

1.) $211 = 0111010011$
 $43 = 00101011$

Convert to 2's
 comp.

$$\begin{array}{r} 00101011 \\ 11010100 \\ + 1 \\ \hline 11010101 \end{array}$$

$$\begin{array}{r} 11010101 \\ + 11010101 \\ \hline 1101010100 \end{array}$$

There is overflow

2) $1111\ 1100\ 0000\ 1011\ 0000\ 1010\ 0000\ 0000$
 $0000\ 0011\ 1111\ 0100\ 1111\ 0110\ 0000\ 0000$

2's : 66385408

Unsigned : 4228581888

3) $0x\ 39780000 =$
 $0011\ 1001\ 0111\ 1000\ 0000\ 0000\ 0000\ 0000$

sign = 0

Exponent = $0111\ 0010 = 114$ - $127 - 114 = 13$

Mantissa = $111\ 1000\ 0000\ 0000\ 0000\ 0000 = .9375$

$-1^0 \cdot (1 + m) (2^{-13}) = .000236511$

4) 6598735.51325

$= 11001001011000001001111.1000001101100100011$

$1.10010010110000010011111000001101100100011E22$

$R_{ins} = 127 + 22 = 149 = 10010101$

$01001010110010010110000010011111$

$= \boxed{0x4AC9609F}$

5) -27396.578125

110101100000100.100101

$1.101011000000100100101E14$

$R_{ins} = 1023 + 14 = 1037 = 0x400$
 $0100 \quad 0000 \quad 1101$

$1100000011011011100000100101000000$
 000000000000000000000000

$\boxed{0xC0DAC12500000000}$

$$6) -1947.5 \quad 1947.5 = 11110011011.11$$

$S=1$

$$0.0111001101111 \cdot 16^4$$

$$3+64 = 1000011$$

$$1100 \ 0011 \ 0111 \ 1001 \ 1011 \ 1100 \ 0000 \ 0000$$

$$= \boxed{0x C379BC00}$$

$$7) -1.5625E-1 = .15625 = .101E-2$$

Sign = 1

0101 0000 0000 0000 0000 0000
1010 1111 1111 1111 1111 1111

$$= \boxed{0x80000005}$$

Hewlett Range

$$\min = -1 \cdot 2^{127}$$

$$\max = 1.1111111111111111 \cdot 2^{103}$$

IEEE Range

$$\min: -1.1111111111111111 \cdot 2^{127}$$

$$\max: 1.1111111111111111 \cdot 2^{127}$$

$$\text{Hewlett Accuracy: } 1.0 \cdot 2^{-15}$$

$$\text{IEEE Accuracy: } 1.0 \cdot 2^{-126}$$

8)	improvement	clock time
	Yes	1830 ps
	NO	1330 ps

$$82) \frac{P_{new}}{P_{old}} = \frac{1}{\frac{ET_{new}}{ET_{old}}} = \frac{ET_{old}}{ET_{new}} = \frac{1C_{old} \cdot 1CPI_{old} \cdot ET_{old}}{1C_{new} \cdot 1CPI_{new} \cdot ET_{new}}$$

$$\frac{1330 \text{ ps}}{195 \cdot 1830} = .8589$$

$$83) 1000 + 230 + 310 + 100 + 200 + 2000 + 500 = 3890$$

$$3890 + 600 = 4490$$

$$\text{with } \frac{4490}{1830} = 2.75$$

$$\text{without } \frac{3890}{1330} = 2.92$$

The improvement works