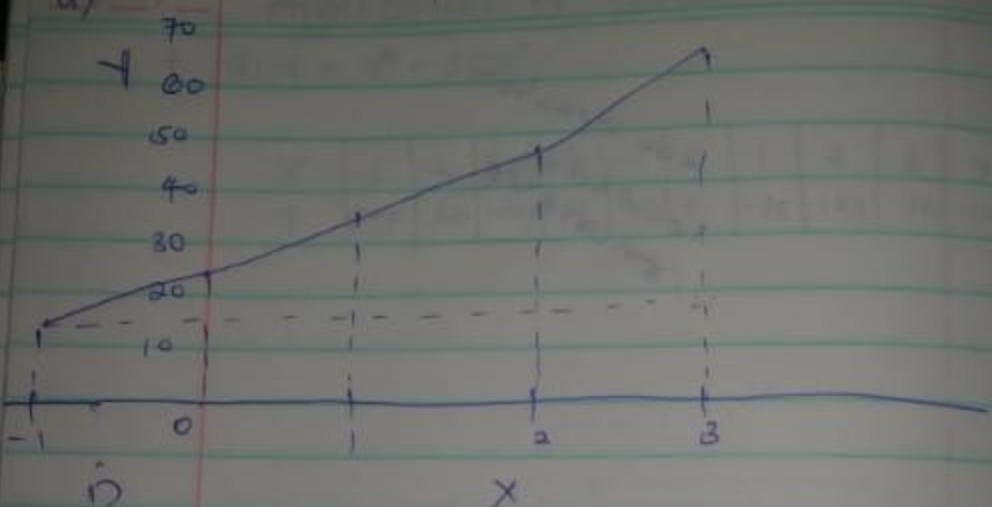


X	-1	0	1	2	3
f	15	24	35	48	63

$$\left(\frac{a+b}{2}\right)h$$

a)



$$\text{Area} = 1 \cdot \left(\frac{15+24}{2}\right) + \left(\frac{24+35}{2}\right) + \left(\frac{35+48}{2}\right) + \left(\frac{48+63}{2}\right)$$

$$= 146$$

$$\text{Area} = (4 \times 15) + \left(\frac{1}{2} \times 48 \times 4\right)$$

$$= 156$$

b). 10 subintervals

14 15 16	41 42 43 44 45 46 47 48 49 50 51	41 42 43 44 45 46 47 48 49 50 51	50 51 52 53 54 55 56 57 58 59 60
21 22 23	42 43 44 45 46 47 48 49 50 51 52	42 43 44 45 46 47 48 49 50 51 52	51 52 53 54 55 56 57 58 59 60 61
28 29 30	43 44 45 46 47 48 49 50 51 52 53	43 44 45 46 47 48 49 50 51 52 53	52 53 54 55 56 57 58 59 60 61 62
	44 45 46 47 48 49 50 51 52 53 54	44 45 46 47 48 49 50 51 52 53 54	53 54 55 56 57 58 59 60 61 62 63

Q. a) $\int \frac{\sqrt{x}}{x^2} dx$

$$= \int \frac{x^{1/2}}{x^2} dx = \int x^{1/2-2} dx$$

$$= \int \frac{1}{x^{3/2}} dx$$

Using power rule $\int x^n dx = \frac{x^{n+1}}{n+1}$

$$n = -3/2$$

$$= \frac{-2}{\sqrt{x}}$$

$$\int \frac{\sqrt{x}}{x^2} dx = \frac{-2}{\sqrt{x}} + c$$

Calendar 2016

$$b) \int e^{3x+4} dx$$

$$\text{let } u = 3x+4$$

$$\frac{du}{dx} = 3$$

$$du = 3 dx$$

$$dx = \frac{1}{3} du$$

$$\frac{1}{3} \int e^u du = \frac{e^u}{3}$$

$$u = 3x+4$$

$$\frac{e^u}{3} = \frac{e^{3x+4}}{3}$$

$$\int e^{3x+4} dx = \frac{e^{3x+4}}{3} + c$$



$$d) \int 2x(4x+7)^8 dx$$

$$= 2 \int x(4x+7)^8 dx$$

$$\int (4x+7)^8 dx \text{ let } u = 4x+7$$

$$\frac{du}{dx} = 4$$

$$dx = \frac{1}{4} du$$

$$\int (4x+7)^8 dx = \int u^8 \cdot \frac{1}{4} du$$

$$= \frac{1}{16} \int (u-7)u^8 du$$

$$= \int (u-7)u^8 du = \int u^9 du - 7 \int u^8 du$$

$$\int u^9 du = \frac{u^{10}}{10}$$

$$\int u^8 du = \frac{u^9}{9}$$

$$\int u^9 du - 7 \int u^8 du = \frac{u^{10}}{10} - \frac{7u^9}{9}$$

$$\frac{1}{16} \int (u-7)u^8 du = \frac{u^{10}}{160} - \frac{7u^9}{144}$$

$$c) \int \frac{1}{1-x} dx$$

$$\text{let } u = 1-x$$

$$\frac{du}{dx} = -1$$

$$du = -dx$$

$$\int \frac{1}{1-x} dx = \int \frac{-1}{u} du$$

$$= -\ln(u)$$

$$u = 1-x$$

$$= -\ln(1-x)$$

$$\int \frac{1}{1-x} dx = -\ln(1-x) + c =$$

$$2 \int x(4x+7)^3 dx = \frac{(4x+7)^{10}}{80} - \frac{7(4x+7)^9}{72}$$

$$= \frac{(4x+7)^9 (36x-7)}{720} + C$$

$$e) \int \frac{3x^2}{(x^2+2)^4} dx =$$

$$\text{let } u = x^2 + 2$$

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

$$dx = \frac{1}{2x} du$$

$$\int \frac{1}{u^4} du = -\frac{1}{3u^3}$$

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

$$\int \frac{3x^2}{(x^2+2)^4} dx = -\frac{1}{3(x^2+2)^3} + C$$

$$f) \int x e^{x^2} dx$$

$$\text{let } u = x^2$$

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

$$dx = \frac{1}{2x} du$$

$$\int x e^u du = \int x \cdot e^u \cdot \frac{1}{2x} du$$

$$= \frac{1}{2} \int e^u du$$

$$= \frac{1}{2} e^u$$

$$= \frac{1}{2} e^{x^2}$$

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

$$9) \int \frac{x}{6x^2+1} dx$$

$$\text{let } u = 6x^2 + 1$$

$$\frac{du}{dx} = 12x$$

$$dx = \frac{1}{12x} du$$

$$\int \frac{x}{u} \cdot \frac{1}{12x} du = \frac{1}{12} \int \frac{1}{u} du$$

$$= \frac{1}{12} \ln(u)$$

$$= \frac{1}{12} (6x^2 + 1)$$

$$= \frac{6x^2 + 1}{12} + C$$



$$h) \int \frac{\ln x}{x} dx$$

$$\text{let } u = \ln(x)$$

$$\frac{du}{dx} = \frac{1}{x}$$

$$dx = x du$$

$$\int \frac{\ln x}{x} dx = \int \frac{u}{x} \cdot x du$$

$$= \int u du$$

$$= \frac{u^2}{2}$$

$$= \frac{(\ln x)^2}{2}$$

$$= \frac{\ln^2(x)}{2} + C$$



$$3) a) \int_2^4 \frac{2}{x-1} - 1 \, dx$$

$$= 2 \int_2^4 \frac{1}{x-1} \, dx - \int_2^4 1 \, dx$$

let $u = x-1$

$$\frac{du}{dx} = 1$$

$$du = dx$$

$$\int \frac{1}{u} \, du = \int 1 \, dx$$

$$= \ln(u) + x$$

$$= \ln(x-1) + x$$

$$= \ln(x-1) - x$$

$$2 \int_2^4 \frac{2}{x-1} - 1 \, dx = [2 \ln(x-1) - x]_2^4$$

$$= (2 \ln(3) - 4) - (2 \ln(1) - 2)$$

$$= 0.19722$$

$$3) \quad \begin{array}{c|c|c|c} x & 2 & 3 & 4 \\ \hline y & 1 & 0 & -0.333 \end{array}$$

$$\text{Area} = \left(\frac{1}{2} \times 1 \times 1 \right) + \left(\frac{1}{2} \times 0.333 \times 1 \right)$$

$$= 0.6665$$

4. $y = bx(x-2)$
 $\text{Area} = 4 \text{ units}^2$

$y = bx(x-2)$
 $b = \frac{y}{x(x-2)}$

4. $y = bx(x-2)$
 $y = bx^2 - 2xb$

$b \int_0^2 (x^2 - 2x) dx = \text{Area}$

$b \left[\frac{x^3}{3} - \frac{2x^2}{2} \right]_0^2 dx$

$b \left[\frac{8}{3} - 4 \right]$

$-\frac{4}{3}b = 4$

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

$b = -3$

BLUE STAR



Calendar 2016

February 2016

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2016

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2016

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July 2016

August 2016

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

b) Gear Area divided into two = 4 units²

o

A.

(0,0) (x,y)

$$\text{gradient} = \frac{\Delta y}{\Delta x}$$

$$= \frac{y-0}{x-0} = \frac{y}{x}$$

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

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

$$y - 0 = \frac{y}{x}(x - 0)$$

$$y = \frac{yx}{x}$$

$$5. \frac{dI}{dt} = -\frac{100}{t^2}, \quad t > 0.2$$

when $t = 2$, current = 150 amps

$$a) \int -100/t^2 dt$$

$$= -100 \int t^{-2} dt$$

$$= -100 \left[\frac{t^{-1}}{-1} \right]$$

$$= 100 t^{-1}$$

$$= 100/t$$

$$b) t = 20 \text{ seconds}$$

$$\text{current} = 100/20$$

$$= 5 \text{ amps}$$

$$c) t \rightarrow \infty$$

$$\text{current} = 100/\infty$$

The current will be zero.