3.19 Cameron Cross

$74 \div 21$

$$21\overline{)74}\ 3$$
$$-63$$
$$11$$

$74 = 111100$
$21 = 10001$

Divisor $(21)_8$: 010001
Remainder $(74)_8$: 111100
Shift to the left so it is now 000001 111000
remainder ↑ quotient

1) 21 (remainder)
000001
-10001
110000
the remainder is less than 0. so add remainder to the divisor and shift the remainder to the left by 1-bit. it is now 000011 110000.

2) 000011
-10001
110010
shift to the left again. so it is now 0000111 100000.

3) 000111
-10001
110110
Shift to the left again because remainder is less than 0. It is now 00001111 000000.

4) 001111
-10001
111110
Shift to the left again, 011110 000000.

5) 011110
-10001
001101

remainder is greater than 1 so shift to the left add 1 to the quotient.
It is now 011010 000001.

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6) 011010
-10001
001001

greater than 1 so shift and add 1 again
it is now 010010 000011.

Shift right by 3 1 position to the left of the remainder it is now
001001 000011.

The octal equivalent to the remainder in binary 001001 is 11 and the quotient in octal is 3.