

Alge Algebra

Practice Questions

1) Absolute change = new obs. - old obs

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

$$= \frac{10}{100} \text{ or } 0.1$$

Relative change = $\frac{\text{Absolute change}}{\text{Old obs.}} \times 100$

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

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

$$= \frac{1000}{68}$$

$$= 14.7058$$

2) Absolute term

$$\textcircled{1} \text{ Las Vegas :- } 565000 - 478000 \\ = 87000$$

$$\textcircled{2} \text{ Dallas :- } 1245000 - 1189000 \\ = 56000$$

Relative term

$$\textcircled{1} \text{ Las Vegas :-}$$

$$\frac{87000}{478000} \times 100 \\ = 18.2008\%$$

$$\textcircled{2} \text{ Dallas :-}$$

$$\frac{56000}{1189000} \times 100 \\ = 4.7098\%$$

Las Vegas is both in absolute as well as relative terms

3)

$$i) \text{ Mean} = \frac{2.63 + 2.56 + 2.42 + 2.71 + 2.8}{5}$$

$$= 2.624$$

ii) Absolute Error = Experiment value - True value

$$\text{Reading 1} = 2.630 - 2.624$$

$$= 0.006$$

$$\text{Reading 2} = 2.560 - 2.624$$

$$= -0.064$$

$$\text{Reading 3} = 2.420 - 2.624$$

$$= -0.204$$

$$R_4 = 2.710 - 2.624$$

$$= 0.086$$

$$R_5 = 2.8 - 2.624$$

$$= 0.176$$

iii) Mean Absolute Error = $\frac{\text{Total of all absolute errors}}{\text{No. of Errors}}$

$$= \frac{0.006 + 0.064 + 0.204 + 0.086}{5}$$

$$= 0$$

iv) Relative Error

Percentage Error

$$R_1 = \frac{0.006}{2.624} = 0.002287 \times 100$$

$$R_2 = \frac{-0.064}{2.624} = -0.0244 \times 100$$

$$R_3 = \frac{-0.204}{2.624} = -0.0777 \times 100$$

$$R_4 = \frac{0.086}{2.624} = 0.03277 \times 100$$

$$R_5 = \frac{0.176}{2.624} = 0.06707 \times 100$$

4)

a) $[-2, 1.5)$

$\hookrightarrow a \quad \hookrightarrow b$

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

	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	<u>1.8787</u>

b) ① $f(x) = x^2 - 5 \quad , \quad x_1 = 2$

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

i	$f(x_i)$	$f'(x_i)$	x_i	x_{i+1}
1	$x^2 - 5$	$2x$	2 2	$\frac{2(2^2 - 5)}{4} = 2.25$
2	$x^2 - 5$	$2x$	2.25	$\frac{2.25 - (2.25^2 - 5)}{2 \cdot 2.25} = 2.23611$

7) $f(x) = x^3 + 48$

we know that $x_2 = x_1 - f(x_1) / f'(x_1)$

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