

## Level 3 Algebra - Inequalities - Solving

June 2013 - Question 5

Jan 2014 - Question 10

Jan 2015 - Question 5

June 2015 - Question 6

Jan 2016 - Question 6

June 2016 - Question 10

Jan 2017 - Question 13

June 2017 - Question 14

Jan 2018 - Question 3

Jan 2018 - Question 20

June 2018 - Question 12

Jan 2019 - Question 3

Jan 2019 - Question 16

June 2019 - Question 2

Jan 2020 - Question 3

Jan 2021 - Question 9

Jan 2022 - Question 10

June 2022 - Question 6

Jan 2023 - Question 8

June 2023 - Question 20

Jan 2024 - Question 6

5 (a) Solve  $7 - 2w < 4$

.....  
(2)

(b) Solve  $x^2 + 3x - 10 \leq 0$

.....  
(3)

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

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10 (a) Solve  $x^2 - x - 2 = 0$

.....  
(2)

(b) Solve  $3p^2 + p - 10 > 0$

.....  
(3)

**(Total for Question 10 is 5 marks)**

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5 (a) Solve  $\frac{5-n}{3} > 6$

.....  
(2)

(b) Solve  $x(4-x) \leq 0$

.....  
(2)

**(Total for Question 5 is 4 marks)**

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6 (a) Use the quadratic formula to solve  $x^2 - 6x + 6 = 0$

Give your answer in the form  $p \pm \sqrt{q}$  where  $p$  and  $q$  are integers.

.....  
(3)

(b) Solve  $x^2 - 6x + 6 < 0$

.....  
(2)

(Total for Question 6 is 5 marks)



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6 (a) Solve  $x^2 < 16$

.....  
(1)

(b) Solve  $(5 - x)(2 + x) \leq 0$

.....  
(2)

**(Total for Question 6 is 3 marks)**

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9 Use the quadratic formula to solve the equation  $3x^2 + 4x - 5 = 0$

Give your solutions in the form  $\frac{p \pm \sqrt{q}}{r}$  where  $p$ ,  $q$  and  $r$  are integers.

.....  
(Total for Question 9 is 2 marks)

10 (a) Solve  $8 - 3y < 11$

.....  
(2)

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

.....  
(3)

(Total for Question 10 is 5 marks)



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13 (a) Solve  $12 - 5x < 2x$

.....  
(2)

(b) Solve  $x^2 + 4x + 3 < 0$

.....  
(2)

(Total for Question 13 is 4 marks)



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14 (a) Sketch the graph of  $y = (x - 2)(x + 3)$

You must label, with coordinates, the points of intersection with the axes.

(3)

(b) Solve  $x^2 + x - 6 > 0$

(2)

(Total for Question 14 is 5 marks)

15 Solve  $\frac{5 - 2n}{9} < 3$

(Total for Question 15 is 2 marks)



3 Solve  $6(2 - 3x) < 5(x + 1)$

.....  
(Total for Question 3 is 3 marks)

4 Use the quadratic formula to solve the equation  $5x^2 + 2x - 1 = 0$

Give your answer in the form  $\frac{p \pm \sqrt{q}}{5}$  where  $p$  and  $q$  are integers.

.....  
(Total for Question 4 is 3 marks)



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20 The equation  $px^2 + (p - 6)x + 2 = 0$  has two real and different roots.

(a) Show that  $p^2 - 20p + 36 > 0$

(3)

(b) Solve  $p^2 - 20p + 36 > 0$

.....  
(3)

(Total for Question 20 is 6 marks)

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TOTAL FOR PAPER IS 90 MARKS



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12 (a) Solve  $4y - \frac{3y - 15}{2} < 7$

.....  
(3)

(b) Solve  $x^2 - 3x + 2 < 0$

.....  
(2)

(Total for Question 12 is 5 marks)

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3 Solve  $\frac{x-3}{4} \geq \frac{1+2x}{6}$

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(Total for Question 3 is 3 marks)



16 (a) Solve  $x^2 \geq 4x + 5$

.....  
(3)

(b) For what range of values of  $b$  has the equation  $25x^2 + bx + 16 = 0$  no real roots?

.....  
(2)

(Total for Question 16 is 5 marks)

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2 (a) Solve  $\frac{4y - 7}{3} < -2$

.....  
(2)

(b) Solve  $2x^2 + 9x - 5 < 0$

.....  
(3)

**(Total for Question 2 is 5 marks)**

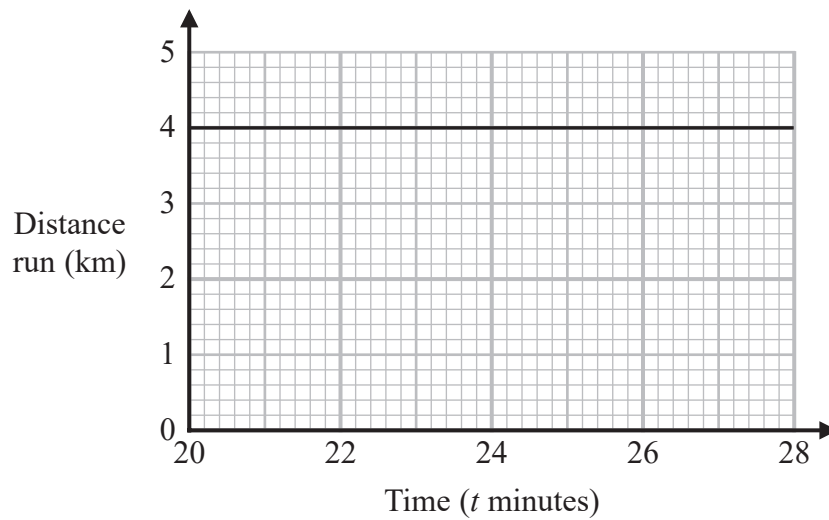
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3 Solve  $3k^2 - 27 \geq 0$

.....  
(Total for Question 3 is 2 marks)

- 4 John went for a run.  
Here is part of his distance-time graph.



What does this graph show about John's speed for values of  $t$  between  $t = 20$  and  $t = 28$ ?

.....  
(Total for Question 4 is 1 mark)



9 (a) Solve  $x^2 > 9$

.....  
(2)

(b) (i) Use the quadratic formula to solve the equation  $3x^2 - 4x - 2 = 0$

Give your answer in the form  $\frac{p \pm \sqrt{q}}{3}$  where  $p$  and  $q$  are integers.

.....  
(3)

(ii) Hence solve  $3x^2 - 4x - 2 < 0$

.....  
(1)

(Total for Question 9 is 6 marks)



10 Solve  $6k^2 + 5k - 6 < 0$

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(Total for Question 10 is 3 marks)



6 (a) Solve  $7 - 2y < 3y - 8$

.....  
(2)

(b) (i) Factorise  $x^2 + x - 6$

.....  
(1)

(ii) Hence solve  $x^2 + x - 6 < 0$

.....  
(2)

**(Total for Question 6 is 5 marks)**

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8 (a) Solve  $2x + 4 < 2 - x$

.....  
(2)

(b) Solve  $x^2 < 12 - x$

.....  
(3)

**(Total for Question 8 is 5 marks)**



20 The equation  $tx^2 + tx - 9 = 0$  has no real roots.

(a) Show that  $t(t + 36) < 0$

(3)

(b) Solve  $t(t + 36) < 0$

.....  
(2)

(Total for Question 20 is 5 marks)

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TOTAL FOR PAPER IS 90 MARKS

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6 (a) Solve  $13 - 7x > 3x - 47$

.....  
(2)

(b) (i) Factorise  $y^2 + 2y - 8$

.....  
(1)

(ii) Hence, or otherwise, solve  $y^2 + 2y - 8 < 0$

.....  
(2)

**(Total for Question 6 is 5 marks)**

