1] $91_{10} + C6_{16}$

(a) $91_{10} = \underset{64\ 32\ 16\ 8\ 4\ 2\ 1}{1\ 0\ 1\ 1\ 0\ 1\ 1}_2$

$C6_{16} = 12\ 6_{16} = 1\ 1\ 0\ 0\ 0\ 1\ 1\ 0_2$

(b)
$$\begin{array}{r}
{\scriptstyle 1\ 1\ 1} \\
+\ \cancel{0}\ 1\ 0\ 1\ 1\ 0\ 1\ 1_2 \\
1\ 1\ 0\ 0\ 0\ 1\ 1\ 0_2 \\
\hline
\underset{256\ 128\ 64\ 32\ 16\ 8\ 4\ 2\ 1}{1\ 0\ 0\ 1\ 0\ 0\ 0\ 0\ 1}_2
\end{array}$$

(c) $= \boxed{417_{10}}$

2] $11_8 - \cancel{10}\ 11_{10}$

(a) $11_8 = 1\ 0\ 0\ 1_2 = 9_{10}$

$11_{10} = 1\ 0\ 1\ 1_2 \rightarrow -11 = 0\ 1\ 0\ 1_2$ (signed)

(b)
$$\begin{array}{r}
{\scriptstyle 1} \\
+\ 1\ 0\ 0\ 1 \\
0\ 1\ 0\ 1 \\
\hline
1\ 1\ 1\ 0_2
\end{array}\quad 14 \boxtimes 0 \Rightarrow \boxed{-2_{10}}$$

(c)

3] $12.3125_{10} + 0110_{I2Q2}$

(a) $12.3125_{10} = b\ 01100.0101_{ISQ4}$

$0110_{I2Q2} = \cancel{b\ 01100}\ b\ 01.10_{I2Q2} = b\ 00001.1000_{ISQ4}$

(b)
$$\begin{array}{r}
0\ 1\ 1\ 0\ 0.0\ 1\ 0\ 1 \\
+\ 0\ 0\ 0\ 0\ 1.1\ 0\ 0\ 0 \\
\hline
0\ 1\ 1\ 0\ 1.1\ 1\ 0\ 1_{ISQ4}
\end{array} \Rightarrow \boxed{13.8125_{10}}$$

(c)

4] $5.75_{10} - 7.125_{10}$

(a) $5.75_{10} = 0101.110_2$ I4Q3
 $\cancel{+0}$

$-7.125_{10} = -(7.125_{10}) = -(0111.001)_2 \Rightarrow 1000.110 \ +1$

$\Downarrow$

1000.111 I4Q3

(b) $\quad 0101.110$
$+\ \ 1000.111$
————————
$\quad 1110.101_2$
$=$ negative

$\Downarrow$

$0001.\underset{\frac{1}{2}}{0}\underset{\frac{1}{4}}{1}\underset{\frac{1}{8}}{1}_2$

1110.101_2

$\Downarrow$

$\boxed{-1.375_{10}}$

5] $9_{10} \cdot 3_{10}$ ← That's a 3

(a) $9_{10} \Rightarrow 1001_2$ (unsigned)
 $3_{10} \Rightarrow 0011_2$ (unsigned)

(b) $*\ \ 01001_2$
 $\quad 00011_2$
————————
$\quad 01001$
$\ 010010$
————————
$0\underset{16}{1}\underset{8}{1}\underset{4}{0}\underset{2}{1}\underset{1}{1}_2$

(c) 11011_2

$\Downarrow$

$\boxed{27_{10}}$

6] $(-5)_{10} \cdot (-6)_{16}$
 I4Q0

(a) $(-5)_{10} = 1011_2$ (signed)
 $(-6)_{16} = 1010_2$ (signed)
 I4Q0

(b)

(c) 00011110_2

$\Downarrow$

$\boxed{30_{10}}$

7] $9.5_{10} \cdot 2.625_{10}$

(a) $9.5_{10} \Rightarrow 1001.100_{U4Q3}$

$2.625_{10} \Rightarrow 0010.101_{U4Q3}$ EXPECT
~~18~~

(b)
```
    *  1 0 0 1 . 1 0 0
       0 0 1 0 . 1 0 1
       1 0 0 1 . 1 0 0
     1 0 0 1 1 0 0
   1 0 0 1 1 0 0
 0 0 0 1 1 0 0 0 . 1 1 1 1 0 0₂
```

$\overset{16\ 8\ 4\ 2\ 1\ \ \frac{1}{2}\ \frac{1}{4}\ \frac{1}{8}\ \frac{1}{16}}{11000.111100_2}$

$\Downarrow$

(c) $\boxed{24.9375_{10}}$

8] $(-1.25)_{10} \cdot 3.5_{10}$

(a) $(-1.25)_{10} = -(1.25_{10}) = -(01.01) = 10.10 + 1 = 10.11_2 \quad I2Q2$

$3.5_{10} = 011.1_2 = 011.10_2 \quad I3Q2$

$\Downarrow$

$110.11_2 \quad \cancel{I2Q} \quad I3Q2$

EXPECT $I6Q4$

(b)
```
    *  1 1 1 1 1 0 . 1 1
       0 0 0 0 1 1 . 1 0
       1 1 1 1 1 0 1 1 0
     1 1 1 1 1 0 1 1 X X
   1 1 1 1 1 0 1 1 X X X
   0 1 0 0 0 1 1 . 1 0 1 0
```

FLIP +1

$\Downarrow$

$\cancel{1} 1 0 0 . 0 1 0 1 + 1$

$\Downarrow$

$100.0110_2 = -4.375_{10}$

$\qquad \frac{1}{4}\ \frac{1}{8}$

(c) $\boxed{-4.375_{10}}$