Q1.

1 EITHER: State or imply non-modular inequality \((x - 4)^2 > (x + 1)^2\), or corresponding equation
Expand and solve a linear inequality, or equivalent
Obtain critical value \(1/2\)
State correct answer \(x < 1/2\) (allow \(\leq\))

OR: State a correct linear equation for the critical value e.g. \(4 - x = x + 1\)
Solve the linear equation for \(x\)
Obtain critical value \(1/2\), or equivalent
State correct answer \(x < 1/2\)

OR: State the critical value \(1/2\), or equivalent, from a graphical method or by inspection or by solving a linear inequality
State correct answer \(x < 1/2\) [4]

Q2.

1 EITHER State or imply non-modular inequality \(x^2 > (3x - 2)^2\), or corresponding equation
Expand and make reasonable solution attempt at 2- or 3-term quadratic, or equivalent
Obtain critical values \(1/2\) and 1
State correct answer \(1/2 < x < 1\)

OR State one correct linear equation for a critical value
State two equations separately
Obtain critical values \(1/2\) and 1
State correct answer \(1/2 < x < 1\)

OR State one critical value from a graphical method or inspection or by solving a linear inequality
State the other critical value correctly
State correct answer \(1/2 < x < 1\) [4]

Q3.

1 EITHER: State or imply non-modular inequality \((2x - 7)^2 = 3^2\), or corresponding equation
Obtain critical values 2 and 5
State correct answer \(x < 2, x > 3\)

OR: State one critical value, e.g. \(x = 5\), by solving a linear equation (or inequality) or from a graphical method or by inspection
State the other critical value correctly
State correct answer \(x < 2, x > 5\) [3]

Q4.
1 EITHER State or imply non-modular inequality \((x - 3)^2 > (x + 2)^2\), or corresponding equation M1
Expand and solve a linear inequality, or equivalent M1
Obtain critical value \(\frac{1}{2}\) A1
State correct answer \(x < \frac{1}{2}\) (allow \(x \leq \frac{1}{2}\)) A1

OR State a correct linear equation for the critical value, e.g. \(3 - x = x + 2\), or corresponding correct inequality, e.g. \(-(x - 3) > (x + 2)\) M1
Solve the linear equation, or inequality M1
Obtain critical value \(\frac{1}{2}\) A1
State correct answer \(x < \frac{1}{2}\) A1

OR Make recognisable sketches of both \(y = |x - 3|\) and \(y = |x + 2|\) on a single diagram B1
Obtain a critical value from the intersection of the graphs M1
Obtain critical value \(\frac{1}{2}\) A1
State final answer \(x < \frac{1}{2}\) A1 [4]

Q5.

1 EITHER State or imply non-modular inequality \((3x - 1)^2 < 2^2\), or corresponding equation or pair of linear equations M1
Obtain critical values \(-\frac{1}{3}\) and 1 A1
State correct answer \(-\frac{1}{3} < x < 1\) A1

OR State one critical value, e.g. \(x = 1\), by solving a linear equation (or inequality) or from a graphical method or by inspection B1
State the other critical value correctly B1
State correct answer \(-\frac{1}{3} < x < 1\) B1 [3]

Q6.

2 EITHER State or imply non-modular inequality \((3x + 2)^2 < x^2\), or corresponding quadratic equation, or pair of linear equations \(3x + 2 = \pm x\) M1
Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations M1
Obtain critical values \(x = -1\) and \(x = -\frac{1}{2}\) A1
State answer \(-1 < x < -\frac{1}{2}\) A1

OR Obtain the critical value \(x = -1\) from a graphical method or by inspection, or by solving a linear equation or inequality B1
Obtain the critical value \(x = -\frac{1}{2}\) similarly B2
State answer \(-1 < x < -\frac{1}{2}\) B1 [4]
Q7.

<table>
<thead>
<tr>
<th>1 EITHER</th>
<th>State or imply non-modular inequality ((2x - 3)^2 &gt; 5^2), or corresponding equation of pair of linear equations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obtain critical values (-1) and 4</td>
</tr>
<tr>
<td></td>
<td>State correct answer (x &lt; -1, x &gt; 4)</td>
</tr>
<tr>
<td>OR:</td>
<td>State one critical value, e.g. (x = 4), having solved a linear equation (or inequality) or from a graphical method or by inspection</td>
</tr>
<tr>
<td></td>
<td>State the other critical value correctly</td>
</tr>
<tr>
<td></td>
<td>State correct answer (x &lt; -1, x &gt; 4)</td>
</tr>
</tbody>
</table>

Q8.

<table>
<thead>
<tr>
<th>3 EITHER</th>
<th>State or imply non-modular inequality ((2x - 1)^2 &lt; (x + 4)^2), or corresponding equation of pair of linear equations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations</td>
</tr>
<tr>
<td></td>
<td>Obtain critical values (-1) and 5</td>
</tr>
<tr>
<td></td>
<td>State correct answer (-1 &lt; x &lt; 5)</td>
</tr>
<tr>
<td>OR</td>
<td>Obtain one critical value, e.g. (x = 5), by solving a linear equation (or inequality) or from a graphical method or by inspection</td>
</tr>
<tr>
<td></td>
<td>Obtain the other critical value similarly</td>
</tr>
<tr>
<td></td>
<td>State correct answer (-1 &lt; x &lt; 5)</td>
</tr>
</tbody>
</table>

Q9.

<table>
<thead>
<tr>
<th>1 EITHER</th>
<th>Attempt to square both sides obtaining three terms on each side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attempt solution of three-term quadratic equation</td>
</tr>
<tr>
<td></td>
<td>Obtain (5x + 4x - 9 = 0) and hence (-\frac{9}{5}) and 1</td>
</tr>
<tr>
<td>OR</td>
<td>Obtain value 1 from graphical method, inspection or linear equation</td>
</tr>
<tr>
<td></td>
<td>Obtain value (-\frac{9}{5}) similarly</td>
</tr>
</tbody>
</table>

Q10.

<table>
<thead>
<tr>
<th>1 Either</th>
<th>Obtain value (x^2 = 27) from inspection, equation, ...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obtain value (x^2 = 1) similarly</td>
</tr>
<tr>
<td></td>
<td>Obtain (x = 1) and (x = 3)</td>
</tr>
<tr>
<td>Or:</td>
<td>Attempt to square both sides obtaining 3 terms on LHS</td>
</tr>
<tr>
<td></td>
<td>Attempt solution for (x^2) of 3-term quadratic</td>
</tr>
<tr>
<td></td>
<td>Obtain (x^2 = 1) and (x^2 = 27)</td>
</tr>
<tr>
<td></td>
<td>Obtain (x = 1) and (x = 3)</td>
</tr>
</tbody>
</table>

Q11.
Online Classes: Megalecture@gmail.com
www.youtube.com/megalecture
www.megalecture.com

<table>
<thead>
<tr>
<th>Q12.</th>
<th>State or imply non-modular inequality ((x + 3)^2 &lt; (2x + 1)^2) or corresponding equation or pair of linear equations</th>
<th>B1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obtain critical values (-\frac{1}{2}) and 2</td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>State answer (x &lt; -\frac{1}{2}, x &gt; 2)</td>
<td>A1</td>
</tr>
<tr>
<td>Or:</td>
<td>Obtain critical value (x = 2) from graphical method, inspection, equation</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>Obtain critical value (x = -\frac{1}{2}) similarly</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>State answer (x &lt; -\frac{1}{2}, x &gt; 2)</td>
<td>B1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q13.</th>
<th>State or imply non-modular equation ((2^x - 7)^2 = 1^2), or corresponding pair of equations</th>
<th>M1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obtain (2^x = 8) and (2^x = 6)</td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>State answer 3</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>Use logarithmic method to solve an equation of the form (2^x = k), where (k &gt; 0)</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td>State answer 2.58</td>
<td>A1</td>
</tr>
<tr>
<td>Or:</td>
<td>State or imply one value for (2^x), e.g. 8, by solving an equation or by inspection</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>State answer 3</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>State second value for (2^x)</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>Use logarithmic method to solve an equation of the form (2^x = k), where (k &gt; 0)</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td>State answer 2.58</td>
<td>A1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q14.</th>
<th>State or imply non-modular inequality ((x - 8)^2 &gt; (2x - 4)^2), or corresponding equation or pair of linear equations</th>
<th>M1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Make reasonable solution attempt at a quadratic, or solve two linear equations</td>
<td>M1</td>
</tr>
<tr>
<td></td>
<td>Obtain critical values 4 and (-4)</td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td>State correct answer (-4 &lt; x &lt; 4)</td>
<td>A1</td>
</tr>
<tr>
<td>Or:</td>
<td>Obtain one critical value, e.g. (x = 4), by solving a linear equation (or inequality) or from a graphical method or by inspection</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>Obtain the other critical value similarly</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>State correct answer (-4 &lt; x &lt; 4)</td>
<td>B1</td>
</tr>
</tbody>
</table>
Q15.

1. **EITHER:** State or imply non-modular inequality \((2x - 1)^2 < (3x)^2\), or corresponding equation

   Expand and make reasonable solution attempt at 2 pt 3-term quadratic, or equivalent

   Obtain critical values \(-1\) and \(\frac{1}{3}\)

   State correct answer \(x < -1, x > \frac{1}{3}\)

   **OR:**

   State two correct equations for a critical value e.g. \(2x - 1 = 3x\)

   State two relevant equations separately e.g. \(2x - 1 = 3x\) and \(2x - 1 = -3x\)

   Obtain critical values \(-1\) and \(\frac{1}{3}\)

   State correct answer \(x < -1, x > \frac{1}{3}\)

   **OR:**

   State one critical value (probably \(x = -1\)), from a graphical method or by inspection or by solving a linear inequality

   State the other critical value correctly

   State correct answer \(x < -1, x > \frac{1}{3}\)

   (The answer \(\frac{1}{3} < x < -1\) scores B0.)

Q16.

1. **EITHER:** State or imply non-modular inequality e.g. \(-2 < 8 - 3x < 2\), or \((8 - 3x)^2 < 2^2\), or corresponding equation or pair of equations

   Obtain critical values 2 and \(3 - \frac{1}{3}\)

   State correct answer \(2 < x < 3 \frac{1}{3}\)

   **OR:**

   State one critical value (probably \(x = 2\)), from a graphical method or by inspection or by solving a linear equality or equation

   State the other critical value correctly

   State correct answer \(2 < x < 3 \frac{1}{3}\)

   [3]

Q17.
Q18.

\[ (x - 3)^2 > (2x)^2 \]

**EITHER:** State or imply non-modular inequality \((x - 3)^2 > (2x)^2\) or corresponding quadratic equation

\[ 2x - 1 = \pm x \]

Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations

Obtain critical values \(x = 1\) and \(x = \frac{1}{3}\)

State answer \(x < \frac{1}{3}, x > 1\)

**OR:** Obtain critical value \(x = 1\) from a graphical method, or by inspection, or by solving a linear inequality or linear equation

Obtain the critical value \(x = \frac{1}{3}\) similarly

State answer \(x < \frac{1}{3}, x > 1\)

Q19.

3 (i) Obtain critical values 4 and 6
State answer \(4 < y < 6\)

(ii) Use correct method for solving an equation of the form \(3^x = a\), where \(a > 0\)
Obtain one critical value, i.e. either 1.26 or 1.63
State answer 1.26 < \(x\) < 1.63

Q20.

1 **EITHER:** State or imply non-modular inequality \((x - 3)^2 > (2x)^2\) or corresponding quadratic equation or pair of linear equations \((x - 3) = \pm 2x\)

Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations

Obtain critical values \(x = 1\) and \(x = -3\)

State answer \(-3 < x < 1\)

**OR:** Obtain critical value \(x = -3\) from a graphical method, or by inspection, or by solving a linear inequality or linear equation

Obtain the critical value \(x = 1\) similarly

State answer \(-3 < x < 1\)

Q21.
Q22.

1 EITHER: Obtain a non-modular inequality from \((2x + 3)^2 < (x - 3)^2\), or corresponding quadratic equation, or pair of linear equations \(2x + 3 = \pm (x - 3)\)  
Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations  
Obtain critical values \(x = -6\) and \(x = 0\)  
State answer \(-6 < x < 0\)  
OR: obtain the critical value \(x = -6\) from a graphical method or by inspection, or by solving a linear equation or inequality  
Obtain the critical value \(x = 0\) similarly  
State answer \(-6 < x < 0\)  

Q23.

1 EITHER: Obtain a non-modular inequality from \((x + 3)^2 > (2x)^2\), or corresponding equation, or pair of linear equations \((x + 3) = \pm 2x\)  
Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations  
Obtain critical values \(x = -1\) and \(x = 3\)  
State answer \(-1 < x < 3\)  
OR: Obtain critical value \(x = 3\) from a graphical method, or by inspection, or by solving a linear inequality or linear equation  
Obtain the critical value \(x = -1\) similarly  
State answer \(-1 < x < 3\)  

Q24.
Q25.

1 EITHER State or imply non-modular inequality \((3x + 1)^2 > 8^2\), or corresponding equation or pair of linear equations M1
Obtain critical values \(\frac{7}{3}\) or \(-3\) A1
State correct answer \(x < -3\) or \(x > \frac{7}{3}\) A1

OR State one critical value, e.g. \(x = -3\), by solving a linear equation (or inequality) or from a graphical method or by inspection B1
State the other critical value correctly B1
State correct answer \(x < -3\) or \(x > \frac{7}{3}\) B1 [3]

Q26.

1 EITHER State or imply non-modular inequality \((4 - 5x)^2 < 3^2\), or corresponding equation or pair of linear equations M1
Obtain critical values \(\frac{1}{5}\) and \(\frac{7}{5}\) A1
State correct answer \(\frac{1}{5} < x < \frac{7}{5}\) A1

OR State one critical value, e.g. \(x = \frac{1}{5}\), by solving a linear equation (or inequality)
or from a graphical method or by inspection B1
State the other critical value correctly B1
State correct answer \(\frac{1}{5} < x < \frac{7}{5}\) B1 [3]

Q27.
2 EITHER
State or imply non-modular inequality $(2x - 3)^2 \leq (3x)^2$, or corresponding equation or pair of linear equations
Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations
Obtain critical values $-3$ and $\frac{3}{5}$
State correct answer $x \leq -3$ or $x \geq \frac{3}{5}$

OR
State one critical value, e.g. $x = -3$, by solving a linear equation (or inequality) or from a graphical method or by inspection
State the other critical value correctly
State correct answer $x \leq -3$ or $x \geq \frac{3}{5}$

Q28.

1 EITHER
State or imply non-modular inequality $(x-2)^2 \geq (x+5)^2$, or corresponding equation or pair of linear equations
Obtain critical value $\frac{3}{2}$
State correct answer $x \leq \frac{3}{2}$

OR
State a correct linear equation for the critical value, e.g. $x - 2 = -x - 5$, or corresponding correct linear inequality, e.g. $x - 2 \geq -x - 5$
Obtain critical value $\frac{3}{2}$
State correct answer $x \leq \frac{3}{2}$

Q29.

1 EITHER
State or imply non-modular inequality $(2x + 1)^2 < (2x - 5)^2$, or corresponding equation or pair of linear equations
Obtain critical value $1$
State correct answer $x < 1$

OR
State the critical value $x = 1$, by solving a linear equation (or inequality) or from a graphical method or by inspection
State correct answer $x < 1$

Q30.
Q31.

| 1 | Either | State or imply non-modular inequality \((x + 1)^2 < (3x + 5)^2\), or corresponding equation or pair of linear equations | M1 |
|   | Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations | M1 |
|   | Obtain critical values \(-2\) and \(-\frac{3}{2}\) | A1 |
|   | State correct answer \(x < -2\) or \(x > -\frac{3}{2}\) | A1 |
| Or | Obtain one critical value, e.g. \(x = -2\), by solving a linear equation (or inequality) or from a graphical method or by inspection | B1 |
|   | Obtain the other critical value similarly | B2 |
|   | State correct answer \(x < -2\) or \(x > -\frac{3}{2}\) | B1 [4] |

Q31.

| 1 | Either | State or imply non-modular inequality \((3x - 2)^2 > (x + 4)^2\) or corresponding equation or pair of linear equations | B1 |
|   | Attempt solution of 3-term quadratic equation or of 2 linear equations | M1 |
|   | Obtain critical values \(-\frac{1}{2}\) and 3 | A1 |
|   | State answer \(x < -\frac{1}{2}, x > 3\) | A1 [4] |
| Or | Obtain critical value \(x = 3\) from graphical method, inspection, equation | B1 |
|   | Obtain critical value \(x = -\frac{1}{2}\) similarly | B2 |
|   | State answer \(x < -\frac{1}{2}, x > 3\) | B1 [4] |

P3 (variant1 and 3)

Q1.

| 1 | EITHER: State or imply non-modular inequality \((x + 3a)^2 > (2(x - 2a))^2\), or corresponding quadratic equation, or pair of linear equations \((x + 3a) = \pm 2(x - 2a)\) | B1 |
|   | Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations | M1 |
|   | Obtain critical values \(x = \frac{1}{2}a\) and \(x = 7a\) | A1 |
|   | State answer \(\frac{1}{2}a < x < 7a\) | A1 |
| OR: | Obtain the critical value \(x = 7a\) from a graphical method, or by inspection, or by solving a linear equation or inequality | B1 |
|   | Obtain the critical value \(x = \frac{1}{2}a\) similarly | B2 |
|   | State answer \(\frac{1}{2}a < x < 7a\) | B1 [4] |

[Do not condone \(<\) for \(<\); accept 0.33 for \(\frac{1}{3}\).]

Q2.
Q3.

1. **EITHER:** State or imply non-modular inequality \((x - 3)^2 > (2(x + 1))^2\), or corresponding quadratic equation, or pair of linear equations \((x - 3) = \pm 2(x + 1)\) B1
   
   Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations M1
   
   Obtain critical values \(-5\) and \(\frac{1}{3}\) A1
   
   State answer \(-5 < x < \frac{1}{3}\) A1

   **OR:**
   
   Obtain the critical value \(x = -5\) from a graphical method, or by inspection, or by solving a linear equation or inequality B1
   
   Obtain the critical value \(x = \frac{1}{3}\) similarly B2
   
   State answer \(-5 < x < \frac{1}{3}\) B1 [4]

   [Do not condone \(\le\) for \(\,<\); accept 0.33 for \(\frac{1}{3}\).]

Q4.
Q5.

1. **EITHER:** State or imply non-modular inequality \((2 - 3x)^2 < (x - 3)^2\), or corresponding equation, and make a reasonable solution attempt at a 3-term quadratic M1
   
   Obtain critical value \(x = -\frac{1}{2}\) A1
   
   Obtain \(x > -\frac{1}{2}\) A1
   
   Fully justify \(x > -\frac{1}{2}\) as only answer A1

   **OR1:** State the relevant critical linear equation, i.e. \(2 - 3x = 3 - x\) B1
   
   Obtain critical value \(x = -\frac{1}{2}\) B1
   
   Obtain \(x > -\frac{1}{2}\) B1
   
   Fully justify \(x > -\frac{1}{2}\) as only answer B1

   **OR2:** Obtain the critical value \(x = -\frac{1}{2}\) by inspection, or by solving a linear inequality B2
   
   Obtain \(x > -\frac{1}{2}\) B1
   
   Fully justify \(x > -\frac{1}{2}\) as only answer B1

   **OR3:** Make recognisable sketches of \(y = 2 - 3x\) and \(y = |x - 3|\) on a single diagram B1
   
   Obtain critical value \(x = -\frac{1}{2}\) B1
   
   Obtain \(x > -\frac{1}{2}\) B1
   
   Fully justify \(x > -\frac{1}{2}\) as only answer B1 [4]

   [Condone ≥ for > in the third mark but not the fourth.]

Q6.
Q7.

1 Either State or imply non-modular inequality \((3x - 1)^2 < (2x + 1)^2\) or corresponding quadratic equation or pair of linear equations \(3x - 1 = \pm (2x + 1)\) B1
Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations M1
Obtain critical values \(x = \frac{2}{5}\) and \(x = 4\) A1
State answer \(\frac{2}{5} < x < 4\) A1

OR

Obtain critical value \(x = \frac{2}{5}\) or \(x = 4\) from a graphical method, or by inspection, or solving a linear equation or inequality B1
Obtain critical values \(x = \frac{2}{5}\) and \(x = 4\) B2
State answer \(\frac{2}{5} < x < 4\) B1
[Do not condone \(\leq\) for \(<\).]
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