AT2. E1

7/4/22

Multiple Choice Answer Sheet

Student Number	SUG SOLS.
Teacher's name	

Colour your Choice for each section

	A	B	C	D
1	●	○	○	○
2	●	○	○	○
3	○	●	○	○
4	○	○	○	●
5	○	○	●	○

First add. $\begin{bmatrix} 17 \\ -6 \end{bmatrix}$ then find. $\sqrt{17^2+6^2}$

$\int_0^{\pi/3} -\cos x = -\sin x \Big]_0^{\frac{\pi}{3}} = -\frac{\sqrt{3}}{2} - 0.$

$2 - x \leq 0$

$2 \leq x$

$3^{3x-9} \times 3^{2x-10} \div 3^{2x+3}.$

$3^{3x-22} = 3^5.$

$3x = 27.$

$x = 9.$

7a) i) $\frac{d}{dx}\sec x = \frac{d}{dx}\frac{1}{\cos x}$.

put $u = 1$ $v = \cos x$.

$\frac{vu' - uv'}{v^2} = \frac{\cos x \times 0 - -\sin x}{\cos^2 x}$.

$= \frac{\sin x}{\cos x . \cos x}$.

$= \tan x \sec x$.

OR. $\frac{d}{dx}\sec x = \frac{d}{dx}(\cos x)^{-1} = -1(\cos x)^{-2} \times -\sin x$

$= \frac{\sin x}{\cos x \ \cos x} = \tan x \sec x$.

just 1.

ii) $\int_{\frac{\pi}{3}}^{\frac{\pi}{6}} \sec x \tan x \, dx = \left[\sec x\right]_{\frac{\pi}{3}}^{\frac{\pi}{6}}$.

$= \left.\frac{1}{\cos x}\right]_{\frac{\pi}{3}}^{\frac{\pi}{6}}$ $\quad \frac{1}{\frac{\sqrt{3}}{2}} - \frac{1}{\frac{1}{2}}$.

$= \frac{2}{\sqrt{3}} - \frac{2}{1}$. $= \frac{2 - 2\sqrt{3}}{\sqrt{3}}$.

OR $\frac{2\sqrt{3} - 6}{3}$

b) i) $\tan^2 x + 1 = \sec^2 x$

ii) $\int_0^{\frac{\pi}{4}} \tan^2 x = \int_0^{\frac{\pi}{4}} \sec^2 x - 1 . dx$

$= \left.\tan x - x\right]_0^{\frac{\pi}{4}}$.

$= 1 - \frac{\pi}{4}$.

7 c) i) $|\underset{\sim}{u}| = \sqrt{3^2+4^2} = 5$.

$|\underset{\sim}{v}| = \sqrt{(-8)^2+5^2} = \sqrt{89}$. ✓

ii) $\underset{\sim}{u} \cdot \underset{\sim}{v} = -24 + 20 = -4$. ✓

$\underset{\sim}{u} \cdot \underset{\sim}{v} = 5\sqrt{89}\cos\theta$.

$\cos\theta = \dfrac{-4}{5\sqrt{89}} =$

$\theta = 95^\circ$ nearest whole. ✓

---

7 d) $A = \int_0^1 1+2x-x^2-2^x \, dx$. ✓

$= \int_0^1 1+2x-x^2-e^{\ln 2 . x} \, dx$.

$= \left[x + x^2 - \dfrac{x^3}{3} - \dfrac{1}{\ln 2} \cdot 2^x\right]_0^1$ ✓

$= 1 + 1 - \dfrac{1}{3} - \dfrac{1}{\ln 2}(2-1)$

$= \dfrac{5}{3} - \dfrac{1}{\ln 2}$ ✓

/12.

a) i) $y = \log_e x$.

$y' = \frac{1}{x}$

$f'(e) = \frac{1}{e}$.

$y - y_1 = m(x - x_1)$.

$y - 1 = \frac{1}{e}(x - e)$.

$ey - e = x - e$.

$ey = x$.

$x = 0 \quad y = 0$ satisfies this eq^n

$0 = 0$.

a) ii) gradient of normal $= -e$.

$(-e \times \frac{1}{e}) = -1$.

eq^n normal.

$y - 1 = -e(x - e)$

if $y = 0$

$\frac{-1}{-e} = x - e$.

$e + \frac{1}{e} = x$

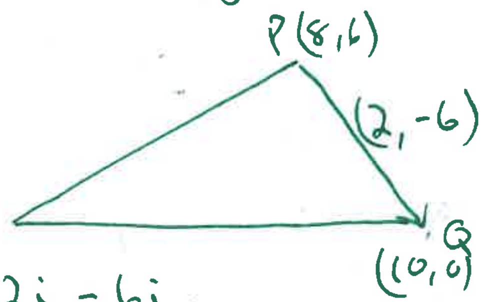
area Δ OPM $= \frac{1}{2} \times e + \frac{1}{e} \times 1$.

$= \frac{e}{2} + \frac{1}{2e}$.

8 P4.

b) i) $\overrightarrow{OR} = 18i + 6j$

ii) $\overrightarrow{PQ}$



$= 2i - 6j.$

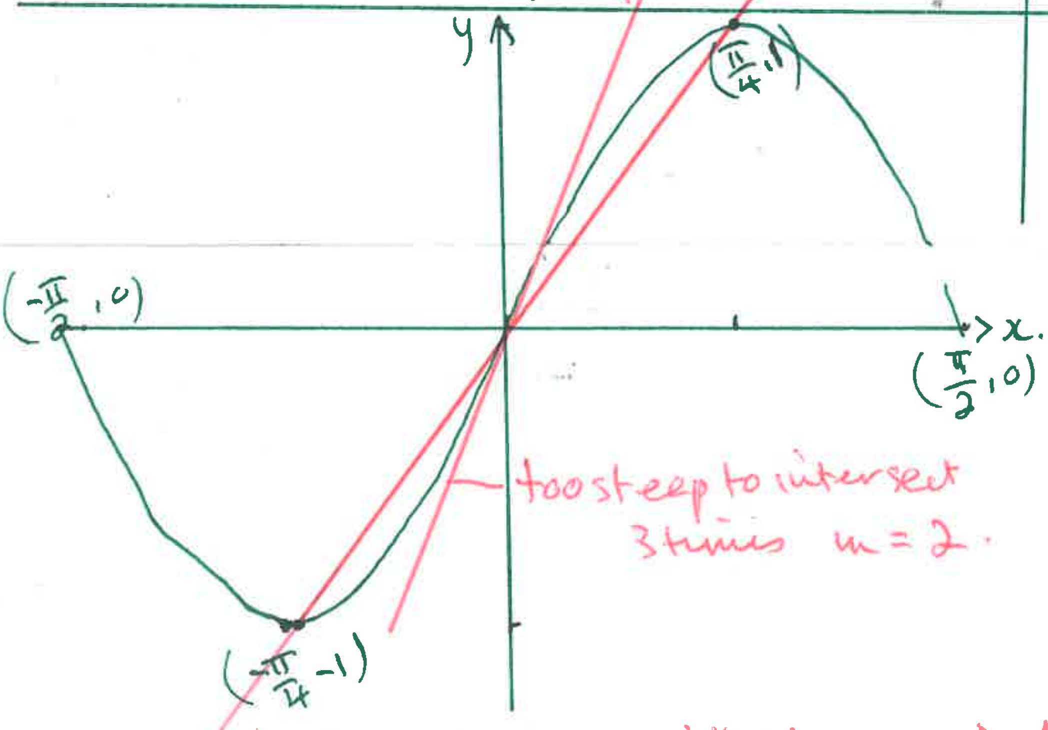
iii) $OR \cdot PQ = 18\times2 + 6\times(-6) = 0.$

because the diagonals of rhombus are perpendicular.

c) $proj_{\underset{\sim}{v}}\underset{\sim}{u} = \dfrac{\underset{\sim}{v}\cdot\underset{\sim}{u}}{\underset{\sim}{v}\cdot\underset{\sim}{v}} \times \underset{\sim}{v}$

$= \dfrac{-12}{25} \times (-3i + 4j)$

$= \dfrac{36i}{25} - \dfrac{48j}{25}.$



1 for shape. domain correct.

1 for intercepts and TPs.

shallowest m permitted $m \geq \frac{4}{\pi}$

1 for each. 2 for both

so $\frac{4}{\pi} \leq m < 2$