Hunter
Martin

A.) Show signed magnitude, 1's comple, 2's comple, excess 64. use 7 bit

$\frac{35}{2} = 17$ R = 1
$\frac{17}{2} = 8$ R = 1
$\frac{8}{2} = 4$ R = 0
$\frac{4}{2} = 2$ R = 0
$\frac{2}{2} = 1$ R = 0
$\frac{1}{2} = 0$ R = 1

1) 35#

a) signed magnitude =>

$\boxed{0\ 100011}$

b.) 1's complement => same thing

$\boxed{0\ 100011}$

c.) 2's complement =>

$\boxed{0\ 100100}$

100011
+ 1
100100

d) Excess 64

35
64
99

$35 + 64 = 99 \Rightarrow \boxed{1\ 1100011_2}$

64 32 16 8 4 2 1

$\frac{99}{2} = 49$ R = 1
$\frac{49}{2} = 24$ R = 1
$\frac{24}{2} = 12$ R = 0
$\frac{12}{2} = 6$ R = 0
$\frac{6}{2} = 3$ R = 0
$\frac{3}{2} = 1$ R = 1
$\frac{1}{2} = 0$ R = 1

2) -22#

=11 R=0
=5 R=1
=2 R=1
=1 R=0
=0 R=1

a.) Signed Magnitude =>

32 16 8 4 2 1

$\boxed{1010110}$

b.) 1's complement => MSB same, flip

32 16 8 4 2 1

$\boxed{1101001}$

c.) 2's Complement

$1101001 + 1 \Rightarrow \boxed{1101010}$

101001
+ 1
101010

d) Excess 64

4
2
2

$-22 + 64 = 42$ $\boxed{0101010}$

$\frac{42}{2} = 21$ R = 0
$\frac{21}{2} = 10$ R = 1
$\frac{10}{2} = 5$ R = 0
$\frac{5}{2} = 2$ R = 1

B) Show IEEE 754 bit patterns

1.) −0.035 # = −0.00001000111101011100 0010 00011

.035 · 2 = .07 0	.12 · 2 = .24 0	.84 · 2 = 1.68 1
.07 · 2 = .14 0	.24 · 2 = .48 0	.68 · 2 = 1.36 1
.14 · 2 = .28 0	.48 · 2 = .96 0	.36 · 2 = .72 0
.28 · 2 = .56 0	.96 · 2 = 1.92 1	.72 · 2 = 1.44 1
.56 · 2 = 1.12 1	.92 · 2 = 1.84 1	.44 · 2 = .88 0

.88 · 2 = 1.76 1	.16 · 2 = .32 0	.12 · 2 = .24 0
.76 · 2 = 1.52 1	.32 · 2 = .64 0	.24 · 2 = .48 0
.52 · 2 = 1.04 1	.64 · 2 = 1.28 1	.48 · 2 = .96 0
.04 · 2 = .08 0	.28 · 2 = .56 0	.96 · 2 = 1.92 1
.08 · 2 = .16 0	.56 · 2 = 1.12 1	.92 · 2 = 1.84 1

2) 1 −0.00001.000111101011100000101000 11 f.

$\boxed{1\ 0111\ 1010\quad 00011110101110000101000011}$

2 + 8 = 10

−5 + 127 = 122

2.) 1010.01101 => 1.01001101 × 2^3

1.01001101 × 2^{3+127} => 1.01001101 × 2^{130}

$\boxed{0\ 1\ 0\ 0\ 0\ 0\ 0\ 1\ 0\quad 01001101 \ldots 16\ zeros}$