

# LEVELS

## Level 1

①  $\frac{4x^2y^3z}{8xy^5z}$

②  $16^{\frac{1}{4}} \cdot 25^{\frac{1}{2}}$

③ Put in Exponential Form:  
 $(\sqrt[3]{2})^7$

④  $(64n^2)^{-\frac{1}{6}}$

⑤  $4^{-2x} \cdot 4^x = 64$

## Level 2

①  $-10x^9y^{-2} \cdot 3xy^6$

②  $81^{\frac{2}{3}} + 125^{\frac{2}{3}}$

③ Put in Radical Form:  
 $x^{\frac{9}{5}}$

④  $\sqrt{50x^9y^8z^2}$

⑤  $27^{3x-7} = 9^{6x-1}$

## Level 3

①  $(\frac{4}{x^2z})^{-3} \cdot (7x)^0$

②  $(-125m^{12})^{-\frac{1}{3}}$

③ Put in Exponential Form  
 $\sqrt{x^2}$

④  $\frac{\sqrt[3]{16x^9y^{11}z}}{x^3y}$

⑤  $(\frac{1}{4})^{9x-5} = 32^{x+8}$

## Level 4

Which can be evaluated?

①  $(\frac{2x^{-2}y}{3x^3y})^{-3}$

② ①  $0^{-\frac{1}{2}}$  ②  $(-27)^{\frac{1}{3}}$  ③  $(8)^{-\frac{1}{3}}$

③ Put in Radical Form:  
 $(6x)^{\frac{2}{3}}$

④  $10^4\sqrt{32x^{17}} - 5x^3\sqrt[4]{2x^5}$

⑤  $(\frac{1}{6})^{3x+2} \cdot 216^{3x} = \frac{1}{216}$

⑥  $(\frac{1}{4x^4} \cdot x^{12})^{-\frac{1}{2}}$

# LEVELS

# Key

## Level 1

- ①  $\frac{4x^2y^3z}{8xy^5z}$   
 $\frac{x}{2y^2}$
- ②  $16^{\frac{1}{4}} \cdot 25^{\frac{1}{2}}$   
 $\sqrt[4]{16} \cdot \sqrt{25}$   
 $2 \cdot 5 = 10$
- ③ Put in Exponential Form:  
 $(\sqrt[3]{2})^7$   
 $2^{\frac{7}{3}}$
- ④  $(64n^{12})^{-\frac{1}{6}}$   
 $\frac{1}{(64n^{12})^{\frac{1}{6}}}$   
 $\frac{1}{2n^2}$
- ⑤  $4^{-2x} \cdot 4^x = 64$   
 $4^{-x} = 4^3$   
 $-x = 3$   
 $x = -3$

## Level 2

- ①  $(-10)x^9y^{-2} \cdot (3)xy^6$   
 $-30x^{10}y^4$
- ②  $81^{\frac{3}{4}} + 125^{\frac{2}{3}}$   
 $27 + 25 = 52$
- ③ Put in Radical Form:  
 $x^{\frac{9}{5}}$   
 $\sqrt[5]{x^9}$  OR  $(\sqrt[5]{x})^9$
- ④  $\sqrt{50x^9y^8z^2}$   
 $\sqrt{25 \cdot 2 \cdot x^8 \cdot x \cdot y^8 \cdot z^2}$   
 $5x^4y^4z\sqrt{2x}$
- ⑤  $27^{3x-7} = 9^{6x-1}$   
 $(3^3)^{3x-7} = (3^2)^{6x-1}$   
 $9x-21 = 12x-2$   
 $-19 = 3x$   
 $-\frac{19}{3} = x$

## Level 3

- ①  $(\frac{4}{x^2z})^{-3} \cdot (7x)^0$   
 $(\frac{x^6z^3}{64})^3 \cdot 1 = \frac{x^{18}z^9}{64^3}$
- ②  $(-125m^{12})^{-\frac{1}{3}}$   
 $\frac{1}{(-125m^{12})^{\frac{1}{3}}} = \frac{1}{-5m^4}$
- ③ Put in Exponential Form  
 $\sqrt[11]{x^2}$   
 $x^{\frac{2}{11}}$
- ④  $\frac{2x^3y^3\sqrt[3]{2y^2z}}{x^2y}$   
 $2y^2\sqrt[3]{2yz}$
- ⑤  $\frac{\sqrt[3]{16x^9y^{11}z}}{x^3y}$   
 $\frac{\sqrt[3]{8 \cdot 2 \cdot x^9 \cdot y^9 \cdot y^2z}}{x^3y}$   
 $\frac{2x^3y^3\sqrt[3]{2yz}}{x^3y}$
- ⑥  $(\frac{1}{4})^{9x-5} = 32^{x+8}$   
 $4^{-9x+5} = 32^{x+8}$   
 $2^{-18x+10} = 2^{5x+40}$   
 $-18x+10 = 5x+40$   
 $-23x = 30$   
 $x = -\frac{30}{23}$

## Level 4

Which can be evaluated?

- ①  $(\frac{2x^{-2}y}{3x^3y})^{-3}$   
 $(\frac{3x^3y}{2x^{-2}y})^3 \rightarrow (\frac{3x^5y}{2y})^3 = (\frac{3x^5}{2})^3 = \frac{27x^{15}}{8}$
- ② ①  $0^{-\frac{1}{2}}$  ②  $(-27)^{\frac{1}{3}}$  ③  $(8)^{-\frac{1}{3}}$
- ③ Put in Radical Form:  
 $(6x)^{\frac{3}{5}}$   
 $\sqrt[5]{(6x)^3}$  OR  $(\sqrt[5]{6x})^3$
- ④  $10^4\sqrt[4]{32x^{17}} - 5x^3\sqrt[4]{2x^5}$   
 $10\sqrt[4]{16 \cdot 2 \cdot x^{16}x}$   
 $20x^4\sqrt[4]{2x} - 5x^3\sqrt[4]{2x^5}$   
 $15x^4\sqrt[4]{2x}$
- ⑤  $(\frac{1}{6})^{3x+2} \cdot 216^{3x} = \frac{1}{216}$   
 $6^{-3x-2} \cdot 6^{9x} = 6^{-3}$   
 $6^{6x-2} = 6^{-3}$   
 $x = -\frac{1}{4}$
- ⑥  $(\frac{1}{4x^4} \cdot x^{12})^{-\frac{1}{2}}$   
 $(\frac{x^8}{4})^{-\frac{1}{2}} \rightarrow (\frac{4}{x^8})^{\frac{1}{2}}$   
 $(\frac{2}{x^4})$