

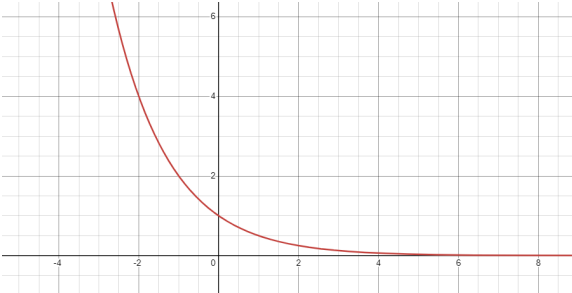
Thx guys with your help I could find the small mistakes and add additional possible answers for some questions, constructed a cleaner version of the mark scheme so its easier to navigate [Aqa 2025 Paper 1 Unofficial MS \(Clean Version\)](#)  
Forget about this paper and start preparing for Mechanics Paper 2. You all got this!

join to discuss answers: -> <https://discord.gg/y8sjtevJEk> (everyone does aqa maths)

Questions and Answers	Student notes
1) Differentiate $3(e^x)$ (1 mark) <b>Answer: <math>3(e^x)</math></b>	
3) What does $\log(2x) - \log(x) = ?$ (1 mark) <b>Answer: <math>\log(2)</math></b>	
4) a) In the binomial expansion $(1-8x)^{0.5}$ , what is the boundary for $x$ ? (1 mark) <b>Answer: <math> x  &lt; \frac{1}{8}</math></b>  b) What is the value for $n$ in the expansion $1 + nx - 8x^2$ (1 mark) <b>Answer: -4</b>	How did i get part b wrong wtf. I didnt multiply $n$ by $x$ . NOT happy.  I thought part b was $\frac{1}{2}$ 😞 cos $n$ is the power right?? I guess i got confused - its defo -4 right? $0.5 \times -8x = -4x$ , its in formula sheet
5) Integrate $(4x - 3 + x^{-\frac{1}{2}})$ . (3 marks) <b>Answer: <math>2x^2 - 3x + 2x^{\frac{1}{2}} + c</math></b>	
6) $a=3, d=-0.5$ Find the sum on the first 250 in an arithmetic series. (2 marks) <b>Answer: <math>-29625/2</math></b>	
7) a) Geometric series, second term is 60, common difference is 0.2, Find the sum of the first 5 terms in the series. (4 marks) <b>Answer: <math>9372/25 = 374.88 \leftarrow \text{THIS ANSWER IS EXACT BTW}</math></b>  b) Another geometric series with $r$ positive. The second term is 60. Prove the sum to infinity is $60/(r-r^2)$ (2 marks) <b>Answer: <math>a = 60/r</math>, Sum = <math>a/(1-r)</math> Plug in <math>60/r</math> into the sum Sum = <math>60/(r-r^2)</math></b>  c) Find value of $r$ which will give the maximum for $r-r^2$ (2 marks) <b>Answer: <math>r = 1/2</math> so max = 0.25</b>	How do you do C (You could differentiate and equate it to 0 then solve for $r$ which will give you $\frac{1}{2}$ , but you can just see it from the factorised form $r(1-r)$  So why is the answer $\frac{1}{4}$ ? Oh yeah my bad thats for the $r-r^2$ . Okk so $\frac{1}{2}$ is the answer woo  Guys how many marks we saying for part d if i got inequality wrong way round 0 or 1??

<p>d) Find the range of T (sum to infinity of <math>60/(r-r^2)</math>). (2 marks)</p> <p><b>Answer: <math>T \geq 240</math></b></p>	
<p>8) Small angle approximation, prove it is equal to <math>(ax+n)</math>. (5 marks)</p> <p><b>Answer: <math>3x+1</math></b></p>	
<p>9) Temperature with the graph question. A and k are positive.</p> <p>a) Show that <math>\theta = -21 - A(e^{-kt})</math> can be rearranged to <math>\ln(21 - \theta) = \ln A - kt</math> (3marks)</p> <p><b>Answer: Take ln of both sides and do some rearranging.</b></p> <p>b) Find the value of A from the other graph. (2 marks)</p> <p><b>Answer: Graph is in form of <math>y=mx+c</math> Find c intercept is equal to <math>\ln A</math>, <math>e^c = A</math> <math>A = 39.5</math></b></p> <p>c) Find the value of k. (2 marks)</p> <p><b>Answer: Same here but have to find the gradient, <math>m = -0.184</math> As k is positive, <math>k = 0.184</math></b></p> <p>d) Find the temperature it is initially at <math>t=0</math> (2 marks)</p> <p><b>Answer: <math>21 - 39.5 = -18.5</math> degrees Celsius</b></p> <p>e) Find the time in which the dessert will get to 4 degrees to the nearest 10 minutes. (3 marks)</p> <p><b>Answer: 4 hours 30 mins (should be in mins) either is proly fine pal</b></p>	
<p>10) Function of <math>f(x) = x^2 + 5</math>      <math>x=R</math> Function of <math>g(x) = x^{1/2}</math>      <math>x \geq 0</math></p> <p>a) Find the range of <math>f(x)</math> (2 marks)</p> <p><b>Answer: <math>\{y: y \geq 5\}</math></b></p> <p>b) Explain if <math>f(x)</math> has an inverse function or not (2 marks)</p> <p><b>Answer: <math>f(x)</math> is a many to one function therefore it does not have an inverse.</b></p> <p>c) Draw <math>g^{-1}(x)</math> on the graph (2 marks)</p> <p><b>Answer: <math>y=x^2</math> graph has to go through the point of intersection (1,1)</b></p>	<p>How many marks u think u dropped overall bro ( like 4-5 , got 96 on last year mock) u do further? Nah</p> <p>For b) you'll need to show a sketch or two x values that return the same y to get the 2nd mark</p> <p>Could you just state not sketch??</p> <p>Im sure this is wrong, the domain was <math>x &gt; 0</math>, so in that domain it would have an inverse?</p> <p>That was for <math>g(x)</math> , <math>f(x)</math> conditions are <math>x=R</math></p> <p>thanks</p>

<p>d) <math>h(x)</math> is <math>gf(x)</math> , Find <math>h(x)</math> (1 mark)  <b>Answer: <math>h(x) = (x^2+5)^{1/2}</math></b></p> <p>e) Find the range of <math>h(x)</math> (1 mark)  <b><math>h(x) \geq \sqrt{5}</math></b></p>	<p>For b you should be able to get the 2nd mark by working out if there were any turning points. You can also get it by drawing the function as a graph and drawing the line across to show many x values give the same y</p> <p>For c you didn't need to label the point of intersection right? ? someone pls answer ts!!! I didnt oops</p> <p>Part e didnt need to be set notation right? No</p>
<p>11) a) Differentiate implicitly and prove that at stationary points <math>y = x/4</math> (4 marks)  <b>Answer: Implicit differentiation with product rule some rearranging</b></p> <p>b) Find the values of x where there is a stationary point in the form <math>\pm \sqrt{n}</math> (3 marks)  <b>Answer: Insert y into the original equation and simplify , <math>\pm \sqrt{8}</math></b></p>	
<p>12) Integrate <math>(4x \sin 2x)</math> and find the shaded area in form of <math>k\pi</math> (8 marks)  <b>Answer: Find area above x axis, then find the area below x axis, make the bottom area positive and add the areas together. it is <math>4\pi</math> sorry pal.....</b></p>	<p>Its <math>4\pi</math> right? yes. First was <math>-\pi</math>, second was <math>3\pi</math> yurhh !</p> <p><math>4\pi</math> defo right (checked on casio cg50 graph mode) trust trust gc50 goated</p> <p>Cant have -ve area</p>
<p>13) Sine rule question  a) Prove that the last angle in the triangle is equal to <math>\pi/2 - 1/4\pi</math>? lg (1 mark)  <b>Answer: <math>\pi - (\text{sum of other angles})</math> gives the answer</b></p> <p>b) Prove that <math>AB/BC = (k \cot x + n)/b</math> , find k,n,b (5 marks)  <b>Answer: <math>(\sqrt{3} \cot x + 1)/2</math></b></p> <p>c) Find exact value of x when <math>\cot(x) = 1</math> (1 mark)  <b>Answer: <math>\pi/4</math></b></p>	<p>How many marks was part c? I assume one mark, maybe? Yes 1 mark</p> <p>I did half of part b and guessed part c right will i get the mark for part c? YES. AYY</p>
<p>14) Draw the graph <math>y=a^x</math> when <math>0 &lt; a &lt; 1</math> (2 marks)  <b>Answer:</b></p>	<p>Ts was not question 14 ( not in order bro) My Bad 😓😓 Tf was question 14</p>

	<p>This was q7</p> <p>I expect you have to state the y intercept as well - (0.1). Yeah for sure</p>
<p>15)a) Graph of <math>y=x^2</math> , Point Q is closest point to P, prove <math>2x^3-4x-3=0</math> (4 marks)  <b>Answer:</b>  <a href="https://imgur.com/a/O04NUpk">https://imgur.com/a/O04NUpk</a> or look at the end of the questions</p> <p>b) Using newton raphson method prove <math>x(n+1) =</math> Not writing all that (4 marks)  <b>Answer:</b>  <a href="https://imgur.com/a/1Cok9lv">https://imgur.com/a/1Cok9lv</a> or look at the end of the questions</p> <p>c) Using <math>x_0 = 3</math> find <math>x(3)</math> ( 2 marks)  <b>Answer: 1.709</b></p> <p>d) Find the distance PQ (2 marks)  <b>Answer : <math>y = 1.709^2</math></b>  <b><math>x = 1.709</math></b>  <b>Pythagoras finding distance = 1.36</b></p>	<p>Ts question (part a) was evil there's like infinite methods everyone ive talked to did it a different way  The easiest way was gradients = <math>-1/2Xp</math></p> <p>Gradient QP X Gradient of tangent = -1</p> <p>Bro is used x5 for the part c am i cooked chat? BETTER THEN USING X2 ( If you wrote it then I guess its good) - yh true ur good tho bro x2 is not far off</p> <p>HOW MANY MARKS ON NEWTON RAPHSON DO I LOSE IF I ONLY DID 0,1,2  1 probs  Like 1 or 2 its not the end of the world so 1 on partc and 1 on part d?</p>
<p>16) Parametric equations  <math>x = 4(4t + 1)^2</math>  <math>y = e^{(-4t)}</math></p> <p>a) Find <math>dy/dx</math> in terms of <math>t</math> (3 marks)  <b>Answer: <math>(-4e^{-4t})/32(4t+1)</math></b></p> <p>b) Find the tangent line at <math>t=0</math> in the form of a cartesian equation. (3 marks)  <b>Answer: <math>y=-x/8 + 12/8</math></b></p> <p>c) Find <math>y=F(x)</math> (3 marks)  <b>Answer: <math>y=e^{((2-\sqrt{rx})/2)}</math> there would be a +1 ( no it is simplified, open the fraction and you will get +1 )</b></p>	<p>Just say 3/2 crodie  12/8 in the big 2025.....( couldnt be asked to simplify) fairsies 😊😊</p> <p>For the <math>Y=F(X)</math> do ppl think u needed to say about discarding a negative square root? Yeagh i reckon you do its a fully justify I'mThink its the only mark i dropped.....</p> <p>I said reject negative root as not in domain for t will that get mark?</p>
<p>17) a) Show that integration by substitution (5 marks)  <b>Answer:</b> <a href="https://imgur.com/a/vzgkpdj">https://imgur.com/a/vzgkpdj</a> or look at the end of the questions</p>	<p>How many marks if i didnt combine the log in the +c with the log in the integral? 4.  Thank u</p>

b) Solve differential equation (5 marks)

**Answer:** <https://imgur.com/a/BfpW3Xz> or  
**look at the end of the questions**

Idkkk theres a chance you get 5 im pretty sure the question only asked A and B to be constants, not integers, so if you got A as 1 and B as  $\ln 2 - 1$  techincallyyyy you didn't do anything wrong but idk its up in the air ( yeah depends on the actual ms)  
This is what i thought cus i wrote the log in the correct form  $+\ln(\dots)$  and my +c was  $(\ln 2 + 1)$  or something which is usually correct in fm.  
Yeah i reckon the intended way was the put the  $\ln 2$  with the  $-\ln(\dots)$  but you should prolly get the mark either way

i got for b)  $\tan y = e^x - \ln(e^x + 1) + \ln 2 - 1$   
but don't understand how it leads to 2 being above  $e^x + 1$ , i thought it would be  $2(e^x + 1)$  ? Minus before  $\ln$  adds the  $1/()$  which they ask for in the question

**Its just** log rules youve got  $\ln 2 + \ln 1/(\dots)$   
that equals  $\ln 2/(\dots)$

**can someone explain - also does this mean i would get 3 of 4 out of 5 marks? 4 i guess cus u will just lose the accuracy**

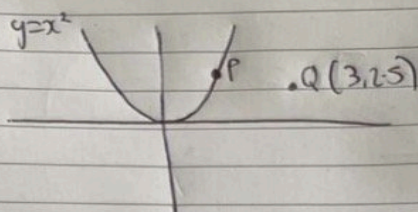
**How many marks for rearranging in to a differential equation and integrating to get  $\tan y$ ? Gave up on the RHS lol. Did u not use the previous part to integrate the RHS? Ithink you will get 1-2 marks.**

**No i did i flipped it around and used part A to do this but i had like 3 mins so i crumbled under the pressure lol. I got the answer to part A fine unfortutante. Lots of people didnt finish though so youll be fine. Probs 2 marks.**

**Paper was ez**



15a)



Show that the  $x$  coordinates of  $P$  satisfy the equation  $2x^3 - 4x - 3 = 0$ , given that point  $P$  is the closest point to  $Q$  on the curve.

$$\frac{dy}{dx} = 2x$$

Let the  $x$  coordinate of  $P = p$ , such that  $\frac{dy}{dx}$  at  $P = 2p$  and  $y$  at  $P = p^2$

equation of normal:

$$y - p^2 = -\frac{1}{2p}(x - p)$$

$$y - p^2 = -\frac{1}{2p^2}x + \frac{1}{2}$$

(Subbing in  $y$  coordinates of  $Q$ ):

$$2.5 = -\frac{3}{2p^2} + \frac{1}{2} + p^2$$

$$5 = -\frac{3}{p} + 1 + 2p^2$$

$$5p = -3 + p + 2p^3$$

$$2p^3 - 4p + 3 = 0$$

$$2p^3 - 4p - 3 = 0$$

$$\therefore \text{at } P: 2x^3 - 4x - 3 = 0$$

15b)

$$x_{n+1} = x_n - \frac{2x_n^3 - 4x_n - 3}{6x_n^2 - 4}$$

$$= \frac{x_n(6x_n^2 - 4) - (2x_n^3 - 4x_n - 3)}{6x_n^2 - 4}$$

$$= \frac{6x_n^3 - 4x_n - 2x_n^3 + 4x_n + 3}{6x_n^2 - 4}$$

$$= \frac{4x_n^3 + 3}{6x_n^2 - 4} //$$



17a)

$$\int \frac{e^{2x}}{e^x + 1} dx$$

$$u = e^x + 1$$
$$du = e^x dx$$

$$\int \frac{e^x du}{u}$$

$$u - 1 = e^x$$

$$\int \frac{u-1}{u} du$$

$$\int 1 - \frac{1}{u} du = u - \ln|u| + c$$

$$= e^x + 1 - \ln|e^x + 1| + c$$

$$K = c + 1$$

$$= e^x - \ln|e^x + 1| + K //$$



17b)

Solve  $\frac{e^x + 1}{e^{2x}} \frac{dy}{dx} = \cos^2 y$

given ~~to~~ when  $y = \pi$ ,  $x = 0$

$$\int \sec^2 y \, dy = \int \frac{e^{2x}}{e^x + 1} \, dx$$
$$\tan y = e^x - \ln|e^x + 1| + m \quad m \text{ is another constant}$$
$$\therefore \tan(\pi) = 1 - \ln|2| + m \quad \tan(\pi) = 0$$
$$m = \ln|2| - 1$$
$$\tan y = e^x - \ln|e^x + 1| + \ln 2 - 1$$
$$\therefore \tan y = e^x + \ln\left(\frac{2}{e^x + 1}\right) - 1 //$$

Ty whoever made this #goat behaviour <3 (thx)

The fact that some1 remembered the exact questions asw, that's impressive ngl

The fact they went home and did it again is sad ← HATER!!!! ———— geet a life I love maths #ME TOO

Nah iim lowkey hating but i appreciate it gang may u all be blessed - ty vrodi

FFS so many stupid marks lost probs won't even get an A on this paper </3

Whos hyped for further on friday!!!

I'm hyped for Econ tmr

im not

Do u guys know how much question 14 was worth (ex the graph was 2 marks , I dont know what was the question 14 in the actual paper)

And also what grade would 82/100 be on this paper an a star bound or no (High A or if you are lucky low A\*)

Do u think they will go down even a bit because wasnt 2024 easier

Im guessing a 74 would be a B(WTF not 74 for B defo not) then -

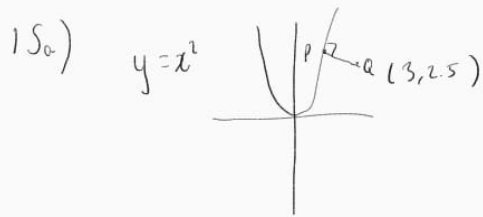
Oh i have no clue how the grade boundaries work haha i got 74 based on this mark scheme. So an A?( potentially a low A or high B)

		A*	A	B	C	D	E
MATHEMATICS ADV PAPER 1	100	87	75	61	48	35	22

2024 grade boundaries

Oh gosh - thank you. I hope i do better in p2 and p3 to get that A.

Alternative solution to 15a)



P is on line  $y = x^2$   $\therefore$  has co-ordinates  $(x, x^2)$

Q  $(3, 2.5)$

Show that x-coordinate of P can be shown as  $2x^3 - 4x - 3 = 0$   
(can't remember exact question)

Solution

$$y = x^2$$

$$\frac{dy}{dx} = 2x$$

gradient of normal at P  $= -\frac{1}{2x}$

$$\text{gradient of normal using } \left( \frac{y_2 - y_1}{x_2 - x_1} \right) = \frac{x^2 - 2.5}{x - 3}$$

$$\text{Equate: } \frac{x^2 - 2.5}{x - 3} = \frac{-1}{2x}$$

$$2x^3 - 5x = -x + 3$$

$$\boxed{2x^3 - 4x - 3 = 0}$$

Its probably the same way as the one above but just way cleaner.