

**Changing a base 10 decimal/fraction to a base b decimal:**

A. Changing a base 10 fraction to a base b decimal is not very difficult:

1. If changing a base 10 decimal to a base b decimal, first change the decimal to a fraction and follow the steps below.
2. When changing a fraction to a base b decimal, you will usually have a fraction that has a denominator of  $b$ ,  $b^2$  or  $b^3$ .
3. If the denominator is  $b$ , change the numerator into base  $b$  then divide by 10.
4. If the denominator is  $b^2$ , change the numerator into base  $b$  then divide by 100.
5. If the denominator is  $b^3$ , change the numerator into base  $b$  then divide by 1000.

B. Examples:

Ex [1]  $4/25 = \underline{\hspace{2cm}}_5$ .

- a) Notice the denominator is  $5^2$ .
- b) 4 in base 10 is 4 in base 5.
- c) Divide by 100 and we get .04.
- d) The answer is .04.

Ex [2]  $9/64 = \underline{\hspace{2cm}}_4$ .

- a) Notice the denominator is  $4^3$ .
- b) 9 in base 10 is 21 in base 4. See [base 10 to b](#).
- c) Divide by 1000 and we get .021.
- d) The answer is .021.

Ex [3]  $.555... = \underline{\hspace{2cm}}_9$ .

- a) Before we can do this problem we must change  $.555...$  into  $5/9$ . See [repeating decimals](#).
- b) Notice the denominator is just 9.
- c) 5 in base 10 is 5 in base 9.
- d) Divide by 10 and we get .5.
- e) The answer is .5.