Q1) Decimal to binary:

a) 23.75_{10}
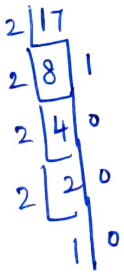
$\dfrac{23}{10}$

2	23	
2	11	1
2	5	1
2	2	1
	1	0

$\dfrac{.75}{10}$ $.75 * 2$ $1 + 0.5$
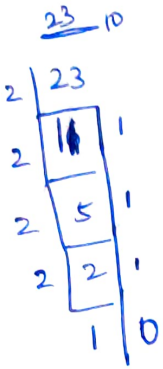
$0.5 * 2$ 1

$.75_{10} \Rightarrow 0.11_2$

$23_{10} \Rightarrow 10111$

$$23.75_{10} \Rightarrow 10111.11_2$$

b) 17.25_{10}

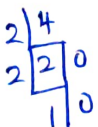| 2	17	
2	8	1
2	4	0
2	2	0
	1	0

$\dfrac{.25}{10}$

$.25 * 2 \Rightarrow 0 + 0.5$

$.05 * 2 \Rightarrow 1 + 0$

$.25_{10} \Rightarrow .01_2$

$$17.25_{10} \Rightarrow 10001.01_2$$

$17_{10} \Rightarrow 10001_2$

c) 4.3_{10}

2	4	
2	2	0
	1	0

$$4.3_{10} \Rightarrow 100.010011_2$$

$\dfrac{.3}{10}$

$3 * 2 \Rightarrow 0 + 0.6$

$0.6 * 2 \Rightarrow 1 + 0.2$

$0.2 * 2 \Rightarrow 0 + 0.4$

$0.4 * 2 \Rightarrow 0 + 0.8$

$0.8 * 2 \Rightarrow 1 + 0.6$

$0.6 * 2 \Rightarrow 1 + 0.2$

Q2) Binary to decimal:

a) 1101.111_2

1	1	0	1	.	1	1	1
2^3	2^2	2^1	2^0		2^{-1}	2^{-2}	2^{-3}

$$8 + 4 + 0 + 1 \quad . \quad 0.5 + 0.25 + 0.125$$

$$13 \quad . \quad 0.875$$

$$13.875_{10}$$

So $\boxed{1101.111_2 \Rightarrow 13.875_{10}}$

b) 100.001_2

1	0	0	.	0	0	1
2^2	2^1	2^0		2^{-1}	2^{-2}	2^{-3}

$$4 \quad . \quad (0.125)$$

$$\boxed{(100.001)_2 \Rightarrow 4.125_{10}}$$

Q3) Decimal to binary, octal, hexadecimal forms:

a) 97_{10}

Binary	Octal	Hexa-decimal

Binary:
```
2 | 97
2 | 48  1
2 | 24  0
2 | 12  0
2 | 6   0
2 | 3   0
      1
```

$97_{10} \Rightarrow (1100001)_2$

Octal:
```
8 | 97
8 | 12  1
      1  4
```

$97_{10} \Rightarrow (141)_8$

Hexa-decimal:
```
16 | 97
       6  1
```

$97_{10} \Rightarrow (61)_{16}$

b) 229_{10}

Binary	Binary	Octal	Hexa decimal

Binary:
```
2 | 229
2 | 114  1
2 | 57   0
2 | 38   1
2 | 19   0
2 | 9    1
2 | 4    1
2 | 2    0
       1  0
```

Binary:
```
2 | 229
2 | 114  1
2 | 57   0
2 | 28   1
2 | 14   0
2 | 7    0
2 | 3    1
       1  1
```

Octal:
```
8 | 229
8 | 26   1
       3  2
```

$229_{10} \Rightarrow 321_2$

Hexa decimal:
```
16 | 229
        14  5
```

$229_{10} \Rightarrow (E5)_{16}$

$229_{10} \Rightarrow 11100101_2$

$Q_4)$ Following Numbers → Binary form:

a) 72_8

$$\frac{7}{111} \qquad \frac{2}{0\,1\,0}$$

2 |7
2 |3| 1
    1| 1

2 |2
  1| 0

$$\boxed{72_8 \Rightarrow 111\ 010_2}$$

b) $FA6_{16}$

$$\frac{15}{1111} \qquad \frac{10}{1110} \qquad \frac{6}{0111}$$

2 |15   2 |10   2 |6
2 |7| 1   2 |5| 0   2 |3| 1
2 |3| 1   2 |2| 1   1| 1
   1| 1   1| 1

$$\boxed{FA6_{16} \Rightarrow 1111\ 1110\ 0111_2}$$