Example 1.22: Addition

```
  1 1 1  ← carries
  1 4 7 6
+ 3 5 5 4
---------
  5 2 5 2   sum
```

Scratchpad

$$6 + 4 = (10)_{10} = (12)_8$$

$$1 + 7 + 5 = (13)_{10} = (15)_8$$

$$1 + 4 + 5 = (10)_{10} = (12)_8$$

$$1 + 1 + 3 = (5)_{10} = (5)_8$$

most significant

Example 1.23: Subtraction

```
  4 14
  5 4 7 5
- 3 7 6 4
---------
  1 5 1 1
```

Digit position 2 required a borrow from position 3

∴
Octal	Decimal
14_8	12
-7_8	-7
5_8	$5_{10} = 5_8$

Example 1.24: Subtraction

```
  3 7 7
  5 4 0 0 4 5
- 3 2 5 6 5 4
-------------
  2 1 2 1 7 1
```

The intermediate 0s become $r - 1$ or 7 when borrowed.

Example 1.25: Multiplication

```
   543
 ×  27
------
 4665
1306
------
17745
```

Scratchpad

$3 \times 7 = (21)_{10} = (25)_8$ ← These can be
$4 \times 7 = (28)_{10} = (34)_8$ obtained directly
$5 \times 7 = (35)_{10} = (43)_8$ from Table 1.4.

```
   25
   34
   43
------
 4665
```

$3 \times 2 = (6)_{10} = (6)_8$
$4 \times 2 = (8)_{10} = (10)_8$
$5 \times 2 = (10)_{10} = (12)_8$

```
   06
   10
   12
------
 1306
```

product

Example 1.26: Division

$543 \div 7$

```
      062
 7 ) 543
     0
     ---
     543
     52
     ---
      23
      16
      ---
       5
```

Use the multiplication table in Table 1.4 to derive the quotient digit (by trial and error).

1.4.3 Hexadecimal Arithmetic

Table 1.5 shows the addition and multiplication tables. The following examples illustrate hexadecimal arithmetic.