Leaving Cert Higher Maths Paper 1 2006
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Answers

Note every attempt has been made to ensure that the answers are correct but we are Human!

Question 1:

(a) a = 3 ,(b) m = -4 ,n = 6 .(c) by long division $pt = r, t = q \Rightarrow pq = r$.(ii) roots are $x = p, x = \mp\sqrt{q}$.

Question 2:

(a) $x = \frac{-1}{3}, y = \frac{-17}{3}; x = 2, y = -1$ (b)(i) $\frac{-8}{9} \geq x \geq 0$ (b)(ii)The equation has no real roots in the domain $\frac{-8}{9} < t < 0$ outside this domain it has real roots $\therefore$ the roots are real if t is an integer .c(i) $x = \frac{-\ln(1+b)}{2\ln b}$;

Question 3

(a) d = 5.(b)(i)
$(x = \frac{1}{4}, y = -2)$,(b)(ii) $k = -4, k = 2$.(c)(i) $-8 - 8\sqrt{3}i = 16(\cos -120 + i\sin -120)$.
(c)(ii) $(-8 - 8\sqrt{3}i)^3 = 16^3(\cos -360 + i\sin -360) = 16^3$
(d)

Question 4:

(a) n=10

$(b) r = \frac{-1}{3}, a = 6, (c) U_6 = 189, S_6 = 189, (ii) S_k = 3(2^k - 1) \Rightarrow 3\sum_1^n 2^k - 1 = 3(2(2^k - 1))$

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Question 5:

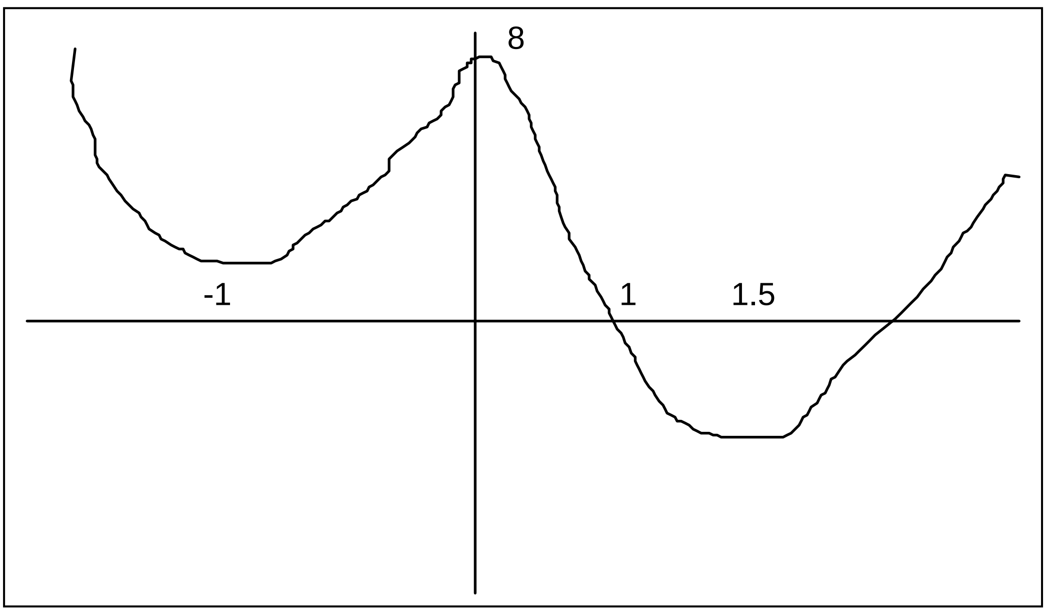
(a) $\binom{8}{4} = {}^8_4C = 70$,(b)A = 1,B= - 1. $(ii) S_n = \frac{1}{2} + \frac{1}{3} - \frac{1}{n+2} - \frac{1}{n+3} : S\alpha = \frac{5}{6}$;

©Simplifies to $(x-1)^2 \geq 0, (ii) a = b.$

Question 6:

(a) $\frac{dy}{dx} = \frac{3}{2}x^{\frac{1}{2}} + x^{\frac{-1}{2}}$.(b) $\frac{dy}{dx} = 12x^3 - 6x^2 - 18x = 6x(2x^2 - x - 3) = x = 0, x = -1, x = \frac{3}{2}$

max at (0,8), Min at (–1,4),and (1.5,-3.8125)



Question 6 Standard proof by induction .
Question 7:
(a) $x_2 = \frac{25}{13}$,(b) $\frac{dy}{dx} = \frac{3\cos\theta Cos^2\theta}{-3\sin\theta\sin^2\theta} = \frac{-1}{\tan^3\theta}$;(c) $\frac{dy}{dx} = \frac{3}{9-x^2}$;

Question 8:
(i) $\frac{2}{3}x^{\frac{3}{2}} + c, (ii)\frac{-1}{2}e^{-2x}; (b)(i)\frac{1}{8}(5^4 - 2^4), (ii)\frac{1}{2}[\frac{1}{\sqrt{2}}]; (c)(i)32, (ii) area = 16.$

Leaving Cert Higher Maths 2006 Paper 2 Answers

Question 1
(a) $(x-1)^2 + (y+1)^2 = 32$.(b)Distance from (5,-1) to 3x-4y + 11= 0 is 6 therefore the radius is 6.b(ii)distance from (5,-1) to x+py+1=0 is $\pm 6 \Rightarrow p = 0, p = -12/35$.
© (i)Radius of circle is 5,distance to line 4x + 3y =12 from (-2,-2) is $\frac{26}{5} > 5$ therefore the line does not cut the circle .Nearest point (2,1)

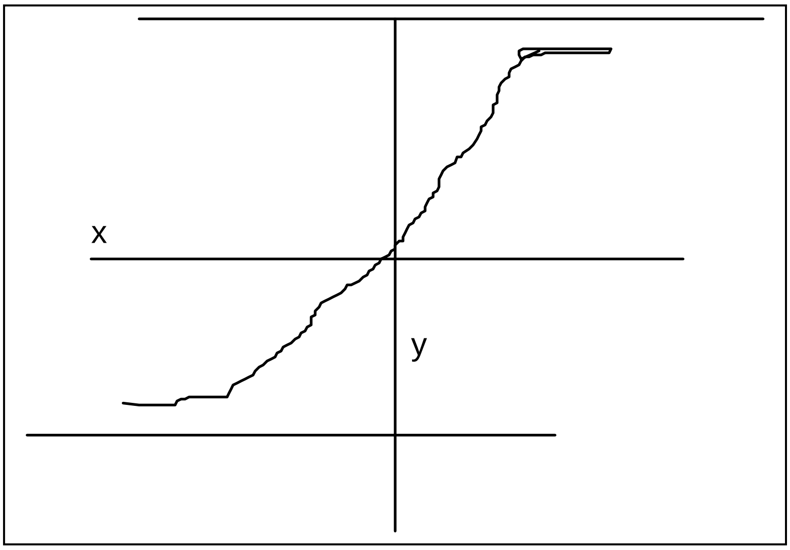
Question 2.
(a) $\left(x^{\perp}\right)^{\perp} = 3\vec{i} - \vec{j}$.(b) (i) $\vec{pq} = 6\vec{i} - 8\vec{j}, \vec{pr} = 4\vec{i} + 3\vec{j}$ (ii) $\vec{s} = 7\vec{i} - \vec{j}$.(iii)45.
© $\vec{h} - \vec{a} = b + \vec{c}$.;$\vec{bc} = \vec{c} - \vec{b}$.;$\vec{ah}.\vec{bc} = |b|^2 - |c|^2 = 0$

Question 3 .
(a)Slope of the line joining (3,-6) and (-7,12) is –9/5,the slope of the line 5x – 9y +6 =0 is 5/9 product of the slopes is –1 .
(b)(i) R = (0,-12),Q = (8,0).(b)(ii) Proof .(c) $\tan\theta = \frac{15}{11}$.

Question 4:
(a) A = 60 ,A = 300.(b)
$(i) 2Cos(2x+30)Sinx+30) : (ii) x = 30,120, x = 210, x = 300, x = 150, x = 330$.
© $R = \frac{k}{\sqrt{3}} : Area; of; sector \frac{k^2\pi}{6},;; Area; of; circle = \frac{k^2\pi}{3}$;

Question 5:

x	$-\sqrt{3}$	-1	$\frac{-1}{\sqrt{3}}$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$
F(x)	$\frac{-\pi}{3}$	$\frac{-\pi}{4}$	$\frac{-\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$



(iv) $-\frac{\pi}{2} < k < \frac{\pi}{2}$

(b)Slant height is 219.A = 86000.

Question 6:

(a) ${}^{11}_{3}C = 165, {}^{5}_{3}C = 10. \Pr ob = \frac{10}{165}$; (b) $U_n = 2(1)^n + 6(\frac{1}{6})^n$ (ii)sub the result into second difference equation.

©(i) $\left(\frac{1}{30}\right)^6 (ii) \frac{29}{30}\frac{28}{30}\frac{27}{30}\frac{26}{30}\frac{25}{30} (iii) 1-(ii)$

Question 7:

(a)(i) $(10)^5 (ii) 5{,}000$ (b)(i) ${}^{35}_{5}C, (ii)({}^{5}_{4}C)({}^{30}_{1}C)(iii){}^{5}_{3}C\,{}^{30}_{2}C.(iv)\frac{(ii)+(iii)}{(i)}$

© The best question on the exam .We use the definition that

$$\partial^2 = \frac{\sum fx^2}{\sum f} - (\bar{x})^2 \Rightarrow \partial^2 = \frac{(-n)^2 + (-n-1)^2 + (-n-2)^2 ....0^2 + ...(n-1)^2 + (n)^2}{(2n+1)} =$$

$$\partial^2 = \frac{2\sum n^2}{(2n+1)} = 2\frac{(n)(2n+1)(n+1)}{6} \div (2n+1) = \frac{(n)(n+1)}{3} \Rightarrow \partial = \sqrt{\frac{(n)(n+1)}{3}}$$

$\bar{x} = 0$ **so we are left with 2** $\sum n^2 = 2(\frac{n}{6})(2n+1)(n+1)$

Question 8 :

(a) $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!}$;(b) (i) $a = (2-4m), b = (\frac{4m-2)}{m}.m = \frac{-1}{2}$

© $(i)\frac{-1}{3} < x < \frac{1}{3}, (ii)\frac{-1}{3} > x > \frac{1}{3}.(iii) x = \frac{1}{3} : (ii) -4 < x < 4, (ii) -4 > x > 4, (iii) x = 4$