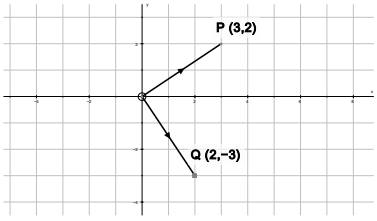
BHASVIC MαTHS

A2 Doubles summer CWC answers

Section: *Core*

<u>Past</u>

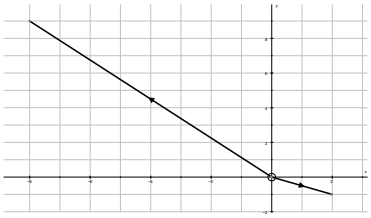
1. $x = \frac{1 \pm i}{2}$, x = 3

2. a) 2 – 3i b) 

c) grad OP x grad OQ = $\frac{2}{3} \times \frac{-3}{2} = -1$ therefore $\angle POQ = \frac{\pi}{2}$

d) $\frac{5}{2} - \frac{1}{2}i$ e) $\frac{\sqrt{26}}{2}$

3. $x = -4 \pm 3i$, $x = \pm 2i$

4. a)  b) $\sqrt{5}$ or 2.24 c) -0.46 d) -5 + 2i

5. (*a*) 10 (*b*) $-\frac{\pi}{6}$ (*c*) $\frac{1}{5}$ (*d*) $\frac{5\pi}{12}$

6. $\left(\frac{1}{2}, -\frac{1}{2}\right)$

7. 30

8. (b) 4804

9. (a) $n^2(n+1)$

10. Proof

11. Proof

12. (a) $(r+2)^2 - r^2 = 4r + 4$

13. (b) $1 - \frac{1}{(n+1)^2}$, $A = 1, B = -1$

(c) 0.06

14. (b) $\frac{n(4n+5)}{(n+1)}$

(c) 36.1

15. (a) $\frac{1}{(r+1)} - \frac{2}{r} + \frac{1}{(r-1)}$

16. (a) $x^6(14-95x^3)(2-5x^3)^3$ (b) $\frac{2x(3-5x)}{\sqrt{3-4x}}$

(c) $\frac{(25x-1)(5x+1)^2}{2\sqrt{x^3}}$ (d) $(26x^2-78x+51)(x^2-3x+1)^4(2x-3)^2$

(e) $-\frac{x(x^3+3x+6)}{2\sqrt{x^2+1}\sqrt{(x^3-3)^3}}$ (f) $\frac{3(x^2-4x+1)(x-1)^2}{(x-3)^2}$

(g) $\frac{30-12x^2+x^3}{(6-x)^2\sqrt{5-x^2}}$

17. a) $\frac{2x\tan x - x^2\sec^2 x}{\tan^2 x}$ b) $\frac{1+\sin x}{\cos^2 x}$ c) $e^{2x}(2\cos x - \sin x)$

d) $e^x \sec 3x\ (1 + 3\tan 3x)$ e) $\frac{3\cos 3x - \sin 3x}{e^x}$ f) $e^x \sin x(\sin x + 2\cos x)$

g) $\frac{\tan x - x\sec^2 x \ln x}{x\tan^2 x}$ h) $\frac{e^{\sin x}(\cos^2 x + \sin x)}{\cos^2 x}$

18. (ai) $e^{3x}(\sin x + 7\cos x)$ (aii) $3x^2 \ln(5x+2) + \frac{5x^3}{5x+2}$ (c) $x = 1, -3$

19. $6\sqrt{3}y - 24x = 3\sqrt{3} - 4\pi$

20. $\frac{x-3}{2\sqrt{(x-1)^3}}$; $(3,\ 2\sqrt{2})$; min

21. (a) $\frac{\frac{1}{2}}{(2-y)} + \frac{\frac{1}{2}}{(2+y)}$ (b) $\sec^2 x = \frac{8+4y}{2-y}$

22. (a) In partial fractions A and B should be 1/3 and -1/3, c is ln 2 (use the fact that when t = 0, x = 0)

(b) as $x \to 3, t \to \infty$ so cannot make 3g

23. (a) $\frac{dV}{dt} = 20 - kV$ (b) $V = \frac{20}{k} - \frac{20}{k}e^{-kt}$ (c) 108 cm^3 (3.s.f)

24. a) proof b) $n = 450\,e^{2t} + 50$ c) number of fish would be infinite, unrealistic

25. (c) 0.24%

26. (a) (i) $1 - \frac{\theta^2}{2!} + \frac{\theta^4}{4!} - \frac{\theta^6}{6!} + \ ...$

(ii) $\theta - \frac{\theta^3}{3!} + \frac{\theta^5}{5!} - \frac{\theta^7}{7!} + \ ...$

(iii) $1 + i\theta - \frac{\theta^2}{2!} - \frac{i\theta^3}{3!} + \frac{\theta^4}{4!} + \frac{i\theta^5}{5!} - \frac{\theta^6}{6!} - \frac{i\theta^7}{7!} + \ ...$

(b) $1 + i\theta - \frac{\theta^2}{2!} - \frac{i\theta^3}{3!} + \frac{\theta^4}{4!} + \frac{i\theta^5}{5!} - \frac{\theta^6}{6!} - \frac{i\theta^7}{7!} + \ ...$

27. (a) $1 - \frac{u^2}{2!} + \frac{u^4}{4!} - \frac{u^6}{6!} + \ ...$

(b) $1 - 2x^2 + \frac{2x^4}{3} - \frac{4x^6}{45} + \ ...$

28. (b) $f^{(3)}(x) = 4f''(x) - 13f'(x)$

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(c) $f(x) = 3x + 6x^2 + \frac{3}{2}x^3 - 5x^4 + \ ...$