Intro to Digits and Bases

1) D: all of the above

2) B: 10

3) A: 8

4) $2 \times 10^2 + 5 \times 10^1 + 5 \times 10^0$
$200 + 50 + 5$
255

Base 2, Binary

1)
- 1000 → $1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 = \boxed{8}$
- 1001 → $1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = \boxed{9}$
- 1101 → $1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$
$8 + 4 + 1$
$\boxed{13}$
- 1111 → $1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$
$8 + 4 + 2 + 1$
$\boxed{15}$

Asynchronous Lesson

Base 2, Binary

2) $32/2 = 16$ r 0
$16/2 = 8$ r 0
$8/2 = 4$ r 0
$4/2 = 2$ r 0
$2/2 = 1$ r 0
$1/2 = 0$ r 1

100000

$1 \times 2^5 + 0 + 0 + 0 + 0 + 0$

32

$42/2 = 21$ r 0
$21/2 = 10$ r 1
$10/2 = 5$ r 0
$5/2 = 2$ r 1
$2/2 = 1$ r 0
$1/2 = 0$ r 1

101010

$1 \times 2^5 + 0 + 1 \times 2^3 + 0 + 1 \times 2^1 + 0$

$32 + 0 + 8 + 0 + 2 + 0$

42

$11/2 = 5$ r 1
$5/2 = 2$ r 1
$2/2 = 1$ r 0
$1/2 = 0$ r 1

1011

$1 \times 2^3 + 0 + 1 \times 2^1 + 1 \times 2^0$

$8 + 0 + 2 + 1$

11

$17/2 = 8$ r 1
$8/2 = 4$ r 0
$4/2 = 2$ r 0
$2/2 = 1$ r 0
$1/2 = 0$ r 1

10001

$1 \times 2^4 + 0 + 0 + 0 + 1 \times 2^0$

$16 + 1$

17

Base 16, Hexadecimals

1) $\boxed{12 = C}$

2) $255 / 16 = 15$ r 15
$15 / 16 = 0$ r 15

$\boxed{255 = FF}$

$F \times 16^1 + F \times 16^0$
$15 \times 16 + 15 \times 1$
$240 + 15$
255

Base 20 Systems

1) a) $20^0 = 1$; $20^1 = 20$; $20^2 = 400$

b) $400 = \boxed{100} \rightarrow 1 \times 20^2 + 0 \times 20^1 + 0 \times 20^0$
400

c) $401 = \boxed{101} \rightarrow 1 \times 20^2 + 0 \times 20^1 + 1 \times 20^0$
$400 + 0 + 1$
401

2) $25 \rightarrow \boxed{15}$ $1 \times 20^1 + 5 \times 20^0$
$20 + 5 = 25$

$45 \rightarrow \boxed{25}$ $2 \times 20^1 + 5 \times 20^0$
$40 + 5 = 45$

$425 \rightarrow \boxed{115}$ $1 \times 20^2 + 1 \times 20^1 + 5 \times 20^0$
$400 + 20 + 5 = 425$

$625 \rightarrow \boxed{165}$ $1 \times 20^2 + 6 \times 20^1 + 5 \times 20^0$
$400 + 11 \times 20 + 5$
$400 + 220 + 5 = 625$

3) • 25 → 
• 45 → 

• 429 → 
• 625 → 

• 5 → —

• 25 → 

• 405 → 

• 605 →