1. Computer Number Systems

$2019_{10} = 3743_8$
Written in ascending octal digits: 3347_8
$3347_8 = 11\ 011\ 100\ 111_8$
$\quad\quad = 110\ 1110\ 0111_{16}$
$\quad\quad = 6 \quad E \quad 7_{16}$

1. $6E7_{16}$ or 6E7

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2. Computer Number Systems

Convert each to binary:
a) $4765_8 = 100111110101_2$ \quad\quad 8 1's
b) $ABE_{16} = 101010111110_2$ \quad\quad 8 1's
c) $8271_{10} = 10000001001111_2$ \quad\quad 6 1's
d) 1011111011_2 \quad\quad\quad\quad\quad 8 1's

2. 8271_{10} or 8271

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3. Recursive Functions

f(-5) = f(-5 + 3) - 2 = f(-2) - 2 = 0 - 2 = -2
f(-2) = f(-2 + 3) - 2 = f(1) - 2 = 2 - 2 = 0
f(1) = f(1 + 3) - 2 = f(4) - 2 = 4 - 2 = 2
f(4) = f(2*4-1) + 1 = f(7) + 1 = 3 + 1 = 4
f(7) = 7 - 4 = 3
f(0) = f(0 + 3) - 2 = f(3) - 2 = 6 - 2 = 4
f(3) = f(3 + 3) - 2 = f(6) - 2 = 8 - 2 = 6
f(6) = f(2*6 - 1) + 1 = f(11) + 1 = 7 + 1 = 8
f(11) = 11 - 4 = 7
So f(f(f(f(-5)))) = f(f(f(-2)))
$\quad\quad\quad\quad\quad$ = f(f(0))
$\quad\quad\quad\quad\quad$ = f(4)
$\quad\quad\quad\quad\quad$ = 4

3. 4

INTERMEDIATE DIVISION SOLUTIONS

4. Recursive Functions

4. 6

$f(1) = 3$
$f(2) = 5$
$f(3) = 3 * f(2) - f(1) = 3 * 5 - 3 = 12$
$f(4) = 3 * f(3) - f(2) = 3 * 12 - 5 = 31$
$f(5) = 3 * f(4) - f(3) = 3 * 31 - 12 = 81$
$f(6) = 3 * f(5) - f(4) = 3 * 81 - 31 = 212 > 200$

5. What Does This Program Do?

5. 32

a	b	c	d	e	f
20	4	10	2		
20	4	10	2		24
20	14	10	2		24
20	14	10	2	14	24
20	24	10	2	14	24
20	4	10	2	14	24
4	4	10	2	14	24

$x = (f / (a + d) - f / (b * d) + (e + d)/(a * b))^{((f - e)/d)}$
$= (24/(4 + 2) - 24 /(4 * 2) + (14 + 2)/(4 * 4))^{((24 - 14)/2)}$
$= (24/6 - 24/8 + 16/16)^{(10/2)}$
$= (4 - 3 + 1)^5$
$= 2^5 = 32$