1.1 $\frac{\cancel{x^{32}}}{x^{\cancel{8}}x^{2}} \cdot \frac{x^{\cancel{7}5}}{x^{2}}$

$= x^{26}.$

1.2 $8^{2} \cdot 4^{x} \cdot 2^{x} = 8^{4}$

$2^{6} \cdot 2^{2x} \cdot 2^{x} = 2^{12}.$

$6+3x = 12$

$3x = 6$

$x = 2.$

1.3 $\frac{x}{y} = 3$ the $x^{-4}y^{4}$.

$\frac{y}{x} = \frac{1}{3}$ $\left(\frac{y}{x}\right)^{4} = \left(\frac{1}{3}\right)^{4}$

$\left(\frac{y}{x}\right)^{4} = \frac{1}{81}$

1.4 $\frac{\sqrt{4^{15}}}{\sqrt{16^{7}}} = \frac{\sqrt{4^{15}}}{\sqrt{4^{14}}} = \sqrt{4^{15-14}} = 2.$

1.5. a) $x+(y+z) = (y+x)+z$ True

b) $y(x+z) = xy+yz$ True

c) $x^{y+z} = x^{z}+x^{y}$ ~~True~~ .False.

d) $\frac{x^{z}}{x^{y}} = x^{y-z}$ False.

1.6 $\ln(x) \geq e.$

$\ln(x) \geq \ln e^{e}.$

$\log_{e}x \geq \log_{e}e^{e}$

due to $e > 1.$ $\log_{e}x$ increasing

$x \geq \cancel{e^{e}}$ $e^{e}.$

2.1 ~~0°C = 32F 100°C = 212F.~~

$$F = \left(\frac{212-32}{100}\right)C + 32.$$

when $F = C$

$$\left(\frac{212-32}{100}\right)C + 32 = C$$

$$1.8C + 32 = C$$

$$0.8C = -32.$$

$$C = -40$$

2.2 $f(x) = 3x - 12 \qquad f(y) = 0.$

$$3y - 12 = 0$$

$$3y = 12$$

$$y = 4$$

2.3 $9^{x^2-6x+2} = 81$

$$x^2 - 6x + 2 = 2.$$

$$x(x-6) = 0$$

$$x = 0 \text{ or } x = 6.$$

2.4 $a(1+3\%)^x = 3a$

$$1.03^x = 3$$

$$n = \log_{1.03} 3$$

$$\approx 37.17$$

2.5 $\log_\pi\left(\frac{1}{\pi^5}\right) = \log_\pi \pi^{-5}$

$$= -5$$

3.1 $\sum_{i=0}^{\infty} \left(\frac{1}{5^i} + 0.3^i \right)$

$\sum_{i=0}^{\infty} \left(\frac{1}{5^i} + 3^i \left(\frac{1}{10}\right)^i \right)$

$= \frac{1}{1-\frac{1}{5}} + \frac{1}{1-\frac{3}{10}}$

$= \frac{1}{\frac{4}{5}} + \frac{1}{\frac{9}{10}}$

$= \frac{5}{4} + \frac{10}{9} = \frac{45+40}{36} = \frac{85}{36}$

3.2 $\lim_{x \to 5} \frac{x^2-25}{x-5}$

$= \frac{\cancel{(x-5)}(x+5)}{\cancel{x-5}}$

$= x+5$

$= 10$

3.3 $f(x) = x^3 - 4$ at $(-2, 2)$.

$= 3x^2$

3.4 $f(x)=\dfrac{x^5+3}{x^2-1}$

$=\dfrac{5x^4(x^2-1)+2x(x^5+3)}{(x^2-1)^2}$

$=\dfrac{5x^6-5x^4+2x^6+6x}{x^4-2x^2+1}$

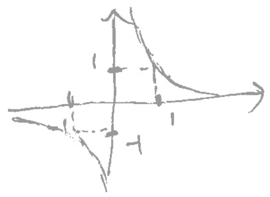
$=\dfrac{3x^6-5x^4+6x}{x^4-2x^2+1}$

3.5 $f(x)=x^9+3$

$=9x^8$

$=72x^7$

3.6



3.8 $f(x,y)=x^3-y^2$

$=8-9$

$=-1$

3.9 $f(x,y)=\ln(x-3y)$

$x-3y>0$

$x>3y$

3.10 $\frac{\partial}{\partial x}(x^5y^7+\frac{x^2}{y^3})$

$5y^7x^4+\frac{2}{y^3}x$

3.11

4.1 $A=\begin{bmatrix} 2 & 5 \\ 2 & 1 \\ 7 & 6 \end{bmatrix}$ $B=\begin{bmatrix} 1 & 0 & 1 \\ 9 & 1 & 5 \end{bmatrix}$

$B \cdot A$

$$\begin{array}{ccc|cc} & & & 2 & 5 \\ & & & 2 & 1 \\ & & & 7 & 6 \\ \hline 1 & 0 & 1 & 9 & 11 \\ 9 & 1 & 5 & 55 & 76 \end{array}$$

4.2 $A=\begin{bmatrix} 5 & 3 \\ 0 & 1 \\ 1 & 2 \end{bmatrix}$ $B\begin{bmatrix} 8 & 4 & 0 \\ 2 & 1 & 2 \end{bmatrix}$

$A \cdot B$

$$\begin{array}{cc|ccc} & & 8 & 4 & 0 \\ & & 2 & 1 & 2 \\ \hline 5 & 3 & 46 & 23 & 6 \\ 0 & 1 & 1 & 1 & 2 \\ 1 & 2 & 4 & 6 & 4 \end{array}$$

4.3 $\begin{bmatrix} e & 2 & 4 \\ 93 & 6.1 & \pi \\ 4.7 & 42 & 0 \end{bmatrix}$

4.4 $\begin{bmatrix} 2 & 6 \\ 2 & 8 \end{bmatrix}$

$16-12=4$

5.1 $6^2 = 36$.

5.2. $$\frac{0.001 \times 0.98}{0.999 \times 0.003 + 0.98 \times 0.001} \approx 24.64\%.$$

5.3 $$\frac{1}{6} \times 20 = \frac{20}{6} = \frac{10}{3}$$

Due to each time of tossing is independent event.