UNIVERSITI MALAYSIA TERENGGANU

FINAL EXAMINATION
PEPERIKSAAN AKHIR

SEMESTER I SESSION 2023/2024 (STEM FOUNDATION PROGRAMME)
SEMESTER I SESI 2023/2024 (ASASI STEM)

COURSE	:	**MATHEMATICS 1**
KURSUS		*MATEMATIK 1*
COURSE CODE	:	**AMM1114**
KOD KURSUS		
DURATION	:	**3 HOURS**
TEMPOH		*3 JAM*

MATRIC NO.	:	_____
NO. MATRIK		
PROGRAMME	:	_____
NAMA PROGRAM		
SEAT NO.	:	_____
NO. MEJA		

INSTRUCTIONS TO CANDIDATES
ARAHAN KEPADA CALON

i. Answer all questions.
   Sila jawab semua soalan.

ii. All answers must be written in answer booklet provided.
   Semua jawapan hendaklah ditulis dalam buku jawapan yang disediakan.

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

THIS QUESTION PAPER CONSISTS OF SEVENTEEN (17) PRINTED PAGES
KERTAS SOALAN INI MENGANDUNGI TUJUH BELAS (17) MUKA SURAT BERCETAK

PART A / *BAHAGIAN A* **(40 Marks/** *40 Markah*)

Please choose the most appropriate answer for each question in this part.
Sila pilih jawapan yang paling tepat bagi setiap soalan dalam bahagian ini.

1. Express $2\ln x - 3\ln y$ as single logarithm.
    Nyatakan $2\ln x - 3\ln y$ *dalam satu logaritma.*

    A. $\ln\left(x^2 - y^3\right)$
    B. $\ln x^2 - \ln y^3$
    C. $\dfrac{\ln x^2}{\ln y^3}$
    D. $\ln\dfrac{x^2}{y^3}$

2. Find the value of the determinant $\begin{vmatrix} 1 & 4 \\ 2 & 7 \end{vmatrix}$.

    Cari nilai penentu $\begin{vmatrix} 1 & 4 \\ 2 & 7 \end{vmatrix}$.

    A. -1
    B. 1
    C. 15
    D. 30

3. Find the **false** statement.
    Cari pernyataan yang ***salah****.*

    A. when $|\mathbf{A}| = 0$, $\mathbf{A}^{-1}$ does not exist

    apabila $|\mathbf{A}| = 0$, $\mathbf{A}^{-1}$ *tidak wujud*

    B. if $\mathbf{A}^{-1}$ exists, $\mathbf{A}$ is called a singular matrix
    jika $\mathbf{A}^{-1}$ *wujud,* $\mathbf{A}$ *dipanggil sebagai matrik tunggal*

    C. if $\mathbf{A}$ is a square matrix, then $\mathbf{A}^2 = \mathbf{AA}$, $\mathbf{A}^3 = \mathbf{AAA}$, and so on

    jika $\mathbf{A}$ *adalah matrik segi empat sama, maka* $\mathbf{A}^2 = \mathbf{AA}$, $\mathbf{A}^3 = \mathbf{AAA}$, *dan demikian seterusnya*

    D. multiplication of matrices is not commutative
    pendaraban matrik adalah tidak kalis tukar-tertib

4. Find the value of x and y.

   Cari nilai bagi x dan y.

   $$\begin{bmatrix} 6 & 2y \\ x & 4 \end{bmatrix} = \begin{bmatrix} -6y & -2 \\ 2 & 2x \end{bmatrix}.$$

   A. $x = 2, y = -1$
   B. $x = -1, y = 2$
   C. $x = 2, y = 1$
   D. $x = -1, y = -2$

5. The operation $-3R_1 + R_2 \to R_2$ is applied on a matrix $\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ 3 & -1 & 4 \\ 0 & 2 & 1 \end{bmatrix}$. Give the result

   for new matrix.

   Operasi $-3R_1 + R_2 \to R_2$ dikenakan terhadap matrik $\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ 3 & -1 & 4 \\ 0 & 2 & 1 \end{bmatrix}$. Berikan hasil

   matrik yang baru.

   A. $\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ -3 & -4 & -5 \\ 0 & 2 & 1 \end{bmatrix}$

   B. $\mathbf{A} = \begin{bmatrix} 3 & -1 & 4 \\ 1 & 2 & 2 \\ 0 & 2 & 1 \end{bmatrix}$

   C. $\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ -8 & 5 & -10 \\ 0 & 2 & 1 \end{bmatrix}$

   D. $\mathbf{A} = \begin{bmatrix} 1 & 2 & 2 \\ 0 & -7 & -2 \\ 0 & 2 & 1 \end{bmatrix}$

6. Find the **correct** statement "if a vector is multiplied by a real positive number".
*Cari penyataan yang **benar** "sekiranya suatu vektor didarab dengan satu nombor nyata positif".*

   A. Only magnitude of the vector changes
      Hanya magnitud vektor yang berubah
   B. Only direction of the vector changes
      Hanya arah vektor yang berubah
   C. Both magnitude and direction of the vector changes
      Kedua-dua magnitud dan arah vektor berubah
   D. Both magnitude and direction of the vector remain the same
      Kedua-dua magnitud dan arah vektor kekal

7. Find the magnitude of the vector $5\mathbf{i} - 2\mathbf{j} + \mathbf{k}$.
Cari magnitud bagi vektor $5\mathbf{i} - 2\mathbf{j} + \mathbf{k}$.

   A. 2
   B. 4
   C. $\sqrt{30}$
   D. $\dfrac{5\mathbf{i} - 2\mathbf{j} + \mathbf{k}}{\sqrt{30}}$

8. Give the dot product of $\mathbf{u} = \begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 4 \\ 0 \\ 3 \end{pmatrix}$.

   Berikan hasil darab bintik $\mathbf{u} = \begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}$ dan $\mathbf{v} = \begin{pmatrix} 4 \\ 0 \\ 3 \end{pmatrix}$.

   A. 7
   B. 5
   C. $\begin{pmatrix} -4 \\ 0 \\ 9 \end{pmatrix}$
   D. $\begin{pmatrix} -3 \\ 2 \\ 6 \end{pmatrix}$

9. Given that vector $\mathbf{a} = -3\mathbf{i} + 6\mathbf{j} - 5\mathbf{k}$ and $\mathbf{b} = -2\mathbf{i} + 3\mathbf{j} + \mathbf{k}$. Express $\mathbf{a} - \mathbf{b}$.

   Diberi vektor $\mathbf{a} = -3\mathbf{i} + 6\mathbf{j} - 5\mathbf{k}$ *dan* $\mathbf{b} = -2\mathbf{i} + 3\mathbf{j} + \mathbf{k}$. *Ungkapkan* $\mathbf{a} - \mathbf{b}$.

   A. $\mathbf{-i + 3j - 6k}$
   B. $\mathbf{-i} + 9\mathbf{j} - 4\mathbf{k}$
   C. $\mathbf{-5i + 3j - 6k}$
   D. $\mathbf{-5i} + 9\mathbf{j} - 4\mathbf{k}$

10. Find the **true** statement.
    *Cari pernyataan yang **benar**.*

    A. The magnitude of a vector can be equal to zero even though one of its components is non-zero
       Magnitud vektor boleh bersamaan dengan kosong walaupun salah satu komponennya adalah bukan kosong
    B. A vector that has a magnitude of 1 is a unit vector
       Suatu vektor dengan magnitud 1 adalah unit vector
    C. Scalar quantities and vector quantities can both be added algebraically
       Kuantiti skalar dan kuantiti vektor boleh ditambah secara beralgebra
    D. A scalar quantity contains magnitude and direction while a vector does not
       Suatu kuantiti skalar mengandungi magnitud dan arah manakala sebaliknya bagi kuantiti vektor

11. The curve with equation $y = f(x)$ is translated so that the point at $(-3,0)$ is mapped onto the point $(-3,-2)$ as shown in Figure 1. Find the equation of the translated curve.

Lengkung dengan persamaan $y = f(x)$ ditranslasi supaya titik $(-3,0)$ dipetakan ke titik $(-3,-2)$ seperti yang tertera dalam Rajah 1. Cari persamaan lengkung translasi.
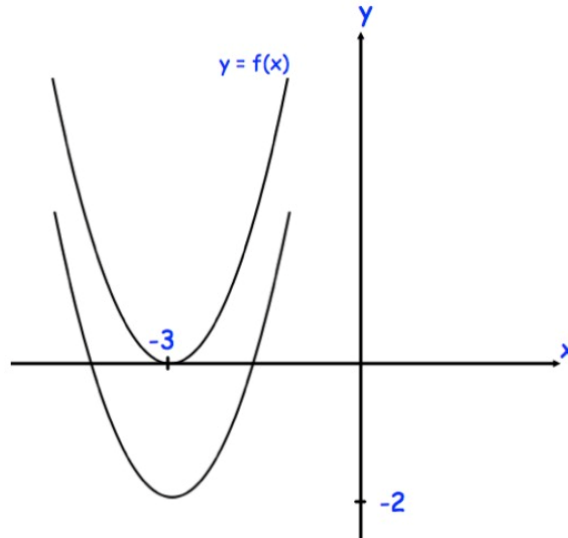

Figure 1
Rajah 1

A. $y = f(x)$

B. $y = f(x) - 2$

C. $y = f(x - 2)$

D. $y = f(x + 3) - 2$

12. Find the **wrong** exponential function.
*Cari fungsi eksponen yang **salah.***

A. 20^x

B. x^{20}

C. $5e^{2x}$

D. 4^{-x}

13. Find the domain of $f(x) = \dfrac{2}{1+x}$.

Cari domain bagi $f(x) = \dfrac{2}{1+x}$.

A. 2

B. $f(x) = 2 + \dfrac{2}{x}$

C. $x \in \mathbb{R}, x \neq -1$

D. $(-\infty, +\infty)$

14. Give the amplitude of the graph $f(x)$ when $f(x) = \sin\theta - \sqrt{2}\cos\theta = \sqrt{3}\sin(\theta - 54.7°)$.

   Berikan amplitud bagi graf $f(x)$ apabila $f(x) = \sin\theta - \sqrt{2}\cos\theta = \sqrt{3}\sin(\theta - 54.7°)$.

   A. $\sqrt{2}$
   B. $\sqrt{3}$
   C. $54.7°$
   D. $\theta - 54.7°$

15. Find the equality of $(\sin A - \cos A)^2$.

   Cari kesamaan bagi $(\sin A - \cos A)^2$.

   A. 1
   B. $\sin^2 A - \cos^2 A$
   C. $1 + 2\sin A\cos A$
   D. $1 - 2\sin A\cos A$

16. Find the result of $(\sec\alpha - \tan\alpha)(\sec\alpha + \tan\alpha)$.

   Cari hasil bagi $(\sec\alpha - \tan\alpha)(\sec\alpha + \tan\alpha)$.

   A. 0
   B. 1
   C. 2
   D. 3

17. Find the result of $\sin(90° - \theta)$.

   Cari hasil bagi $\sin(90° - \theta)$.

   A. $\sin\theta$
   B. $\cos\theta$
   C. $1 - \sin\theta$
   D. $\sin(\theta - 90°)$

18. Find the value of $\sqrt{2}\tan\theta + 1$ if $r\sin\theta = 1$ and $r\cos\theta = \sqrt{2}$.
   Cari nilai bagi $\sqrt{2}\tan\theta + 1$ jika $r\sin\theta = 1$ dan r kos $\theta = \sqrt{2}$.

   A. 2
   B. 3
   C. $\sqrt{2}$
   D. $\dfrac{1}{\sqrt{2}}$

19. Find the derivative of $x^{\frac{1}{5}}$.

Cari terbitan bagi $x^{\frac{1}{5}}$.

A. $\frac{1}{5}x^{-\frac{4}{5}}$

B. $-\frac{1}{5}x^{\frac{4}{5}}$

C. $\frac{1}{5}x^{\frac{6}{5}}$

D. $5x^{\frac{4}{5}}$

20. Find the derivative of the $\dfrac{6x^2 + 4x - 3}{2x}$.

Cari terbitan bagi $\dfrac{6x^2 + 4x - 3}{2x}$.

A. $18x^2 + 8x - 3$

B. $3x + 2 - \dfrac{3}{2x}$

C. $3 + \dfrac{3}{2}x^{-2}$

D. $3 + \dfrac{3}{2}x^2$

21. Find $\dfrac{d}{dx}\left(\dfrac{x^2 - 4x + 2}{x^3}\right)$.

Cari $\dfrac{d}{dx}\left(\dfrac{x^2 - 4x + 2}{x^3}\right)$.

A. $-\dfrac{1}{x} + \dfrac{8}{x^2} - \dfrac{6}{x^3}$

B. $-\dfrac{1}{x^2} + \dfrac{8}{x^3} - \dfrac{6}{x^4}$

C. $\dfrac{1}{x} - \dfrac{4}{x^2} + \dfrac{2}{x^3}$

D. $\dfrac{1}{x^2} - \dfrac{8}{x^3} + \dfrac{6}{x^4}$

22. Express the differentiation of $\cos^4 2x$ with respect to x.

    Ungkapkan pembezaan bagi $kos^4 2x$ terhadap x.

    A. $\cos^3 8x \sin 2x$
    B. $4\cos^3 2x$
    C. $8\cos^3 2x \sin 2x$
    D. $-8\cos^3 2x \sin 2x$

23. Find $\dfrac{d}{dx}\left(\tan^6 x\right)$ with respect to x.

    Bezakan $\dfrac{d}{dx}\left(\tan^6 x\right)$ terhadap x.

    A. $6\tan^5 x \sec^2 x$
    B. $\tan^5 6x \sec^2 x$
    C. $6\sec^2 x$
    D. $6\tan^5 \sec^2 x$

24. Express the differentiation of $\ln\left(2 + x^2\right)$ with respect to x.

    Ungkapkan pembezaan bagi $\ln\left(2 + x^2\right)$ terhadap x.

    A. $\dfrac{1}{2 + x^2}$
    B. $\dfrac{2x}{2 + x^2}$
    C. $\dfrac{1}{2x}$
    D. $\dfrac{1}{2x + x^2}$

25. Find the derivative of $x^2 + y^2 = 4$.

    Cari terbitan bagi $x^2 + y^2 = 4$.

    A. $\dfrac{dy}{dx} = -\dfrac{x}{y}$
    B. $\dfrac{dy}{dx} = \dfrac{x}{y}$
    C. $\dfrac{dy}{dx} = 2x + 2y$
    D. $\dfrac{dy}{dx} = -\dfrac{2x}{y}$

26. Find the derivative of $x^3 - xy + y^2 = 3$.

    Cari terbitan bagi $x^3 - xy + y^2 = 3$.

    A. $\dfrac{dy}{dx} = 3x^2 - y$

    B. $\dfrac{dy}{dx} = \dfrac{y - 3x^2}{2y^2 - 1}$

    C. $\dfrac{dy}{dx} = \dfrac{y - 3x^2}{2y - x}$

    D. $\dfrac{dy}{dx} = \dfrac{3 + y - 3x}{x + 2y}$

27. Express the differentiation of e^{-2x+1} with respect to x.

    Ungkapkan pembezaan bagi e^{-2x+1} terhadap x.

    A. $-2xe^{-2x+1}$

    B. $2e^{-2x+1}$

    C. $-\dfrac{1}{2}e^{-2x+1}$

    D. $-2e^{-2x+1}$

28. Find $\dfrac{d}{dx}\left(6\tan\dfrac{1}{3}x\right)$.

    Cari $\dfrac{d}{dx}\left(6\tan\dfrac{1}{3}x\right)$.

    A. $2\sec\dfrac{1}{3}x$

    B. $2\sec^2\dfrac{1}{3}x$

    C. $\dfrac{1}{3}\sec^2\dfrac{1}{2x}$

    D. $6\sec^2\dfrac{1}{3}x$

29. Find the derivative of $\left(5x - \dfrac{x^{-\frac{1}{2}}}{2}\right)$.

Cari terbitan bagi $\left(5x - \dfrac{x^{-\frac{1}{2}}}{2}\right)$.

A. $5 - \dfrac{1}{4x^{\frac{3}{2}}}$

B. $5 - \dfrac{1}{4x^{-\frac{3}{2}}}$

C. $5 + \dfrac{1}{4x^{-\frac{3}{2}}}$

D. $5 + \dfrac{1}{4x^{\frac{3}{2}}}$

30. Find $\dfrac{d}{dx}\left(2\sqrt{x} + 5\right)$.

Cari $\dfrac{d}{dx}\left(2\sqrt{x} + 5\right)$.

A. $x^{-\frac{1}{2}}$

B. $x^{\frac{1}{2}}$

C. $2\sqrt{x}$

D. $\dfrac{4}{3}x^{\frac{3}{2}} + 5x$

31. Find $\displaystyle\int \dfrac{1}{\left(2x^2\right)^2}\,dx$.

Cari $\displaystyle\int \dfrac{1}{\left(2x^2\right)^2}\,dx$.

A. $-\dfrac{1}{12x^3} + c$

B. $\dfrac{1}{12x^3} + c$

C. $-\dfrac{4}{3x^3} + c$

D. $-\dfrac{4x^3}{3} + c$

32. Find the integration of $\left(\dfrac{2}{\sqrt{x}}\right)dx$.

   Cari kamiran bagi $\left(\dfrac{2}{\sqrt{x}}\right)dx$.

   A. $4x^{-\frac{1}{2}}+c$

   B. $4x^{\frac{1}{2}}+c$

   C. $2x^{-\frac{3}{2}}+c$

   D. $2x^{\frac{1}{2}}+c$

33. Express $\int\left(\sqrt{x}+1\right)(x-2)dx$.

   Ungkapkan $\int\left(\sqrt{x}+1\right)(x-2)dx$.

   A. $\dfrac{3}{2}x^{\frac{1}{2}}-x^{-\frac{1}{2}}+1+c$

   B. $\dfrac{2}{5}x^{\frac{5}{2}}-\dfrac{4}{3}x^{\frac{3}{2}}+\dfrac{1}{2}x^2-2x+c$

   C. $\dfrac{2}{3}x^{\frac{3}{2}}+x+\dfrac{1}{2}x^2-2x+c$

   D. $-\dfrac{2}{5}x^{\frac{5}{2}}+\dfrac{4}{3}x^{\frac{3}{2}}-\dfrac{1}{2}x^2+2x+c$

34. Find $\int e^{2x+1}dx$.

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

   A. $e^{2x+1}+c$

   B. $2e^{2x+1}+c$

   C. $\dfrac{e^{2x+1}}{2}+c$

   D. $\dfrac{2}{e^{2x+1}}+c$

35. Find the integration of $\left(\dfrac{2x^3 - 4}{x^2} \right) dx$.

   Cari kamiran bagi $\left(\dfrac{2x^3 - 4}{x^2} \right) dx$.

   A. $2 + 8x^{-3} + c$
   B. $x^2 + 4x^{-1} + c$
   C. $2x - 4x^{-2} + c$
   D. $2x^2 - 4x^{-1} + c$

36. Express the integration of $\left(3x^2 + \cos x \right) dx$.

   Ungkapkan kamiran bagi $\left(3x^2 + \cos x \right) dx$.

   A. $3x^3 + \sin x + c$
   B. $x^3 - \sin x + c$
   C. $x^3 + \sin x + c$
   D. $3x - \sin x + c$

37. Find the integration of $\left(5x + 2 \right)^{\frac{1}{3}} dx$.

   Cari kamiran bagi $\left(5x + 2 \right)^{\frac{1}{3}} dx$.

   A. $\dfrac{3}{20} \left(5x + 2 \right)^{\frac{4}{3}} + c$
   B. $\dfrac{1}{3} \left(5x + 2 \right)^{\frac{4}{3}} + c$
   C. $\dfrac{3}{4} \left(5x + 2 \right)^{\frac{4}{3}} + c$
   D. $\dfrac{5}{3} \left(5x + 2 \right)^{\frac{4}{3}} + c$

38. Find the value of $\int_{-3}^{-2} \dfrac{1}{(3x+5)^3} dx$.

   Cari nilai bagi $\int_{-3}^{-2} \dfrac{1}{(3x+5)^3} dx$.

   A. $\dfrac{17}{96}$

   B. $-\dfrac{5}{32}$

   C. $\dfrac{5}{32}$

   D. $-\dfrac{17}{96}$

39. Find the value of $\int_{0}^{\frac{\pi}{2}} (1+\sin x) dx$.

   Cari nilai bagi $\int_{0}^{\frac{\pi}{2}} (1+\sin x) dx$.

   A. $\dfrac{\pi}{2} - 1$

   B. $-\dfrac{\pi}{2} + 1$

   C. $\dfrac{\pi}{2} + 1$

   D. $-\dfrac{\pi}{2} - 1$

40. Find the value of $\int_{0}^{\frac{\pi}{4}} (\cos x + 2\sin 2x) dx$.

   Cari nilai bagi $\int_{0}^{\frac{\pi}{4}} (\cos x + 2\sin 2x) dx$.

   A. $\dfrac{1}{\sqrt{2}} + 1$

   B. $\sqrt{2} + 1$

   C. $-\dfrac{1}{\sqrt{2}} - 1$

   D. $-\sqrt{2} + 1$

PART B/*BAHAGIAN B* **(60 Marks/ 60 Markah)**

Please answer all question.
Sila jawab semua soalan.

1. Compute the argument of $\dfrac{-12-7i}{2+i}$. (4 marks)

   Kira hujah bagi $\dfrac{-12-7i}{2+i}$. *(4 markah)*

2. It is given that $p = 2^x$ and $q = 2^y$. Present $\dfrac{8^{x+y}}{4^x}$ in terms of p and q. (4 marks)

   Diberi bahawa $p = 2^x$ *dan* $q = 2^y$. *Persembahkan* $\dfrac{8^{x+y}}{4^x}$ *dalam sebutan* p *dan* q.
   (4 markah)

3. With respect to the origin O, the points A and B have position vectors given by $\overrightarrow{OA} = 2\mathbf{i} - \mathbf{j}$ and $\overrightarrow{OB} = \mathbf{i} - 2\mathbf{z}$. Compute angle of AOB in degrees by using a scalar product. (3 marks)

   Merujuk titik asalan O, titik A dan B mempunyai vektor kedudukan yang diberikan oleh $\overrightarrow{OA} = 2\mathbf{i} - \mathbf{j}$ *dan* $\overrightarrow{OB} = \mathbf{i} - 2\mathbf{z}$. *Kira sudut bagi AOB dalam unit darjah dengan menggunakan hasil darab skalar. (3 marks)*

4. Functions f and g are defined by
   Fungsi f dan g tertakrif sebagai

   $$f(x) = 2x + 1, \quad x \in \mathbb{R}, x > 0,$$

   $$g(x) = \frac{2x - 1}{x + 3}, \quad x \in \mathbb{R}, x \neq -3.$$

   a. Solve the equation $gf(x) = x$. (3 marks)

      Selesaikan persamaan $gf(x) = x$. *(3 markah)*

   b. Present $g^{-1}(x)$ in terms of x. (2 marks)

      Persembahkan $g^{-1}(x)$ *dalam sebutan* x. *(2 markah)*

5. Solve the following by using Cramer's rule. (8 marks)

    Selesaikan yang berikut menggunakan petua Cramer. (8 markah)

    $$4x + 8y + z = 2$$
    $$x + 7y - 3z = -14$$
    $$2x - 3y + 2z = 3$$

6. Show that $\sin 3x = 3\sin x - 4\sin^3 x$, by first expanding $\sin(2x + x)$. (4 marks)

    Tunjukkan bahawa $\sin 3x = 3\sin x - 4\sin^3 x$, dengan mengembangkan $\sin(2x + x)$ terlebih dahulu. (4 markah)

7. Solve the equation $2\tan^2 \theta + 3\tan \theta - 1 = 0$ for $0° \leq \theta \leq 360°$. (4 marks)
    Selesaikan persamaan $2\tan^2 \theta + 3\tan \theta - 1 = 0$ bagi $0° \leq \theta \leq 360°$. (4 markah)

8. Given the parametric equations $x = 2t + 1$ and $y = 3t - t^3$. Present $\dfrac{dy}{dx}$ in terms of t. (3 marks).

    Diberikan persamaan parametrik $x = 2t + 1$ dan $y = 3t - t^3$. Persembahkan $\dfrac{dy}{dx}$ dalam sebutan t. (3 markah)

9. Given that $xy = \sin x$. Show that $\dfrac{d^2y}{dx^2} + \dfrac{2}{x}\dfrac{dy}{dx} + y = 0$. (6 marks)

    Diberikan bahawa $xy = \sin x$. Tunjukkan $\dfrac{d^2y}{dx^2} + \dfrac{2}{x}\dfrac{dy}{dx} + y = 0$. (6 markah)

10. The curve $y = f(x)$ has a stationary point at $(2,10)$ and it is given that $f''(x) = \dfrac{12}{x^3}$.

    Lengkung $y = f(x)$ mempunyai titik pegun pada $(2,10)$ dan diberikan bahawa $f''(x) = \dfrac{12}{x^3}$.

    a. Compute $f(x)$. (6 marks)

        Kira $f(x)$. (6 markah)

    b. Compute the coordinates of the other stationary point. (2 marks)
        Kira koordinat bagi titik pegun yang lain. (2 markah)

    c. Classify the nature of each of the stationary points. (2 marks)
        Kelaskan sifat bagi setiap titik pegun tersebut. (2 markah)

11. By using substitution $u = 3x^2 - 2$, solve $\int \dfrac{5x}{\left(3x^2 - 2\right)^2} dx$. (4 marks)

Dengan menggunakan penggantian $u = 3x^2 - 2$, selesaikan $\int \dfrac{5x}{\left(3x^2 - 2\right)^2} dx$.

(4 markah)
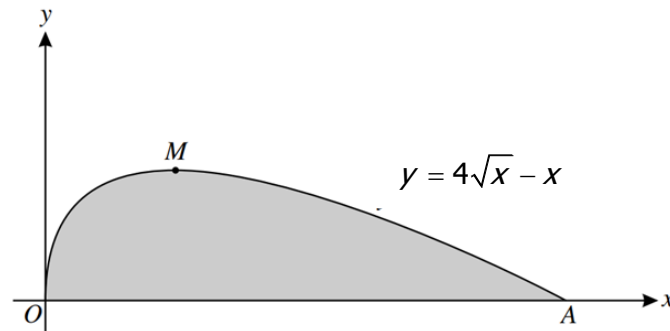
12.

$y = 4\sqrt{x} - x$

Figure 2
Rajah 2

Figure 2 shows part of the curve $y = 4\sqrt{x} - x$. The curve has a maximum point at $M(4,4)$ and meets the x -axis at O and $A(16,0)$. Compute the volume obtained when the shaded region is rotated through $360°$ about the x -axis. Give your answer in terms of π . (5 marks)

Rajah 2 menunjukkan sebahagian daripada lengkung $y = 4\sqrt{x} - x$. Lengkung tersebut mempunyai titik maksimum pada $M(4,4)$ dan menemui paksi-x pada O dan $A(16,0)$. Kira isipadu yang diperoleh apabila kawasan berlorek diputarkan kira-kira $360°$ melalui paksi-x . Berikan jawapan anda dalam sebutan π . (5 markah)

End of Question Paper
Kertas Soalan Tamat