Question 1: Evaluate each of the following

(a) \(25^{\frac{1}{2}}\)  (b) \(81^{\frac{1}{2}}\)  (c) \(4^{\frac{1}{2}}\)  (d) \(144^{\frac{1}{2}}\)  (e) \(8^{\frac{1}{3}}\)  (f) \(125^{\frac{1}{3}}\)

(g) \(100^{\frac{1}{2}}\)  (h) \(1000^{\frac{1}{3}}\)  (i) \(49^{\frac{1}{2}}\)  (j) \(225^{\frac{1}{2}}\)  (k) \(64^{\frac{1}{3}}\)  (l) \(27^{\frac{1}{3}}\)

(m) \(216^{\frac{1}{3}}\)  (n) \(64^{\frac{1}{3}}\)  (o) \(16^{\frac{1}{4}}\)  (p) \(1^{\frac{1}{4}}\)  (q) \(81^{\frac{1}{4}}\)  (r) \(625^{\frac{1}{4}}\)

Question 2: Write each of the following in index form

(a) \(\sqrt{x}\)  (b) \(\sqrt{y}\)  (c) \(\sqrt[3]{a}\)  (d) \(\sqrt[4]{y}\)  (e) \(\sqrt[6]{x}\)  (f) \(\sqrt[8]{c}\)

Question 3: Evaluate each of the following

(a) \(9^{\frac{3}{2}}\)  (b) \(4^{\frac{3}{2}}\)  (c) \(8^{\frac{2}{3}}\)  (d) \(27^{\frac{2}{3}}\)  (e) \(125^{\frac{2}{3}}\)  (f) \(49^{\frac{3}{2}}\)

(g) \(4^{\frac{5}{2}}\)  (h) \(64^{\frac{2}{3}}\)  (i) \(9^{\frac{5}{2}}\)  (j) \(100^{\frac{3}{2}}\)  (k) \(16^{\frac{3}{2}}\)  (l) \(1000^{\frac{2}{3}}\)

(m) \(100^{\frac{5}{2}}\)  (n) \(32^{\frac{2}{5}}\)  (o) \(4^{\frac{7}{2}}\)  (p) \(8^{\frac{5}{3}}\)  (q) \(16^{\frac{3}{4}}\)  (r) \(81^{\frac{3}{4}}\)

(s) \(32^{\frac{3}{5}}\)  (t) \(27^{\frac{5}{3}}\)  (u) \(64^{\frac{5}{6}}\)  (v) \(10000^{\frac{3}{4}}\)

Question 4: Write each of the following in index form

(a) \(\sqrt[3]{a}\)  (b) \(\sqrt[w]{5}\)  (c) \(\sqrt[3]{x^2}\)  (d) \(\sqrt[3]{w^4}\)  (e) \(\sqrt[5]{m^2}\)  (f) \(\sqrt[9]{k^4}\)

Question 5: Write each of the following in the form \(9^n\)

(a) 81  (b) 3  (c) 27

Question 6: Write each of the following in the form \(64^n\)

(a) 8  (b) 4  (c) 16

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Question 7: Simplify each of the following
(a) \((9x^2)^{\frac{3}{2}}\)  (b) \((4x^6)^{\frac{1}{2}}\)  (c) \((25x^8)^{\frac{1}{3}}\)  (d) \((4x^3)^{\frac{1}{2}}\)  (e) \((8x^3)^{\frac{1}{3}}\)  (f) \((125x^6)^{\frac{1}{3}}\)

Question 8: Evaluate each of the following
(a) \((64x^3)^{\frac{2}{3}}\)  (b) \((9x^4)^{\frac{3}{2}}\)  (c) \((27x^6)^{\frac{2}{3}}\)  (d) \((4x^6)^{\frac{5}{3}}\)  (e) \((16x^8)^{\frac{3}{4}}\)  (f) \((32x^{20})^{\frac{3}{5}}\)

Question 9: Write each of the following as fractions
(a) \(8^{-\frac{2}{3}}\)  (b) \(25^{-\frac{3}{2}}\)  (c) \(64^{-\frac{2}{3}}\)  (d) \(4^{-\frac{5}{2}}\)  (e) \(81^{-\frac{3}{4}}\)  (f) \(100000^{-\frac{2}{5}}\)

Apply

Question 1: Arrange the following in order, smallest first.
\[25^{\frac{1}{2}}, 8^{\frac{2}{3}}, 27^{\frac{1}{3}}\]

Question 2: Which is the odd one out?
Explain your answer:
\[64^{\frac{1}{2}}, 16^{\frac{3}{4}}, 9^{\frac{2}{3}}, 4^{\frac{3}{2}}\]

Question 3: Work out
(a) \(64^{\frac{1}{3}} \times 2^3\)  (b) \(27^{\frac{2}{3}} \div 9^{\frac{3}{2}}\)  (c) \((8^{\frac{2}{3}})^2\)

Question 4: Gina has completed her homework. Can you spot any mistakes?

Question 1
\[\text{Work out } 9^{\frac{1}{2}}\]
\[4.5\]

Question 2
\[\text{Work out } 27^{\frac{2}{3}}\]
\[18\]