Question	Working	Marks
1 (a)	$-3\times q=-12\Rightarrow q=4$	M1A1 [2]
(b)	$b^2-4ac<0,\ \ (p-2)^2-4\times1\times'4'<0$ To find critical values; $p^2-4p-12=0\Rightarrow(p-6)(p+2)=0\Rightarrow p=6,\ -2$ (Chooses inside region from their critical values) $-2<p<6$	M1 dM1A1 ddM1 A1 [5]
Alternative		
(b)	$b^2-4ac<0,\ \ (p-2)^2-4\times1\times'4'<0$ $(p-2)^2<16\Rightarrow-4<(p-2)<4$ $-2<p<6$	M1 dM1A1 ddM1A1
		Total 7 marks

(a)	M1	Substitute $x=0$ and $f(x)=-12$ and proceed to eliminate the term in p to obtain a linear equation in q.
	A1	$q=4$ (score M1 A1 if no working shown)
(b)	For the first 3 marks allow $b^2-4ac<0$ or $b^2-4ac=0$ or $b^2-4ac>0$	
	M1	Attempt to use b^2-4ac (<0) with $b=p-2$, $a=1$ and $c=4$ (ft from (a)). Correct formula shown and used or correct substitution.
	dM1	Attempt to solve their quadratic inequality or equation. Depends on previous M mark. See general guidance for solving quadratic equations.
	A1	Correct critical values, $(p=)-2,(p=)6$
	ddM1	Correct use of their critical values, showing that the inside region has been selected. Both M marks needed. Allow with $\leq$ or $<$ or set language statement.
	A1	$-2<p<6$ must be in terms of p. Allow $p\in(-2,6)$ or $-2<p$ AND $p<6$ or $\{-2<p\ \cap\ p<6\}$
Alternative		
(b)	For the first 3 marks allow $b^2-4ac<0$ or $b^2-4ac=0$ or $b^2-4ac>0$	
	M1	Attempt to use $b^2-4ac<0$ with $b=p-2$, $a=1$ and $c=4$ (ft from (a)). Correct formula shown and used or correct substitution.
	dM1	Write in the form $(p-2)^2<16$ and attempt to take square root of both sides (both positive and negative options are needed), or as $(p-2)^2-16<0$ and attempt to factorise $[(p-2)-4][[(p-2)+4]]<0$ Depends on first M mark.
	A1	Correct critical values, $p=-2$, $p=6$ (Accept if wrong variable is used.)
	ddM1	Correct use of their critical values, showing that the inside region has been selected. Both M marks needed. Allow with $\leq$ or $<$ or set language statement.
	A1	$-2<p<6$ (in terms of p) with options as above.