HW3: Computer Arithmetic

1) ~~$91_{10} - C6_{16}$~~

$91_{10} = 1011011$

$C6_{16} = 6_{10} + (12_{10})(16_{10}) = 198_{10}$

1100 0110

~~11000110~~

~~− 1011011~~

~~1101011 = 64 + 32 + 8 + 2 + 1 = 107~~

-107_{10}

Correct, but this problem is actually $91_{10} + C616$, not $91_{10} - C616$. Re'd at the end

2) $11_8 - 11_{10} = 11_8 + -11_{10}$

11_8 → 001 001 I6Q0

$11_{10} = 1011$ I4Q0 $-11_{10} = 110101$ I6Q0

```
  001001
+ 110101   complement
  111110 I6Q0 → 000010 I6Q0 = 2_10
```

-2_{10}

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$

4) 5.75_{10} → 101.11 I3Q2

7.125_{10} → 111.0001 I3Q4

-7.125_{10} → 1000.1111

```
  0101.1100
+ 1000.1111
  1110.0011 I4Q4
  0001.1101 I4Q4 = 1.8125_10
```

-1.8125_{10}

5) $9_{10} \rightarrow$ 1001 (8 4 2 1) 4Q0

$3_{10} \rightarrow$ 11 4Q0

```
  1001
x   11
------
  1001
 10010
------
 11011  4Q0 →
```

$16+8+2+1 = \boxed{27_{10}}$

6) $-5_{10} \cdot -6_{10}$

5_{10} = 0101 I4Q0

-5_{10} = 1011 I4Q0

6_{10} = 0110 I4Q0

-6_{10} = 1010 I4Q0

```
        1111011
    x  1XXXXDXD
---------------
     11111110110
     1111111011
    111111011
   11111011
  1111011
---------------
11110110000011110
```

(16 8 4 2 1) $= \boxed{30_{10}}$

7) $9.5_{10} \rightarrow$ 1001.1 U4Q1

$2.625_{10} \rightarrow$ 10.101 U4Q3

($.625 = \frac{5}{8}$; $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$)

$$
\begin{array}{r}
10011 \\
\times\ 10.101 \\
\hline
10011 \\
1001100 \\
1001100000 \\
\hline
11000.1111_{U5Q4}
\end{array}
$$

$\rightarrow \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} = .9375_{10}$

24.9375_{10}

$9.5_{10} \times 2.625_{10} = 24.9375_{10}$

1) $91_{10} \rightarrow 1011011_{U7Q0}$

$C6_{16} \rightarrow + 11000110_{U8Q0}$

$100100001_{U9Q0} = 1 + 256 + 32 =$ **289_{10}**

256 128 64 32 16 8 4 2 1