


INEQUALITIES

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Foundation Tier

1.

20	(a)	$n > 2$	M1	for a method to isolate terms in n in any inequality or equation eg. $14n - 11n > 6$ or $n = 2$	Ignore incorrect inequality sign and accept “=” sign
			A1	cao	
	(b)		M1	for $-2 - 3 < x \leq 4 - 3$ ($-5 < x \leq 1$)	A circle around -5 and 1 implies M1
			M1	for drawing a line from -5 to 1 or (indep) for an open circle at either -2 or -5 or (indep) for a closed circle at 4 or 1	A line from -5 to 1 implies M2 if no working shown
			A1	cao	

Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Foundation Tier

2.

19	(a)	Inequality shown	B2	for fully correct solution with all three aspects with no ambiguity Aspect 1: circle at 4 Aspect 2: circle not shaded Aspect 3: arrow pointing left or line extending beyond -5 , starting from their circle	Circling the number 4 alone scores B0 Aspect 1 and Aspect 2 must relate to the same circle.
			(B1)	for any two aspects)	
	(b)	4,5,6,7	B2	for all four numbers in any order	
			(B1)	for 2 or 3 correct values with no errors or 4 correct values with one extra)	
	(c)	$x \geq 6$	M1	for a correct intention to subtract 5 from both sides or a correct intention to subtract x from both sides	Can work with an equation for both M marks
			M1	for a full method to solve the inequality or showing a critical value of 6	Award 2 marks for an answer of $x \geq 6$ where \geq is an = or any incorrect inequality symbol, or for an answer shown as just 6.
			A1	cao	

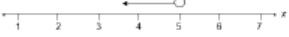
Pearson Edexcel – Specimen 2 - Paper 3 (Calculator) Foundation Tier

3.

20	(a)		diagram	C1	line drawn from -2 to 3
				C1	cao
	(b)		$y < 2.25$	M1	for clear intention to subtract 7 from both sides of inequality or equation or divide all terms of inequality or equation by 4 or $4y < 9$ or 2.25 or $y < 2.25$ or as final answer
				A1	

OCR November 09 November 2020- Morning (Calculator) Foundation Tier

4.


16		$x < 5$ AND 	4	B2 for $x < 5$ or M1 for $3x < 19 - 4$ or better AND B2FT for $x < 5$, or <i>their</i> inequality, correctly shown or B1 for $x < 5$, or <i>their</i> inequality, correctly shown with a hollow circle and wrong arrow or filled circle and correct arrow	Solution to inequality: Allow M1 for this expression with other inequality symbols or equals sign or $[x =] 5$ as solution (can be implied by mark/circle on the diagram) or trials leading to selection of 5 or final correct trial using 5 Displaying the solution: Display must show an inequality that fits on the number line for FT Mark to candidate's advantage either $x < 5$ or <i>their</i> inequality Accept an arrow of any length or a line reaching 1 If no solution to inequality seen: Hollow circle at 5 arrow to left M1B2 Filled circle at 5 arrow to left M1B1 Hollow circle at 5 arrow to right M1B1 Filled circle at 5 arrow to right M1B0 Mark at 5 no line or arrow M1B0 Circle and/or arrow at other than 5 M0B0
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OCR Tuesday 5 November 2019 – Morning (Calculator) Foundation Tier

5.

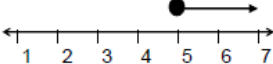
6		$x < 2$ or $2 > x$	2	B1 for $x \leq 2$ or $x > 2$	
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6.

16		<p>$x < 5$</p> <p>AND</p> 	4	<p>B2 for $x < 5$ or M1 for $3x < 19 - 4$ or better</p> <p>AND</p> <p>B2FT for $x < 5$, or <i>their</i> inequality, correctly shown or B1 for $x < 5$, or <i>their</i> inequality, correctly shown with a hollow circle and wrong arrow or filled circle and correct arrow</p>	<p>Solution to inequality:</p> <p>Allow M1 for this expression with other inequality symbols or equals sign or $[x =] 5$ as solution (can be implied by mark/circle on the diagram) or trials leading to selection of 5 or final correct trial using 5</p> <p>Displaying the solution:</p> <p>Display must show an inequality that fits on the number line for FT Mark to candidate's advantage either $x < 5$ or <i>their</i> inequality Accept an arrow of any length or a line reaching 1</p> <p>If no solution to inequality seen: Hollow circle at 5 arrow to left M1B2 Filled circle at 5 arrow to left M1B1 Hollow circle at 5 arrow to right M1B1 Filled circle at 5 arrow to right M1B0 Mark at 5 no line or arrow M1B0 Circle and/or arrow at other than 5 M0B0</p>
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OCR Monday 11 November 2019 – Afternoon (Calculator) Foundation Tier

7.

19		<p>$x \geq 5$</p> <p>AND</p> 	4	<p>B2 for $x \geq 5$ as final answer or M1 for $3x \geq 10 + 5$ or better</p> <p>AND</p> <p>B2FT for $x \geq 5$, or <i>their</i> inequality, correctly shown or B1FT for $x \geq 5$, or <i>their</i> inequality, shown with a correct circle and wrong arrow or wrong circle and correct arrow</p>	<p>Solution to inequality</p> <p>Allow M1 for this expression with other inequality symbols or equals sign or $[x =] 5$ as solution (can be implied by mark/circle on the diagram) or trials leading to selection of 5 or final correct trial using 5</p> <p>Displaying the solution Diagram must show an inequality that fits on the number line for FT Mark to candidate's advantage either $x \geq 5$ or <i>their</i> inequality Accept a line or arrow</p> <p>If no solution to inequality seen: Filled circle at 5 arrow to right M1 B2 Empty circle at 5 arrow to right M1 B1 Filled circle at 5 arrow to left M1 B1 Empty circle at 5 arrow to left M1 B0 Mark at 5 no line or arrow M1B0 Circle and/or arrow at other than 5 M0B0</p>
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OCR Monday 12 November 2018 – Morning (Calculator) Foundation Tier

8.

7	(a)		Hollow circle at 3 only Line/arrow "pointing" right from 3	1 1	Marks independent	No other blobs Open line or arrow only and condone mark/blob over 8 or x If line, must reach approx. 8 Condone line/arrow starting closer to 3 than 4
	(b)		$11a - 2c$ final answer	2	B1 for $11a$ or $-2c$ seen	Accept in any order $11a + -2c$ scores 1 mark
	(c)		6	2	M1 for $2x = 12$ or $\frac{x}{3} = 2$ or $\frac{x}{1.5} = 4$	If T&I only correct answer scores Must be algebraic method for M1 Do not accept embedded answers

OCR Thursday 7 June 2018 – Morning (Non-Calculator) Foundation Tier

9.

12	a		$4cd - 20c$ final answer	2	M1 for $4cd$ or $-20c$ in final answer	Condone $4dc$ $4cd + -20c$ scores M1 only Do not accept eg $4 \times c \times d$
	b		$3x^2 - 10x - 8$ final answer	2	M1 for at least three of the following terms correct $3x^2 - 12x + 2x - 8$	May be seen in a table -10x implies both $-12x$ and $2x$
	c		$x \leq 8$	2	Mark final answer M1 for $3x \leq 22 + 2$ or $3x < 22 + 2$ or $3x = 22 + 2$ or $x > 8$ or $x = 8$ If 0 scored, SC1 for answer $x \leq \frac{20}{3}$ or $x \leq 6\frac{2}{3}$	Condone $x < 8$ for 2 marks Condone 8 on answer line for M1

OCR Thursday 2 November 2017– Morning (Calculator) Foundation Tier

10.

4	(a)	(i)	=	1		
		(ii)	<	1		
		(iii)	<	1		
	(b)		$x > 2$	1		Allow $2 < x$

OCR Sample Question Paper 3 – Morning/Afternoon (Calculator) Foundation Tier

11.

18	(a)	(i)	$x > 3$	3 3 AO1.3a	M1 for 4x soi M1 for 12 soi	
		(ii)	2	1 1 AO1.3a		
	(b)		[+]5 -5	2 2 AO1.3a	M1 for $x^2 = 25$ If zero scored SC1 for 5 seen as answer	
	(c)		[x =] 2 [y =] -1	3 3 AO1.3b	M1 for eliminating one variable M1 for correct substitution of <i>their</i> x or y	

AQA Thursday 6 June 2019 – Morning (Calculator) Foundation Tier

12.

24	-1 0 1 2	B3	B2 three correct values with no incorrect values or -3 -2 -1 0 1 2 and -1 0 1 2 3 4 5 or interval that contains only the integers -1 0 1 2 B1 -3 -2 -1 0 1 2 or -1 0 1 2 3 4 5 SC2 answer 2 3 4 5	
	Additional Guidance			
	Examples of intervals that contain only the integers -1 0 1 2 $-1 \leq x \leq 2$ or $[-1, 2]$ or $-2 < x < 3$ or $(-2, 3)$			
	-1 0 1 2 3 4 5 may be shown as an interval that contains only these integers eg $-1 \leq x < 6$ or $[-1, 6)$			
	Intervals can be shown on a number line			
	-3 -2 -1 0 1 2 can not be shown as an interval or on a number line			
	Lists may be in any order eg 1 2 3 4 5 -1 0			B1
	Condone repeats in lists eg -1 0 1 1 2			B3
	Ignore commas/and/or between numbers in lists -3 -2 -1 0 1 2 3 4 5 with no other valid working			B0

AQA Tuesday 6 November 2018 – Morning (Non-Calculator) Foundation Tier

13.

10	1, 5, 7 and 35	B2	any order B1 for any two or three correct values
	Additional Guidance		
	Their correct values must be identified as answers, and not given in, for example, a list of the first ten integers or as values in a calculation		
	If more than 4 answers given, maximum B1 if at least two correct		

AQA Monday 12 November 2018 – Morning (Calculator) Foundation Tier

14.

28	Alternative method 1		
	$\frac{1}{2}x > 3 - 8$ or $\frac{1}{2}x > -5$ or $8 - 3 > -\frac{1}{2}x$ or $5 > -\frac{1}{2}x$ or $8 + \frac{1}{2}x > 3$	M1	oe
	$x > -10$	A1	oe $-10 < x$
	Alternative method 2		
	$16 > 6 - x$ or $16 - 6 > -x$ or $10 > -x$ or $x > 6 - 16$ or $16 + x > 6$	M1	oe
	$x > -10$	A1	oe $-10 < x$
	Additional Guidance		
	Answer using incorrect sign eg $x < -10$ or $x = -10$		M1A0

AQA Thursday 24 May 2018 – Morning (Non-Calculator) Foundation Tier

15.

28	$5x + 15 < 60$ or $5x < 45$ or $x + 3 < 12$	M1	
	$x < 9$ or $9 > x$	A1	SC1 incorrect sign eg $x \leq 9$ or $x = 9$ or $x > 9$ or $x \geq 9$ or $x = < 9$ or answer of 9
	Additional Guidance		
	Allow use of other inequality signs or = if recovered to answer of $x < 9$		M1A1
	Embedded answer of $5(9 + 3) < 60$		M0A0
$5x + 3 < 60$ followed by $x + 3 < 12$ followed by $x < 9$ is not a recovery, but is two errors		M0A0	

AQA Thursday 2 November 2017 – Morning (Non-Calculator) Foundation Tier

16.

31(a)	$(x - 10)(x + 10)$	B1	either order ignore fw
	Additional Guidance		
	$(x + 10)(x + -10)$		B1
	Condone missing bracket at end only $(x - 10)(x + 10)$ $(x - 10)(x + 10)$		B1 B0
	$(x - 10)(x + 10)$ followed by attempt to solve, eg answer $x = 10, x = -10$		B1
	answer only $x = 10, x = -10$		B0

31(b)	$7x - 2x > 1 - 6$ or $5x > -5$ or $6 - 1 > 2x - 7x$ or $5 > -5x$ or $1 > -x$	M1	oe collecting terms
	$x > -1$ or $-1 < x$	A1	SC1 incorrect sign eg $x \geq -1$ or $x = -1$ or answer of -1
	Additional Guidance		
	Answer $x > \frac{-5}{5}$		M1A0
	Answer only $\frac{-5}{5}$		SC0
	$x > -1$ with -1 or $0, 1, 2, \dots$ as the answer		M1A0

AQA Wednesday 8 November 2017 – Morning (Calculator) Foundation Tier

17.

18	$5 < x \leq 9$	B1	
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AQA Tuesday 13 June 2017 Morning– Morning (Calculator) Foundation Tier

18.

27	Alternative method 1		
	A includes 1 or B does not include 1	B1	oe Correct statement about 1 without contradiction
	A does not include 6 or B includes 6	B1	oe Correct statement about 6 without contradiction
	Alternative method 2		
	$1 \leq x < 6$ or $1 < x \leq 6$ or $1 \leq x$ and $1 < x$ or $x < 6$ and $x \leq 6$ or A is 1, 2, 3, 4, 5 or B is 2, 3, 4, 5, 6	M1	oe eg $x \geq 1$ and $x < 6$ for 1 st statement A includes 3 and B includes 18 A is 3, ... 17 and B is 4, ... 18
	A is 1, 2, 3, 4, 5 and B is 2, 3, 4, 5, 6	A1	oe eg A = 1 to 5 and B = 2 to 6
	Additional Guidance		
	For 2 marks, must have clearly indicated both sets of integer solutions		M1A1
	For 2 marks, must have clearly indicated both differences		B1B1
	A could be 1 but not 6, B could be 6 but not 1		B1B1
A is $x = 1$ and B is $x = 6$		B1B1	
A: 3, 6, 9, 12, 15 and B: 6, 9, 12, 15, 18		M1A0	
Comment that inequality signs are switched with no other working		B0B0	
'1 and 6 don't appear in both' – need to be correctly linked to A and B		B0B0	

AQA Sample Paper 1– Morning (Non-Calculator) Foundation Tier

19.

26	$5x - 3x > 11 + 2$ or $2x > 13$	M1	
	$x > 6.5$	A1	oe SC1 6.5