

Lecture 1

Ex 7

(a) $64 = (1000000)_b$

(b) $17 = (10001)_b$

(c) $79 = (1001111)_b$

Ex 8

(a) $\frac{1}{8} = (.001)_b$

(b) $\frac{7}{8} = (.111)_b$

(c) $\frac{35}{16} = (10.0011)_b$

Ex 9

(a) $11.25 = (1011.01)_b$

(b) $3.5 = (11.1)_b$

(c) $30.75 = (1110.11)_b$

Ex 15

(a) $\frac{1}{4} = (.01)_b \quad + 1. \overbrace{00\dots0} \times 2^{-2}$

(b) $\frac{1}{3} = (.01)_b \quad + 1. \overbrace{010101\dots01} \times 2^{-2}$

(c) $\frac{2}{3} = (.10)_b \quad + 1. \overbrace{0101\dots01} \times 2^{-1}$

$$\begin{aligned}
& \frac{1}{2} \times 16 \quad 2^{-51} + 2^{-53}; \\
& + 1. \overline{100 \dots \dots \dots 00} \times 2^{-51} \\
& + 1. \overline{100 \dots \dots \dots 00} \times 2^{-53} \\
& = + 1. \overline{100 \dots \dots \dots 00} \times 2^{-51} \\
& + 0. \overline{101 \dots \dots \dots 00} \times 2^{-51} \\
& \hline
& + 1. \overline{010 \dots \dots \dots 00} \times 2^{-51} \\
& + 1. \overline{100 \dots \dots \dots 00} \times 2^0 \\
& = + 0. \overline{100 \dots \dots \dots 00010} \times 2^0 \\
& + 1. \overline{100 \dots \dots \dots 00} \times 2^0 \\
& = + 0. \overline{100 \dots \dots \dots 00010} \times 2^0 \\
& + 1. \overline{100 \dots \dots \dots 00000} \times 2^0 \\
& = + 1. \overline{100 \dots \dots \dots 010} \times 2^0 \\
& - 1. \overline{100 \dots \dots \dots 000} \times 2^0 \\
& = + 0. \overline{100 \dots \dots \dots 010} \times 2^0 = 2^{-51}
\end{aligned}$$

Ex 19

$$(a) \text{ when } x = 2k\pi \quad \frac{1 - \sec x}{\tan^2 x} = \frac{1 - \frac{1}{\cos x}}{\frac{\sin^2 x}{\cos^2 x}} = \frac{\frac{\cos x - 1}{\cos x}}{\frac{\sin^2 x}{\cos^2 x}} = \frac{(\cos x - 1) \cos x}{1 - \cos^2 x} = -\frac{\cos x}{1 + \cos x}$$

(b) when $x = 0$

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

(c) when $x = 0$

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

Ex 21

$$(a) \quad p(x) = 1 + x(1 + 5x + x^2 + 6x^3) \\ = 1 + x(1 + x(5 + x + 6x^2)) = 1 + x(1 + x(5 + x(1 + 6x)))$$

$$(b) \quad p(x) = 1 + x(-5 + 5x + 4x^2 - 3x^3) = 1 + x(-5 + x(5 + 4x - 3x^2)) \\ = 1 + x(-5 + x(5 + x(4 - 3x)))$$

$$(c) \quad p(x) = 1 + x(1 - x + x^2 + 2x^3) = 1 + x(1 - x(1 - x - 2x^2)) \\ = 1 + x(1 - x(1 - x(1 + 2x)))$$