

Question		Answer	Marks	AOs	Guidance	
11	(a)	Line joining (2, 3) to (10, 200) has gradient $\frac{200-3}{10-2} = 24.625$ Equation of the line is $N = 24.625t - 46.25$ $m = \frac{197}{8} = 24.625, c = -\frac{185}{4} = -46.25$	M1 A1 A1	3.3 1.1 1.1	Attempt to find the gradient of the line Each value correct. Accept rounded to 2 or more s.f.	Values may be implied by correct equation
		Alternative solution 1 Regression line (BC) for data set (2, 3), (10, 200) Regression line is $N = 24.625t - 46.25$ $m = 24.625, c = -46.25$	M1 A1 A1		Using the calculator to find the regression line (may be implied) Each value correct. Accept rounded to 2 or more s.f.	
		Alternative solution 2 Simultaneous equations Using (2, 3) $2m + c = 3$ and using (10, 200) $10m + c = 200$ $m = \frac{197}{8} = 24.625, c = -\frac{185}{4} = -46.25$	M1 A1 A1		Attempt to find and solve simultaneous equations (BC) Each value correct. Accept rounded to 2 or more s.f.	
			[3]			
11	(b)	The number of calls increases by 24.625 per day	B1 [1]	3.4	FT their m . Condone missing units	
11	(c)	When $t = 1, N = -21.625$ and N cannot be negative	B1 [1]	3.5b	Argument from a correct value for N FT their equation	
11	(d)	When $t = 2, N = e^{0.53 \times 2} = 2.886 \approx 3$ When $t = 10, N = e^{0.53 \times 10} = 200.33 \approx 200$ So this is a good model for these two points	M1 E1 [2]	1.1a 3.4	Substitution of both values into the model, soi Conclusion from correct values	

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11	(e)	rate of increase $\frac{dN}{dt} = 0.53e^{0.53t}$	M1	1.1a	Using gradient of $e^{kx} = ke^{kx}$
		When $t = 10$, $\frac{dN}{dt} = 0.53e^{0.53 \times 10}$	M1	1.1a	Substituting $t = 10$ into their expression
		106 new calls per day	B1	3.4	cao Allow for gradient found BC or numerical method
			[3]		