for Question 1 is 4 marks)

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2. (a) Simplify  $\sqrt{50} - \sqrt{18}$  giving your answer in the form  $a\sqrt{2}$ , where  $a$  is an integer. (2)  
(b) Hence, or otherwise, simplify

$$\frac{12\sqrt{3}}{\sqrt{50} - \sqrt{18}}$$

giving your answer in the form  $b\sqrt{c}$ , where  $b$  and  $c$  are integers and  $b \neq 1$ . (3)

(Total for Question 2 is 5 marks)

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3. (a) Simplify  $(9x^4)^{\frac{1}{2}}$  (1)  
(b) Simplify  $a^7 \div a^{-3}$  (1)  
(c) Simplify  $(x^{-2})^{-3}$  (1)

$$\frac{(2q)^2 - q^{\frac{7}{2}}}{q^2} \text{ can be written in the form } d - q^f$$

(d) Work out the value of  $d$  and the value of  $f$ . (3)

(Total for Question 3 is 6 marks)

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4. (a) Factorise  $63x^2d + 9xd^2$  (2)  
(b) Factorise  $4ab - 8b + 2a - 4$  (3)  
(c) Factorise  $x^2 - 9t^2$  (1)

(Total for Question 4 is 6 marks)

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5.  $f(x) = x^2 - 10x + 23$   
(a) Express  $f(x)$  in the form  $(x + a)^2 + b$ , where  $a$  and  $b$  are constants to be found. (2)  
(b) Hence, or otherwise, find the exact solutions to the equation

$$x^2 - 10x + 23 = 0 \quad (2)$$

(Total for Question 5 is 4 marks)

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6. Factorise completely  $x - 4x^3$ . (3)

(Total for Question 6 is 3 marks)

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7. Solve, algebraically, the simultaneous equations

$$2x^2 + 2y = 7$$

$$2y + 2x = 3$$

**(Total for Question 7 is 5 marks)**

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8. Find the set of values of  $x$  for which

(a)  $2(3x + 4) > 1 - x$ , (2)

(b)  $3x^2 + 8x - 3 < 0$ . (4)

**(Total for Question 8 is 6 marks)**

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9. The line **L** is given by the equation  $3y - 2x = 24$ .

(a) Write the equation for **L** in the form  $y = mx + c$ . (2)

(b) Find an equation of the line parallel to line **L** and which passes through the point (3, 3). (2)

**(Total for Question 9 is 4 marks)**

10. The line  $l$  passes through the points  $A(3, 1)$  and  $B(4, -2)$ .

Find an equation for  $l$ .

**(Total for Question 10 is 3 marks)**

11. A circle  $C$  has centre  $(-1, 7)$  and passes through the point  $(0, 0)$ .

Find an equation for  $C$ .

**(Total for Question 11 is 4 marks)**

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12. Simplify  $\frac{x^2 + 7x - 8}{(x + 8)^2}$

**(Total for Question 12 is 2 marks)**

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13. Express  $\frac{2x}{x+3} + \frac{7}{x-3}$  as a single fraction.

Give your answer in its simplest form.

**(Total for Question 13 is 3 marks)**

**Total 55 marks**

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