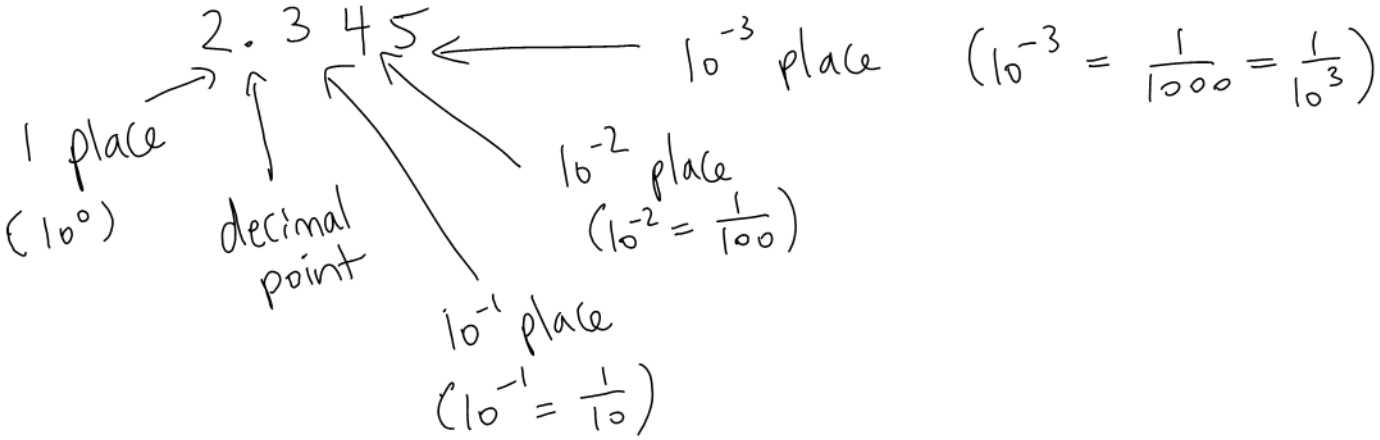
Quiz Tuesday Section 1.2

1.3 Converting Non-Integer Numbers to Decimal



$$2.345 = 2 \times 10^0 + 3 \times 10^{-1} + 4 \times 10^{-2} + 5 \times 10^{-3}$$
$$= 2 \times 1 + \frac{3}{10} + \frac{4}{100} + \frac{5}{1000}$$

In other bases:

$$57.14_8 = 5 \times 8^1 + 7 \times 8^0 + 1 \times 8^{-1} + 4 \times 8^{-2}$$

8^0 place, 8^{-1} place, 8^{-2} place

$$= 40 + 7 + \frac{1}{8} + \frac{4}{64}$$
$$= 47.1875$$

The dot is called the radix point rather than the decimal point.

Notice: The number to the left of the radix point is associated with the exponent 0.

Ex: Convert to decimal

a) 11.011_2

2^1 place, 2^0 place, 2^{-1} place

$$= 1\times 2^1 + 1\times 2^0 + 0\times 2^{-1} + 1\times 2^{-2} + 1\times 2^{-3}$$

on calculator: 2 y^x (−3)

$$= 2 + 1 + \frac{1}{2^2} + \frac{1}{2^3}$$

$$= 3.375$$

b) $A0.3F6_{16}$ (round to 3 decimal places)

16^1 place, 16^0 place, 16^{-1} place

$$= \underset{10}{A}\times 16^1 + 0\times 16^0 + 3\times 16^{-1} + \underset{15}{F}\times 16^{-2} + 6\times 16^{-3}$$

$$= 160 + \frac{3}{16} + \frac{15}{16^2} + \frac{6}{16^3}$$

$$\approx 160.248$$

$A_{16} = 10$

$C_{16} = 12$

$F_{16} = 15$

c) 765.4_8

8^0 8^{-1}

$= 7\times8^2 + 6\times8^1 + 5\times8^0 + 4\times8^{-1}$

$= 7\times64 + 48 + 5 + \frac{4}{8}$

$= 501.5$

1.4 Converting From Decimal

$\frac{7}{4} = 1 + \frac{3}{4}$

1 is the quotient (Q for short)

3 is the remainder (R for short)

To find Q and R using a calculator:

$7 \div 4 = 1.75$

Q = 1

R = $4\times0.75 = 3$

Ex: Find Q and R

a) $50 \div 4$

$= 12.5$

Q = 12

R = $4\times0.5 = 2$

b) $92 \div 8$

$= 11.5$

$Q = 11$

$R = 8 \times 0.5 = 4$