1. Convert $(321)_{10}$ to base 7 *Solution:* We repeatedly divide by 7 until the quotient is zero:

	Quotient		Remainder
$321 \div 7 =$	45	$+$	6
$45 \div 7 =$	6	$+$	3
$6 \div 7 =$	0	$+$	6

   By taking the remainders in reverse order, we find that: $(321)_{10} = (636)_7$

2. Convert $(214)_{10}$ to base 8 *Solution:* We repeatedly divide by 8 until the quotient is zero:

	Quotient		Remainder
$214 \div 8 =$	26	$+$	6
$26 \div 8 =$	3	$+$	2
$3 \div 8 =$	0	$+$	3

   By taking the remainders in reverse order, we find that: $(214)_{10} = (326)_8$

3. Convert $(234)_5$ to base 10

   Moving from left to right, we have:
   $(234)_5 = (2 \cdot 5^2) + (3 \cdot 5^1) + (4 \cdot 5^0) = 50 + 15 + 4 = (69)_{10}$

4. Working in base 8, find $267 \cdot 23$

   Tip: Carry the Quotient

	267	multiplicand
$\cdot$	23	multiplier
	25	$7 \cdot 3$
$+$	160	$+7 \cdot 20$
$+$	220	$+60 \cdot 3$
$+$	1400	$+60 \cdot 20$
$+$	600	$+200 \cdot 3$
$+$	4000	$+200 \cdot 20$
	6625	product

   The student here used this kind of multiplication 23.267 = (20 + 3)(200 + 60 + 7)= 3.200 + 3.60 + 3.7 + 20.200+ 20.60 + 20.7 = (now add and multiply mod 8, so write down the remainder (mod 8) and carry the quotient) = (6625)_8...   I guess this method is LONG

5. Working in base 16, find $FAB2 - 987E$

   Tip: Borrow the base

   $FAB2 - 987E = (F000 - 9000) + (A00 - 800) + (A0 - 70) + (18 - E) = 6234$

	FAB2	minuend
-	987E	subtrahend
	6234	difference

   See my comment above...

1

HW 18/9/2018 section 13

1) Convert 326 to base 8.

step 1: Divide until quotient = 0.

```
    40              5              0    ← stop
 8)326          8)40           8)5
   320             40            -0
   ───             ──             ──
    6              0              5
```

step 2: read remainders from right to left.

$$326 = (506)_8$$

2) convert 422 to base 16

A	B	C	D	E	F
10	11	12	13	14	15

```
    26             1              0    ← stop
16)422         16)26          16)1
   416            16            -0
   ───            ──            ──
    6             10             1
```

$$422 = (1\ A\ 6)_{16}$$

3) Convert $(2163)_7$ to base 10

$$= 2 \times 7^3 + 1 \times 7^2 + 6 \times 7^1 + 3 \times 7^0$$
$$= (780)_{10}$$

4)

```
      B   26
  (A B ₡ A)₁₆
 -(2 8 3 F)₁₆
 ──────────────
  (8 3 8 B)₁₆
```

$A(10) + 16 = 26 - 15 = 11 \pmod{16} = 11 = B$

$11 - 3 = 8 \pmod{16} = 8$

5)

```
    4 A   19
  0(A B. 3)₁₆
    (1  4)₁₆
 ──────────────
  2  A  C  C
  A  B  3  0
 ──────────────
  (D 5 F C)₁₆
```

$3 + 16 = 19$

$4 \times 19 = 76 \pmod{16} = 12$ (carry 4)

$40 + 4 = 44 \pmod{16} = 12$ (carry 2)

$40 + 2 = 42 \pmod{16} = 10$ (carry 2)

$B + A = 21 \pmod{16}$

```
       4
  16)76
     64
    (12)
       2
  16)44
     32
     12
       2
  16)42
     32
     10
```