Questions

Q1. (ii) Second (new) observation − third observation

$= \frac{78}{100} - \frac{68}{100}$

$= 0.1$

(iii) Relative change = $\frac{\text{Absolute change}}{\text{old observation}} \times 100$

$= \frac{10}{68} \times 100$

$= 14.71$

2. Absolute Terms

i) Las vegas

$565000 - 478000$

$= 87000$

ii) Dallas

$1,245,000 - 1,183,000$

$= 56,000$

Relative change

i) Las Vegas :- $\frac{87000}{4,78,000} \times 100 = 18.2008\%$

ii) Dallas :- $\frac{56000}{1,183,000} \times 100 = 4.7032\%$

3. (i) Mean = $\frac{\Sigma x}{n} = \frac{2.63 + 2.56 + 2.42 + 2.71 + 2.80}{5}$

(iii) Mean Absolute Error = $\frac{0.006 - 0.064 - 0.204 + 0.086 + 0.176}{5}$

$= 0$

(ii) Absolute error = Experiment value − True value

$R_1 = 0.06$
$R_2 = -0.064$
$R_3 = -0.204$
$R_4 = 0.086$
$R_5 = 0.176$

(iv) Relative error

$R_1 = \frac{0.006}{2.624} = 0.002287 \Rightarrow 0.2287\%$

$R_2 = \frac{-0.064}{2.624} = -0.0244 \Rightarrow -2.44\%$

$R_3 = \frac{-0.204}{2.624} = -0.0777 \Rightarrow -7.777\%$

$R_4 = \frac{0.086}{2.624} = 0.03277 \Rightarrow 3.277\%$

$R_5 = \frac{0.176}{2.624} = 0.06707 \Rightarrow 6.707\%$

(v) Percentage

Q(4) [-2, 1.5]

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

	a	b	$t = \frac{a+b}{2}$	f(a)	f(b)	f(t)
①	-2	1.5	-0.25	-22.5	3.75	2.1094
②	-2	-0.25	-1.125	-22.5	2.1094	-1.295
③	-1.125	-0.25	-0.6875	-1.295	2.1094	1.8787

Q.6 $f(x) = x^2 - 5, \quad x_1 = 2$

$x_2 = x_1 - \frac{f(x)}{f'(x)}$

i	f(x)	f'(x)	x_i	x_{1+i}
1	x^2-5	$2x$	2	$2 - \frac{(2^2-5)}{2(2)} = 2.25$
2	x^2-5	$2x$	2.25	$\frac{2.25-(2.25^2-5)}{2.25(2)}$
				$= 2.2361$

Q7. ① $f(x) = x^3 + 48$

We know that

$x_2 = x_1 - \frac{f(x)}{f'(x)}$

i	f(x)	f'(x)	x_i	x_{i+1}
1.	x^3+48	$3x^2$	1	$1 - \frac{(1+48)}{3(1)} = -15.33$
2.	x^3+48	$3x^2$	-15.33	$-15.33 - \frac{(-15.33^2+48)}{3(-15.33)^2}$
				$= -10.2881$
3.	x^3+48	$3x^2$	-10.2881	$-7.0099 - \frac{(-7.0099^3+48)}{3(-7.0099)^2}$
				$= -4.9989$
4.	x^3+48	$3x^2$	-7.0099	