

Reading Quiz 0.1

Intro. to digits and bases

1. D (all of the above)
2. B (10) There are 10 digits in the decimal system as the prefix -dec- means 10.
3. C (8 digits for an 8 based system)
4. $255 = \underset{(200)}{2 \times 10^2} + \underset{(50)}{5 \times 10^1} + \underset{(5)}{5 \times 10^0}$

Base or Binary

1. Binary to decimal

$$1000 = \underset{8}{(1 \times 2^3)} + \underset{0}{(0 \times 2^2)} + \underset{0}{(0 \times 2^1)} + \underset{0}{(0 \times 2^0)} = 8$$

$$1001 = \underset{8}{(1 \times 2^3)} + \underset{0}{(0 \times 2^2)} + \underset{0}{(0 \times 2^1)} + \underset{1}{(1 \times 2^0)} = 9$$

$$1101 = \underset{8}{(1 \times 2^3)} + \underset{4}{(1 \times 2^2)} + \underset{0}{(0 \times 2^1)} + \underset{1}{(1 \times 2^0)} = 13$$

$$1111 = \underset{8}{(1 \times 2^3)} + \underset{4}{(1 \times 2^2)} + \underset{2}{(1 \times 2^1)} + \underset{1}{(1 \times 2^0)} = 15$$

2. Decimal to Binary

$$32 =$$

$$32/2 = 16 \text{ r } 0$$

$$16/2 = 8 \text{ r } 0$$

$$8/2 = 4 \text{ r } 0$$

$$4/2 = 2 \text{ r } 0$$

$$2/2 = 1 \text{ r } 0$$

$$1/2 = 0 \text{ r } 1$$

$$\text{Binary} = \underline{100000}$$

$$11 =$$

$$11/2 = 5 \text{ r } 1$$

$$5/2 = 2 \text{ r } 1$$

$$2/2 = 1 \text{ r } 0$$

$$1/2 = 0 \text{ r } 1$$

$$\text{Binary} = \underline{1101}$$

$$42 =$$

$$42/2 = 21 \text{ r } 0$$

$$21/2 = 10 \text{ r } 1$$

$$10/2 = 5 \text{ r } 0$$

$$5/2 = 2 \text{ r } 1$$

$$2/2 = 1 \text{ r } 0$$

$$1/2 = 0 \text{ r } 1$$

$$\text{Binary} = \underline{101010}$$

$$17 =$$

$$17/2 = 8 \text{ r } 1$$

$$8/2 = 4 \text{ r } 0$$

$$4/2 = 2 \text{ r } 0$$

$$1/2 = 0 \text{ r } 1$$

$$\text{Binary} = \underline{10010001}$$

Base or Hexidecimals

i. The correct answer is B (12 in Hexidecimal = C)
system uses digits 1-9 and A=10, B=11, and C=12

$$2. \quad 255 =$$
$$255/16 = 15 \text{ r } 15$$



Since this 15 is already less than 16 we can not divide this any further. The hexidecimal expression is 15.

Base -20 Systems

1a.) $20^0 = 1$, $20^1 = 20$, and $20^2 = 400$

b.) $1 \times 20^2 = 400$

c.) $(1 \times 20^2) + (0 \times 20^1) + (1 \times 20^0) = 405$

2.)

$$25 = (0 \times 20^2) + (1 \times 20^1) + (5 \times 20^0) = 510$$

45 =

$$(0 \times 20^2) + (2 \times 20^1) + (5 \times 20^0) = 520$$

425 =

$$(1 \times 20^2) + (1 \times 20^1) + (5 \times 20^0) = 511$$

625 =

$$(1 \times 20^2) + (9 \times 20^1) + (9 \times 20^0) = 991$$

3.)

$$25 - 20 = 5$$

↓

$$\left(\begin{array}{c} \equiv \\ \equiv \\ \equiv \end{array} \right) \quad \begin{array}{c} \equiv \\ \equiv \\ \equiv \end{array} \quad \begin{array}{c} \equiv \\ \equiv \\ \equiv \end{array} \quad \begin{array}{c} \equiv \\ \equiv \\ \equiv \end{array}$$

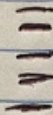
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minus equals

$$45 - 20 = 25$$

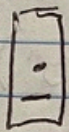


Mayan digits



$$425 - 20 = 405$$

$$1 \times 400 + 2 \times 20 + 5 \times 1 = 405$$



405