BAM - MARKING GUIDE FEB 2026.

1 (a) 534 (b) 0.1162

(c) 0.157 (d) -718411.08

2.

Solution (a).

let

$$f(x) = ax^2 + bx + c.$$

$$f(2) = a(2)^2 + b(2) + c.$$

$$f(2) = 4a + 2b + c$$

$$4a + 2b + c = 10 \quad \text{———— (i)}.$$

$$f(-1) = a(-1)^2 + b(-1) + c$$

$$f(-1) = a - b + c$$

$$a - b + c = -5 \quad \text{———— (ii)}$$

$$f(2.5) = a(2.5)^2 + b(2.5) + c$$

$$f(2.5) = 6.25a + 2.5b + c.$$

$$6.25a + 2.5b + c = 16 \quad \text{———— (iii)}$$

Solve simultaneous the three equation.

$$\begin{cases} 4a + 2b + c = 10 & \text{———— (i)} \\ a - b + c = -5 & \text{———— (ii)} \\ 6.25a + 2.5b + c = 16 & \text{———— (iii)} \end{cases}$$

(01)

The value of $a = 2$, $b = 3$ and $c = -4$

Recall from

$$f(x) = ax^2 + bx + c.$$

$$f(x) = 2x^2 + 3\cancel{x} + (-4)$$

$\therefore$ The quadratic expression is $f(x) = 2x^2 + 3x - 4$

Solution (b)

Given that;

$$2f(x) = 6 + \frac{2}{x+2}$$

For vertical asymptote.

$$x + 2 = 0.$$

$$x = -2.$$

For horizontal asymptote.

let $f(x) = y$

$$2y = 6 + \frac{2/x}{x/x + 2/x}$$

$$2y = 6 + \frac{2(1/x)}{1 + 2(1/x)} \qquad 1/x \Rightarrow 0$$

$$2y = 6 + \frac{2(0)}{1+0}$$

$$2y = 6$$

$$y = 6/2$$

$$y = 3.$$

Horizontal asymptote

(iii) but

x intercept

$$2y = 6 + \frac{2}{x+2}.$$

$$0 \times 2 = 6 + \frac{2}{x+2}$$

$$0 = \left(6 + \frac{2}{x+2}.\right) x+2$$

$$0 = 6(x+2)+2$$

$$0 = 6x+12+2.$$

$$6x+14=0.$$

$$\frac{6x}{6} = \frac{-14}{6}$$

$$x = -14/6 \Rightarrow -7/3$$

y intercept; $x=0$.

$$2y = 6 + \frac{2}{x+2}.$$

$$2y = 6 + \frac{2}{0+2}.$$

$$2y = 6+4$$

$$2y = 10$$

$$y = 5.$$

(ii) Another form

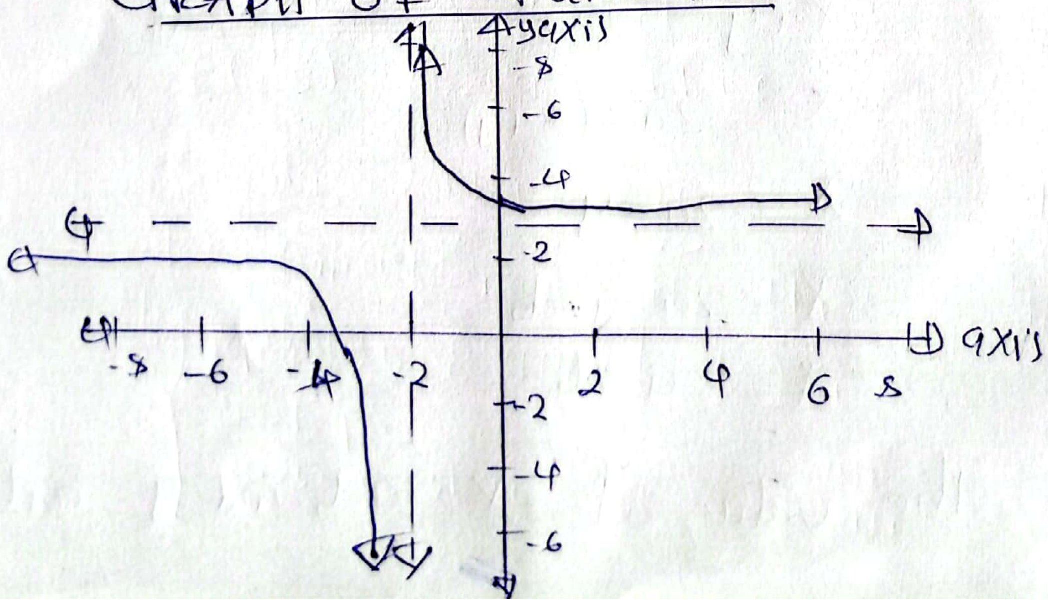
$$2f(x) = 6 + \frac{2}{x+2}.$$

$$f(x) = \frac{1}{2}\left(6 + \frac{2}{x+2}\right)$$

$$f(x) = \frac{3(x+2)+1}{x+2}.$$

$$\therefore f(x) = \frac{3x+7}{x+2}.$$

GRAPH OF FUNCTION



3

Solution (a)

$$\begin{cases} x+y = 2a \quad \text{———} (i) \\ ax+by = a^2+b^2 \quad \text{———} (ii) \end{cases}$$

Solve by elimmination method.

$$\begin{matrix} a \\ 1 \end{matrix} \begin{cases} x+y = 2a \quad \text{———} (i) \\ ax+by = a^2+b^2 \quad \text{———} (ii) \end{cases}$$

$$- \begin{cases} ax+ay = 2a^2 \quad \text{———} (i) \\ ax+by = a^2+b^2 \quad \text{———} (ii) \end{cases}$$

$$ay-by = 2a^2-(a^2+b^2)$$

$$y(a-b) = a^2-b^2$$

$$y = \frac{a^2-b^2}{a-b}$$

$$y = \frac{(a+b)(a-b)}{a-b}$$

$$y = a+b$$

but

$$x+y = 2a \quad \text{———} (i)$$

$$x = 2a-(\cancel{x}+y)$$

$$x = 2a-y$$

$$x = 2a-a-b$$

$$x = a-b$$

$\therefore$ The value of $x = a-b$ and $y = a+b$.

(04)

Soln (b)

Given that

$$3x^2+4x-5=0.$$

let α and β be the roots of equation.

$$\alpha+\beta = \frac{-b}{a}$$

$$\alpha+\beta = \frac{-4}{3}.$$

Sum of root $(\alpha+\beta) = \frac{-4}{3}$ ——— (I)

Product of root $(\alpha\beta) = \frac{c}{a}$

$$= \frac{-5}{3}$$

$$\alpha\beta = \frac{-5}{3}. \text{ ——— (II)}$$

From (i)

$$\frac{1}{\alpha}+\frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta}$$

$$= (\alpha+\beta)\div\alpha\beta$$

$$= -\frac{4}{3} \div \frac{-5}{3}$$

$$= \frac{-4}{3} \times \frac{-3}{5}$$

$$\frac{1}{\alpha}+\frac{1}{\beta} = 4/5$$

Soln (ii)

From (ii)

$$\alpha^2+\beta^2 = (\alpha+\beta)^2-2\alpha\beta.$$

$$= \left(\frac{-4}{3}\right)^2-2\left(\frac{-5}{3}\right) \Rightarrow \frac{46}{9}.$$

(05)

$\therefore \alpha^2+\beta^2 = \frac{46}{9}.$

Solution (c)

From

$$81+27+9 - - - + \frac{1}{27}$$

r = common ratio.

$$r = \frac{G_2}{G_1} = \frac{G_3}{G_2}.$$

$$r = \frac{27}{81} = \frac{9}{27}$$

$$r = \frac{1}{3}.$$

Now.

$$G_1 = 81$$

$$G_n = \frac{1}{27}.$$

from

$$S_n = \frac{G_1(1-r^n)}{1-r}.$$

$$S_n = \frac{G_1(1-r^n)}{1-r} \text{ ——— } (1)$$

<u>but</u>

$$G_n = G_1 r^{n-1}$$

$$\left(\frac{1}{27}\right) = 81\left(\frac{1}{3}\right)^{n-1}$$

$$\frac{(27)^{-1}}{81} = 3^{-1(n-1)}$$

$$3^{-3} \times 3^{-4} = 3^{-n+1}$$

$$3^{-7} = 3^{-n+1}$$

$-7 = -n+1$

$n = 7+1$

$n = 8.$

Now

$S_n = \frac{G_1(1-r^n)}{1-r}$

$S_8 = \frac{81(1-(\frac{1}{3})^8)}{1-\frac{1}{3}}$

$S_8 = \frac{3270}{27}.$

$S_8 = \frac{3280}{27} \Rightarrow 121.48.$

Sum of terms are $\frac{3280}{27}$.

4

Solution (a)

Given

$x = a\sin 2t$ —— (i)

$y = b\cos 2t$ —— (ii)

$\frac{dx}{dt} = 2a\cos 2t$ —— (iii)

$\frac{dy}{dt} = -2b\sin 2t$ —— (iv)

but

$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{1}{\left(\frac{dx}{dt}\right)}$

$= -2b\sin 2t \times \frac{1}{2a\cos 2t}$

(07)

$$\frac{dy}{dx} = \frac{-b}{a}\left(\frac{\sin 2t}{\cos 2t}\right)$$

$$\frac{dy}{dx} = -\frac{b}{a}\tan 2t \quad \text{at } t = \frac{3\pi}{8}$$

$$\frac{dy}{dx} = \frac{-b}{a}\tan 2\left(\frac{3\pi}{8}\right)$$

$$= \frac{-b}{a}\tan \frac{3\pi}{4}$$

$$= -\frac{b}{a}(-1)$$

$$\therefore \frac{dy}{dx} = \frac{b}{a}$$

$$\therefore \frac{dy}{dx} = \frac{b}{a}$$

<u>Solution (b)</u>

From (i); using implicit differentiation method

$$y^3 + x^4 + \cos y^4 = c$$

$$3y^2\frac{dy}{dx} + 4x^3 + 4y^3\frac{dy}{dx}\cdot 4 - \sin y^3 = 0$$

$$3y^2\frac{dy}{dx} + 4x^3 - 16y^3\sin y^3\frac{dy}{dx} = 0$$

$$\frac{dy}{dx}(3y^2 - 16y^3\sin y^3) = -4x^3$$

$$\therefore \frac{dy}{dx} = \frac{-4x^3}{3y^2 - 16y^3\sin y^3}$$

From (ii)

$y = e^{x^2}\sin x$ usin product rule

let

$u = e^{x^2}$

$\frac{dy}{dx} = 2x\,e^{x^2}$ ——— (i)

$v = \sin x$

$\frac{dv}{dx} = \cos x$ ——— (ii)

From

$\frac{dy}{dx} = uv' + vu'$

$= e^{x^2}(\cos x) + \sin x(2xe^{x^2})$.

$= \cos x\,e^{x^2} + 2x\sin x\,e^{x^2}$.

$= e^{x^2}(\cos x + 2x\sin x)$.

$\therefore \frac{dy}{dx} = e^{x^2}(\cos x + 2x\sin x)$.

Solution (c)

$y = 5x^6 - 12x^5$

$\frac{dy}{dx} = 30x^5 - 60x^4$.

at max or min $\frac{dy}{dx} = 0$.

$30x^5 - 60x^4 = 0$.

$x^4(30x - 60) = 0$.

$x^4(30x-60)=0$

$x^4=0$

$x=0$ or

$30x-60=0$

$30x=60$

$x=2$

then.

$$\frac{d^2y}{dx^2} = 30x^5-60x^4$$
$$= 150x^4-240x^3$$

at $x=0$

$\frac{d^2y}{dx^2} = 0$ inflexion point

but at $x=2$

$$\frac{d^2y}{dx^2} = 150(2)^4-240(2)^3$$
$$= 480 \text{ tve.}$$

$\frac{d^2y}{dx^2} > 0$; 480 minimum value

Now

$y = 5x^6-12x^5$ at $x=0$.

$y=0$

then at $x=2$

$y=-64$

Inflexion point $(0,0)$ and minimum point $(2,-64)$ (10)

5

Solution

From (i)

$$\int_1^2 nx(2+x^2)^3 dx = 1$$

$$n\int x(2+x^2)^3 dx = 1.$$

let $u = 2+x^2$

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

$$dx = \frac{du}{2x} \text{ ——— (1).}$$

now

$$n\int x \cdot u^3 \cdot \frac{du}{2x}.$$

$$\frac{n}{2}\int u^3 du.$$

$$\frac{n}{2}\left|\frac{u^4}{4}\right| = 1$$

$$\frac{n}{2}\left|\frac{(2+x^2)^4}{4}\right|_1^2 = 1$$

$$\frac{n}{8}\left|(2+x^2)^4\right|_1^2 = 1$$

$$\frac{n}{8}(1215) = 1.$$

$$n(1215) = 8$$

$$n = 8/1215.$$

$\therefore$ The value of $n = 8/1215$.

CamScanner

From (ii)

$$\int_{\pi/6}^{\pi/3} \cos^2 x \, dx.$$

From.

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\cos 2x = \cos^2 x - [1 - \cos^2 x]$$

$$\cos 2x = \cos^2 x - 1 + \cos^2 x$$

$$\cos 2x = 2\cos^2 x - 1$$

$$\cos^2 x = \frac{\cos 2x + 1}{2} \quad \text{———— (1)}$$

Now

$$= \int_{\pi/6}^{\pi/3} \left(\frac{\cos 2x + 1}{2}\right) dx$$

$$= \frac{1}{2}\int \cos 2x \, dx + \frac{1}{2}\int 1 \, dx$$

$$= \frac{1}{2}\left|\frac{1}{2}\sin 2x\right|_{\pi/6}^{\pi/3} + \frac{1}{2}\left|x\right|_{\pi/6}^{\pi/3}$$

$$= \frac{1}{2}\left(\left|\frac{1}{2}\sin 2x\right|_{\pi/6}^{\pi/3} + \left|x\right|_{\pi/6}^{\pi/3}\right)$$

$$= \frac{\pi}{12}$$

$\therefore$ The value of $\int_{\pi/6}^{\pi/3} \cos^2 x \, dx = \pi/12$.

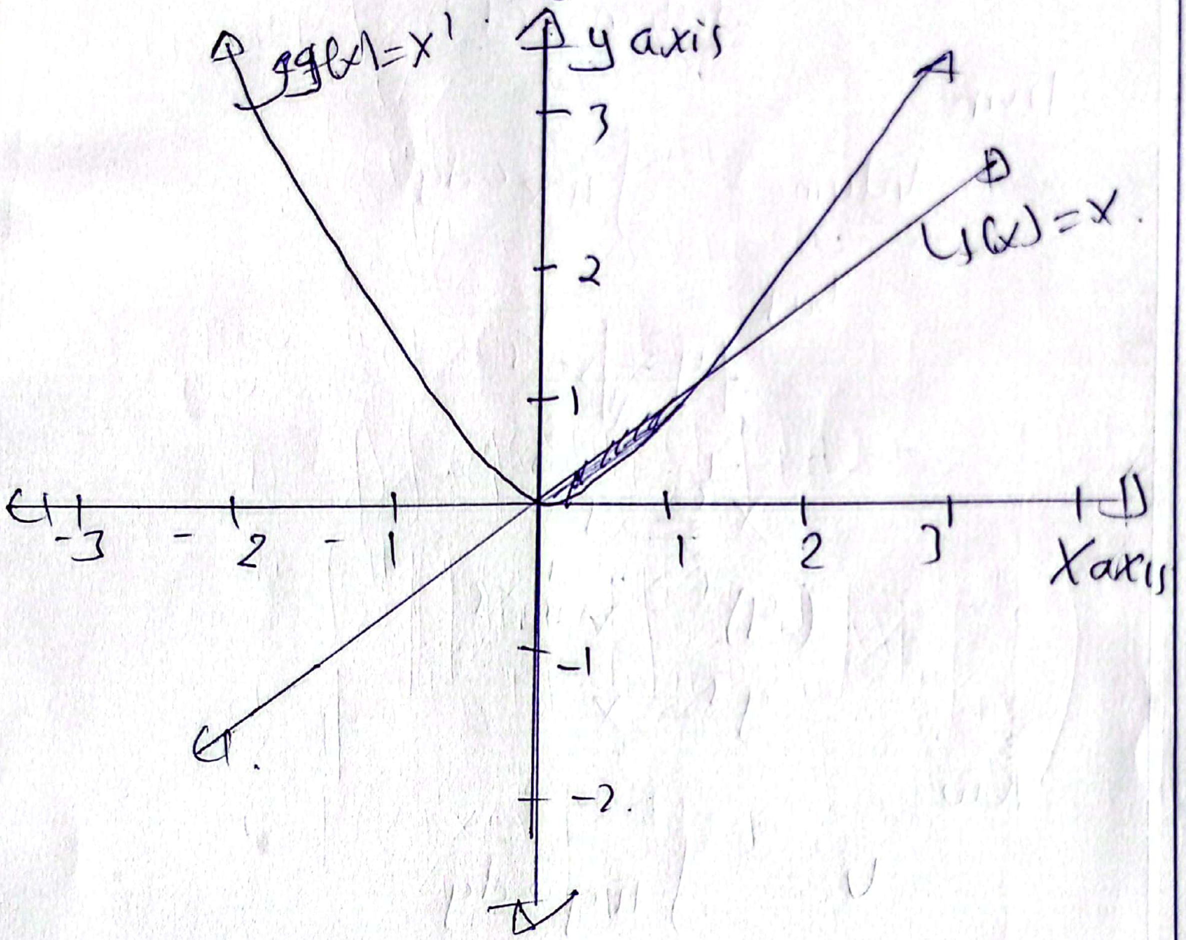
Solution (b)

Given

$y = x^2$ ——— (i)

$y = x$ ——— (ii).

Consider the graph



limits.

$y = x^2$

$y = x$

$x^2 - x = 0$

$x(x-1) = 0$

$x = 0$ or $x - 1 = 0$

$x = 0$ or $x = 1$

$$\text{Area} = \int_a^b (f(x) - g(x))\,dx$$

$$Area = \int_0^1 (x - x^2)\, dx$$

$$Area = \frac{1}{6} \text{ square units.}$$

Solution (c)

From

$$Volume = \int \pi x^2\, dy$$

but

$$\cancel{\sqrt[3]{y} = \sqrt[3]{x^{1/3}}}$$

$$x^{\frac{1}{3}} = y$$

$$(y)^3 = x^{\frac{1}{3} \times 3}$$

$$y^3 = x \quad \text{——— (i)}$$

now

$$v = \int_8^{27} \pi y^3\, dy$$

$$v = \pi \int_8^{27} y^3\, dy$$

$$v = \pi \int_8^{27} y^3\, dy \implies \frac{527345}{4}\pi$$

$$Volume = \frac{527345\pi}{4} \text{ cubic units.}$$

6

Solution (a)

Mean ($\bar{x}$) = 8

~~Standard deviation~~ Variance = 16.

From the information above
let
x and y be remaining values.

Now

$$\bar{x} = \frac{2+4+10+12+14+x+y}{7}.$$

$$8 = \frac{42+x+y}{7}$$

$$56 = 42+x+y$$

$$x+y = 14 \text{ ——— (i)}.$$

Now

$$\text{Var}(x) = \frac{\sum x^2}{N} - \left(\frac{\sum x}{N}\right)^2.$$

$$16 = \frac{2^2+4^2+10^2+12^2+14^2+x^2+y^2}{7} - (8)^2.$$

$$16+64 = \frac{460+x^2+y^2}{7}$$

$$80 \times 7 = 460+x^2+y^2.$$

$$x^2+y^2 = 560-460$$

$$x^2+y^2 = 100 \text{ ——— (ii)}$$

From eqn (i)

$$x+y = 14$$

$$x = 14-y$$

$$(14-y)^2+y^2 = 100$$

$$196-28y+2y^2 = 100$$

$$2y^2-28y+196-100$$

$$2y^2-28y+96 = 0$$

$$y^2-14y+48 = 0$$

Solve quadratically $y = 8$ or 6.

but $x+y=14$

For $y=8$

$x=14-8$

$x=6$

For $y=6$

$x+y=14$

$x=14-6$

$x=8$

$\therefore$ The remaining values are 6 and 8

Solution (b)

Age	f	x	d = x−A	u = d/c	fu	fu²
20-29	11	24.5	−20	−2	−22	44
30-39	36	34.5	−10	−1	−36	36
40-49	50	44.5	0	0	0	0
50-59	57	54.5	10	1	57	57
60-69	60	64.5	20	2	60	120
	214				59	257

From

$$\text{Mean} = A + \frac{c\sum fu}{N}$$

$$= 44.5 + 10\left(\frac{59}{214}\right)$$

$$\text{Mean} = 47.26$$

From

$$Sd = c\sqrt{\frac{\sum fu^2}{N} - \left(\frac{\sum fu}{N}\right)^2}$$

$$= 10\sqrt{\frac{257}{214} - \left(\frac{59}{214}\right)^2}$$

Standard deviation = 10.61

8

Solution

$$\pm\begin{cases} x = \cos a + \sin \varphi \\ y = \cos a - \sin \varphi \end{cases}$$

$$x + y = 2\cos\varphi$$

$$\cos a = \frac{x+y}{2} \quad \text{---} (i)$$

$$x - y = 2\sin\varphi$$

$$\sin a = \frac{x-y}{2} \quad \text{---} (ii)$$

Squares the two equation then add.

$$\sin^2 a + \cos^2 a = \left(\frac{x+y}{2}\right)^2 + \left(\frac{x-y}{2}\right)^2$$

$$1 = \frac{(x+y)^2}{4} + \frac{(x-y)^2}{4}$$

$$(x+y)^2 + (x-y)^2 = 4$$

or

$$x^2 + 2xy + y^2 + x^2 - 2xy + y^2 = 4$$

$$2(x^2+y^2) = 4$$

$$x^2 + y^2 = 2.$$

$$\therefore x^2 + y^2 = 2.$$

Solution (b)

From

$$\frac{\sin(A-B)}{\sin C}.$$

but

$$C = A+B$$

$$= \frac{\sin(A-B)}{\sin(A+B)}$$

$$= \frac{\sin A\cos B - \cos A\sin B}{\sin A\cos B + \cos A\sin B}$$

Divide by $\cos A\sin B$ throughout

$$= \frac{\frac{\sin A\cos B}{\cos A\sin B} - \frac{\cos A\sin B}{\cos A\sin B}}{\frac{\sin A\cos B}{\cos A\sin B} + \frac{\cos A\sin B}{\cos A\sin B}}.$$

$$= \frac{\tan A - 1}{\tan B + 1}$$

$$= \frac{\left(\frac{\tan A}{\tan B}\right) - 1}{\left(\frac{\tan A}{\tan B}\right)+1}$$ but $\tan A = p\tan B$

$$= \frac{\frac{p\tan B}{\tan B} - 1}{\frac{p\tan B}{\tan B} + 1}$$

$$\frac{\sin(A-B)}{\sin C} = \frac{p-1}{p+1}$$ in term of p.

Solution (c)

From

$$\frac{\sin x \cos x}{\sin x} = \frac{\sqrt{3}\sin^2 x}{\sin x}$$

$$\frac{\cos x}{\sin x} = \sqrt{3}$$

$$\cot x = \sqrt{3}$$

$$\frac{1}{\tan x} = \sqrt{3}$$

$$\tan x = \frac{1}{\sqrt{3}}$$

$$x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$$

$$x = 30^\circ$$

From

$$X = 180^\circ n + \alpha$$

$$= 180^\circ n + 30^\circ$$

when

$n = 0$ $x = 30^\circ$

$n = 1$ $x = 210^\circ$

$n = 2$ $x = 390^\circ$

$n = 3$ $x =$

The value of x which are in range of $0^\circ \leq x \leq 360^\circ$ are 30°, 210°.

09 From (i)

$$y = e^{\sin x}$$

let

$$u = \sin x$$

$$\frac{du}{dx} = \cos x \text{ ——— (i)}$$

$$y = e^{u}$$

$$\frac{dy}{du} = e^{u}$$

$$\frac{dy}{du} = e^{\sin x} \text{ ——— (ii)}$$

From chain rule

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$\frac{dy}{dx} = e^{\sin x} \cdot \cos x$$

$$\frac{dy}{dx} = \cos x\, e^{\sin x}$$

From (ii)

$$y = \ln\left(\frac{3x-2}{x+1}\right)$$

let

$$u = \frac{3x-1}{x+1}$$

$$\frac{du}{dx} = \frac{(x+1)3 - (3x+1)(1)}{(x-1)^2}$$

$$\frac{du}{dx} = \frac{3\cancel{x}+3 - 3\cancel{x}\cancel{+1}}{(x-1)^2} = \frac{2}{(x-1)^2}$$

$$\frac{dy}{dx} = \frac{\cancel{4}\,2}{(x+1)^2} \text{ ——— (1)}$$

~~t~~hen

$$y = \ln u$$

$$dy/du = \frac{1}{u} \text{ ——— (11)}$$

from chain rule

$$\frac{dy}{dx} = dy/du \times dy/dx$$

$$dy/dx = \frac{1}{u} \cdot \frac{4}{(x-1)^2}.$$

$$dy/dx = \frac{1}{\left(\frac{3x-2}{x+1}\right)} \times \frac{\cancel{4}\,2}{(x+1)^2}.$$

$$dy/dx = \left(\frac{x+1}{3x-2}\right) \times \frac{2}{(x+1)^2}.$$

$$\frac{dy}{dx} = \frac{2}{(3x-2)(x+1)}.$$

$$dy/dx = \frac{2}{(3x-2)(x+1)}$$

Solution (b)

Form (i)

$$\int \frac{1}{x\ln x}\,dx$$

let

$$\ln x = u$$
$$u = \ln x$$
$$\frac{du}{dx} = \frac{1}{x}$$
$$x\,du = dx \quad \text{——— (1)}$$

from

$$\int \frac{1}{xu}\cdot dx$$
$$\int \frac{1}{xu}\cdot x\,du$$
$$\int \frac{1}{u}\,du$$
$$\ln u + c$$
$$\ln(\ln x) + c$$

Form (ii)

$$\log x^2 = (\log x)^2$$
$$\frac{2\log x}{\log x} = \frac{(\log x)^2}{\log x}$$
$$2 = \log x$$
$$10^2 = x$$
$$x = 100$$

∴ The value of $x = 100$

Solution (c)

From

$$A_n = P\left(1+\frac{RT}{100}\right)^n$$

where

$P = 4000$

$R = 6\%$

$T = 1$

From

$$A_n = 4000\left(1+\frac{6\times 5}{100}\right)^{nt}$$

$$= 4000\left(1+\frac{6\times 5}{100}\right)^{1/4\times 5}$$

$$= 4000\left(1+\cancel{0.06}^{\,30/100}\right)^{1/4\times 5}$$

$$A_n = \cancel{4058.695}$$

$$A_5 = 4000(1+0.3)^{5/4}$$

$$A_5 = 4000(1.3)^{5/4}$$

$$A_5 = 5552.5$$

10(a) From (1)

$$X+y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix} \text{ --- (i)}$$

$$X-y = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix} \text{ --- (ii)}$$

$$X+X = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix} + \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$$

$$2x = \begin{pmatrix} 10 & 0 \\ 2 & 8 \end{pmatrix}$$

$$x = \frac{1}{2}\begin{pmatrix} 10 & 0 \\ 2 & 8 \end{pmatrix}$$

$$x = \begin{pmatrix} 5 & 0 \\ 1 & 4 \end{pmatrix} \text{ --- (*)}$$

but

$$X+y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix}$$

$$y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix} - X$$

$$y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix} - \begin{pmatrix} 5 & 0 \\ 1 & 4 \end{pmatrix}$$

$$y = \begin{pmatrix} 2 & 0 \\ 1 & 1 \end{pmatrix} \text{ --- (**)}$$

$\therefore$ The value of $x = \begin{pmatrix} 5 & 0 \\ 1 & 4 \end{pmatrix}$ and $y = \begin{pmatrix} 2 & 0 \\ 1 & 1 \end{pmatrix}$

Solution (a)

For singular matrix, Determinant = 0.

$$|A| = \begin{vmatrix} -2 & 1 & 1 \\ 3 & 2 & 2 \\ 1 & y & 4 \end{vmatrix} = 0$$

$$\begin{vmatrix} -2 & 1 & 1 \\ 3 & 2 & 2 \\ 1 & y & 4 \end{vmatrix} = 0$$

$$-2|8-2y| - 1|12-2| + 1|3y-2| = 0$$

$$-16+4y-10+3y-2 = 0$$

$$7y-26-2 = 0$$

$$7y = 28$$

$$7y = 28$$

$$y = 4.$$

∴ The value of $y = 4$.

Solution (b)

let

x be Sprit and

y be Beer

Consider the table below

Bee

Produced item	corn	hops	barley	objective function
Spirit	$5x$	$4x$	$35x$	$13x$
Beer	$15y$	$4y$	$20y$	$23y$
Requirement	480	160	1190	

Now

$5x + 15y \leq 480$ —— (i) $\langle 96, 32 \rangle$

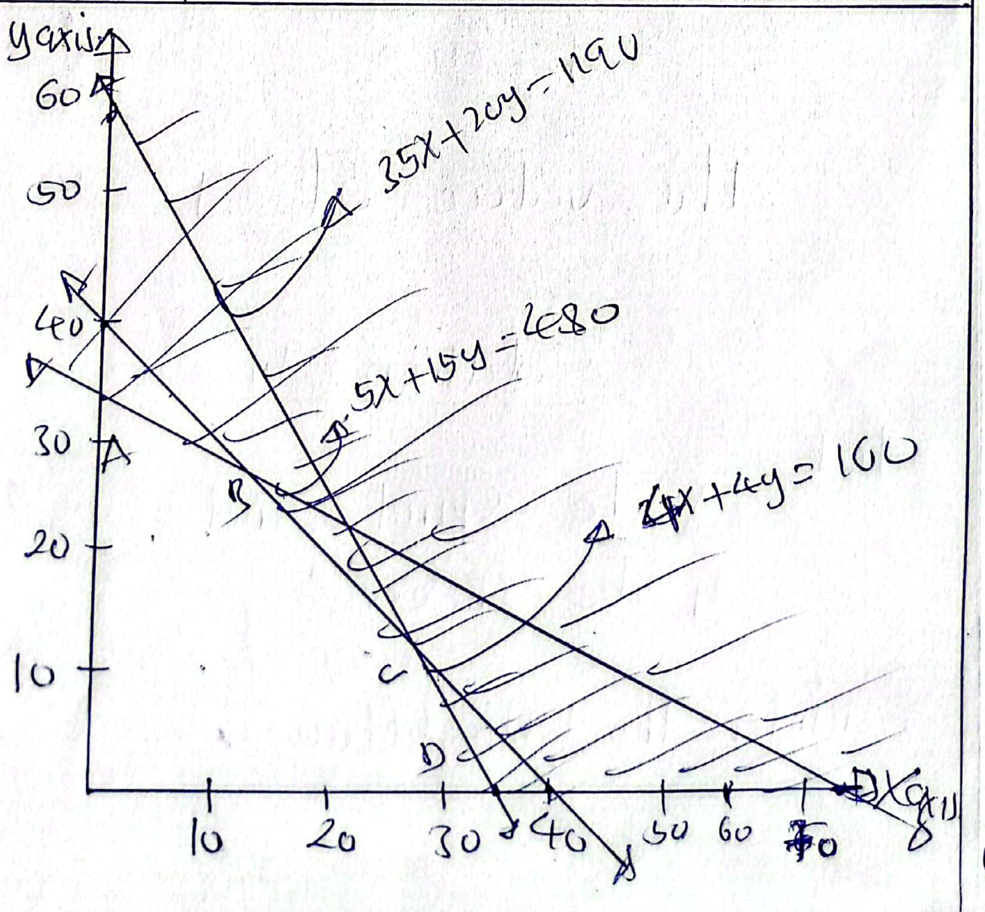
$4x + 4y \leq 160$ —— (ii) $\langle 40, 40 \rangle$

$35x + 20y \leq 1190$ —— (iii) $\langle 34, 59.5 \rangle$

$f(x, y) = 13x + 23y$

$x \geq 0$ and $y \geq 0$

THE GRAPH OF LINEAR PROGRAMMING



Corner points	objective function $f(x,y) = 13x + 23y$
A(0, 32)	736
B(12, 28)	800
C(26, 14)	660
D(34, 0)	442

The brewery owner should produce 12 spirit and 28 beer so as to produce a ~~pro a~~ maximum profit of $800

7 From (a)

$${}^{n}P_{4} = 30\, {}^{n}C_{5}.$$

$$\frac{n!}{(n-r)!} = \frac{30\, n!}{(n-r)!\, r!}$$

$$\frac{n!}{(n-4)!} = \frac{30\, n!}{(n-5)!\, 5!}$$

$$\frac{1}{(n-4)\times(n-5)!} = \frac{30}{(n-5)!\times 5!}$$

$$30(n-4)\cancel{(n-5)!} = \cancel{(n-5)!}\times 5!$$

$$30(n-4) = 5!$$

$$30(n-4) = 120$$

$$(n-4) = \frac{120}{30}$$

$$n-4 = 4$$

$$n = 4+4$$

$$n = 8.$$

$\therefore$ The value of $n = 8$.

Solution(b)

let A be ace and S be spade.

$$p(A) = \frac{4}{52} \text{ and } p(S) = \frac{13}{52}.$$

From

$$p(A\cup D) = p(A) + p(S) - p(A\cap B)$$

$$p(A\cup S) = p(A) + p(S) - 0$$

$$p(A\cup S) = p(A) + p(S)$$

$$= \frac{4}{52} + \frac{13}{52}$$

$$p(A\cup S) = \frac{17}{52}$$

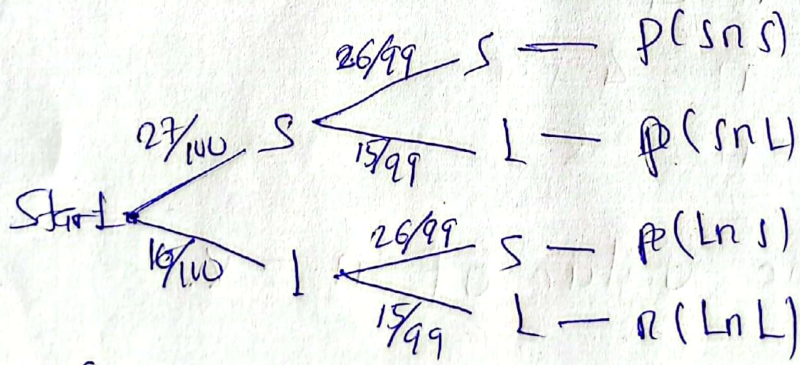
∴ The probability of drawing ace or Spade is $17/52$.

Solution (c)

let L be clip which are too large
S be clip which are small.

<u>but</u> $n(S) = 100$, $n(C) = 27$, $n(S_1) = 16$

Consider the tree diagram below.



~~From (a)~~

$$p(L\cap S) + p(S\cap L) + p(L\cap S) + p(L\cap L) = \frac{39}{550} + \frac{9}{220} + \frac{104}{2475} + \frac{4}{165}$$

$$= 0.1781$$

<u>From (a)</u>

$$p(L\cap S) = \frac{16}{100} \times \frac{26}{99} = 104/2475$$

<u>from (b)</u>

probability = 0.042

From (c) $p(S\cap L) + p(L\cap S) = 821/9900 = 0.0829$.