Negative Indices

1. Write the following as fractions without indices:

a. $5^{-1} = \frac{1}{5}$ b. $3^{-4} = \frac{1}{81}$ c. $2^{-3} = \frac{1}{8}$

d. $10^{-2} = \frac{1}{100}$ e. $4^{-3} = \frac{1}{64}$ f. $3^{-3} = \frac{1}{27}$

g. $11^{-2} = \frac{1}{121}$ h. $2^{-8} = \frac{1}{256}$ i. $5^{-4} = \frac{1}{625}$

j. $2 \times 3^{-2} = \frac{2}{9}$ k. $3 \times 3^{-4} = \frac{3}{81} = \frac{1}{27}$ l. $2^5 \times 10^{-4} = \frac{32}{10\,000} = \frac{2}{625}$

2. Write the following fractions in index form:

a. $\frac{1}{2} = 2^{-1}$ b. $\frac{1}{3} = 3^{-1}$ c. $\frac{1}{7} = 7^{-1}$

d. $\frac{1}{5^3} = 5^{-3}$ e. $\frac{1}{2^2} = 2^{-2}$ f. $\frac{1}{8^7} = 8^{-7}$

3. Fill in the gaps to convert these fractions into index form:

a. $\frac{1}{25} = 5^{\boxed{-2}}$ b. $\frac{1}{16} = 2^{\boxed{-4}}$ c. $\frac{1}{27} = 3^{\boxed{-3}}$

d. $\frac{1}{100} = \boxed{10}^{-2}$ e. $\frac{2}{9} = 2 \times 3^{\boxed{-2}}$ f. $\frac{4}{36} = 2^{\boxed{2}} \times 6^{\boxed{-2}}$

g. $\frac{25}{64} = 5^{\boxed{2}} \times 4^{\boxed{-3}}$ h. $\frac{8}{121} = \boxed{2}^{\boxed{3}} \times 11^{\boxed{2}}$ i. $\frac{125}{27} = \boxed{5}^{3} \times \boxed{3}^{-3}$

4. Convert the following decimals into index form using negative indices:

a. $0.1 = 10^{-1}$ b. $0.25 = 2^{-2}$ c. $0.125 = 2^{-3}$

d. $0.0001 = 10^{-4}$ e. $0.04 = 5^{-2}$ f. $0.0625 = 2^{-4}$