January 2024
WFM02 Further Pure Mathematics F2 Mark Scheme

Question Number	Scheme	Notes	Marks
1	$\dfrac{1}{x+2} > 2x+3$		
	Examples: $\dfrac{1-(x+2)(2x+3)}{x+2} > 0 \Rightarrow 2x^2+7x+5=0$ $x+2 > (2x+3)(x+2)^2$ $\Rightarrow (x+2)\left(2x^2+7x+5\right)=0$ or $2x^3+11x^2+19x+10=0$ $\dfrac{1}{x+2} = 2x+3 \Rightarrow (2x+3)(x+2)-1 = 2x^2+7x+5=0$ Uses algebra to obtain a 3TQ, $(x+2)$ multiplied by a 3TQ or a 4TC. Allow slips and condone incorrect inequality signs but the first algebraic step should be otherwise appropriate so do not accept work with e.g., $(2x+3)(x+2)=0$. The "= 0" can be implied by solutions. Graphical attempts require intersections to be found algebraically. Squaring first is acceptable so allow M1 for obtaining a 5TQ $(4x^4+28x^3+73x^2+84x+35=0)$		**M1**
	e.g., $(2x+5)(x+1)=0 \Rightarrow x=-\dfrac{5}{2},-1$	Both -1 and $-\frac{5}{2}$ from appropriate work and no extra incorrect cvs. May only be seen in the solution set. Allow solving a 3TQ etc. by calculator.	**A1**
	$x=-2$	Identifies -2 as a critical value. May only be seen in solution set. This is the only mark available if there is no algebraic manipulation seen. Allow from any or no working e.g., from $(2x+3)(x+2)=0$	**B1**
	$\Rightarrow x<-\dfrac{5}{2},\ -2<x<-1$ or e.g., $(-\infty,-2.5),(-2,-1)$ **M1**: For the regions $x<a,\ -2<x<b$ with real cvs $a<-2$ and $b>-2$ **but condone** $b<x<-2$ as a notational slip for this mark. Condone any non-strict inequality signs and poor notation for this mark. Not dependent but must follow an attempt at algebraic manipulation. **A1**: Correct solution set in any form. Do not isw if the correct inequalities are subsequently incorrectly amended. Allow all marks even if an incorrect inequality sign was seen earlier in the working.		**M1 A1**
	Examples: $-\dfrac{5}{2} > x$ or $-2<x<-1$ M1 A1 $\quad$ $x<-\dfrac{5}{2}$ and $-2<x<-1$ M1 A1 (Accept any word between the two correct regions) $x<-\frac{5}{2},\ -1<x<-2$ M1 A0 (notational slip) $\left(-\infty,-\dfrac{5}{2}\right)\cap(-2,-1)$ M1A0 (incorrect symbol – allow "and") $\left[-\infty,-\dfrac{5}{2}\right]\cup[-2,-1]$ M1A0 $x<-\frac{5}{2}\ \ -2<x\ \ x<-1$ M0 A0 (insufficient)		
			(5)
			Total 5