IGCSE Edexcel Past Papers

FURTHER PURE MATHEMATICS

Paper 2

2015 — Winter 2019

1 - (4PM0-S 2016-Paper 2-Q6) - *INTERSECTION POINT, INTEGRATION*

(a) Use algebra to find the coordinates of the points of intersection of the curve with equation $y = x^2 + 2x - 6$ and the line with equation $y = 5x + 4$

(5)

(b) Use algebraic integration to find the exact area of the finite region bounded by the curve and the line.

(5)

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2 - (4PM0-W 2016-Paper 2-Q3) - *INTERSECTION POINT*

Solve the equations

$$3y = 12 - 4x$$

$$(x + 1)^2 + (y - 2)^2 = 4$$

(7)

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3 - (4PM0-S 2017-Paper 2-Q2) - *INTERSECTION POINT*

Solve the equations

$$y = x^2 - 6x + 5$$

$$y + x = 11$$

(5)

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4 - (4PM0-S 2018-Paper 2-Q4) - *INTERSECTION POINT, CARTESIAN COORDINATES*

(a) Find the exact value of the root of the equation $e^{3x} = 8$

Give your answer in the form $\ln a$, where a is an integer.

(2)

The curve C_1 has equation $y = 2e^{3x}$ and the curve C_2 has equation $y = (e^{3x} - 4)^2$

The curves C_1 and C_2 intersect at the points P and Q.

(b) Use algebra to find the exact coordinates of the points P and Q.

(5)

(c) Find, to 3 decimal places, the length of PQ.

(2)

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ANSWERS

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1 - (4PM0-S 2016-Paper 2-Q6) - *INTERSECTION POINT, INTEGRATION*

(a)	$5x+4=x^2+2x-6$	M1
	$x^2-3x-10(=0)$	A1
	$(x-5)(x+2)(=0)$	
	$x=5 \;\; y=29; \quad x=-2 \;\; y=-6$	M1A1A1 (5)
(b)	$\int_{-2}^{5}\left((5x+4)-\left(x^2+2x-6\right)\right)\mathrm{d}x$ (either way round)	M1
	$\int_{-2}^{5}\left(-x^2+3x+10\right)\mathrm{d}x$	
	$\left[-\frac{1}{3}x^3+\frac{3}{2}x^2+10x\right]_{-2}^{5}$ (Correct integration of a function, either way round or correct integration of two sep functions)	M1A1
	$=\left(-\frac{125}{3}+\frac{75}{2}+50\right)-\left(\frac{8}{3}+6-20\right)$	dM1
	$=57\frac{1}{6}, \frac{343}{6}$ **must** be positive	A1cao (5)
		[10]

2 - (4PM0-W 2016-Paper 2-Q3) - *INTERSECTION POINT*

$3y=12-4x \Rightarrow y=4-\frac{4}{3}x$ OR $4x=12-3y \Rightarrow x=3-\frac{3}{4}y$

$(x+1)^2+(4-\frac{4}{3}x-2)^2=4$

$\Rightarrow 25x^2-30x+9=0$ 3TQ

$(5x-3)(5x-3)=0 \Rightarrow x=\frac{3}{5}$

$y=4-\frac{4}{3}\times\frac{3}{5}=\frac{16}{5}$

$\left(3-\frac{3}{4}y+1\right)^2+(y-2)^2=4$

$\Rightarrow 25y^2-160y+256=0$ 3TQ

$(5y-16)(5y-16)=0 \Rightarrow y=\frac{16}{5}$

$x=3-\frac{3}{4}\times\frac{16}{5}=\frac{3}{5}$

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3 - (4PM0-S 2017-Paper 2-Q2) - *INTERSECTION POINT*

	$x^2-6x+5=11-x$		M1
	$x^2-5x-6\ (=0)$	OR $y^2-17y+60\ (=0)$	A1
	$(x-6)(x+1)\ (=0)$	$(y-12)(y-5)\ (=0)$	dM1
	$x=6,\ y=5$		A1
	$x=-1,\ y=12$		A1 [5]

4 - (4PM0-S 2018-Paper 2-Q4) - *INTERSECTION POINT, CARTESIAN COORDINATES*

(a)	$3x=\ln 8$ or $x=\frac{1}{3}\ln 8$ or $\log_e 8=3x$ or $e^x=2$ or $e^x=\sqrt[3]{8}$ $e^x=8^{\frac{1}{3}}$		M1
	$x=\ln 2$		A1 (2)
(b)	$2e^{3x}=\left(e^{3x}-4\right)^2$	or $y=\left(\frac{y}{2}-4\right)^2$	M1
	$0=\left(e^{3x}\right)^2-10e^{3x}+16$	$y^2-20y+64=0$	A1
	$\left(e^{3x}-8\right)\left(e^{3x}-2\right)=0$	$(y-16)(y-4)=0$	
	$e^{3x}=8\ \ x=\frac{1}{3}\ln 8=\ln 2$	$y=16$	M1
	$e^{3x}=2\ \ x=\frac{1}{3}\ln 2$	$y=4$	A1
	$(\ln 2,16)$ $\left(\frac{1}{3}\ln 2,4\right)$		A1 (5)
(c)	Length $PQ=\sqrt{\left(\ln 2-\frac{1}{3}\ln 2\right)^2+12^2},\ =12.0088...=12.009$		M1,A1 (2)
			[9]

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