

Name:

Powers and Exponents Worksheet

1 Simplify

a $\left(\frac{2}{3}\right)^9 \times \left(\frac{4}{9}\right)^{-6}$

b $\frac{(3b^3)^9}{(9b^2)^4}$

c $\frac{(4x^2)^6}{(2x^4)^4}$

d $(-4)^{100} \times (-4)^{20}$

2 Find the value of x

a $5^{\left(\frac{2}{5}\right)} = 5^x$

b $\left(\frac{8}{9}\right)^5 \times \left(\frac{9}{4}\right) = 2x$

c $6^x = 216$

d $x(3^{-5}) = 3$

3 Write in exponential form

a $\left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2}$

b $\left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1}$

4 Find the values of the following

a $(3^{-1} + 4^{-1} + 5^{-1})^0$

b $(3^0 + 4^{-1}) \times 2^2$

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Answers

1

$$\text{a) } \left(\frac{2}{3}\right)^9 \times \left(\frac{4}{9}\right)^{-6}$$

$$\frac{27}{8}$$

$$\text{c) } \frac{(4x^2)^6}{(2x^4)^4}$$

$$\frac{256}{x^4}$$

$$\text{b) } \frac{(3b^3)^9}{(9b^2)^4}$$

$$3b^{19}$$

$$\text{d) } (-4)^{100} \times (-4)^{20}$$

$$4^{120}$$

2

$$\text{a) } 5^{\left(\frac{2}{5}\right)} = 5^x$$

$$x = \frac{2}{5}$$

$$\text{c) } 6^x = 216$$

$$x = 3$$

$$\text{b) } \left(\frac{8}{9}\right)^5 \times \left(\frac{9}{4}\right) = 2x$$

$$x = \frac{4096}{6561}$$

$$\text{d) } x(3^{-5}) = 3$$

$$x = 729$$

3

$$\text{a) } \left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2}$$

$$\frac{15625}{64}$$

$$\text{b) } \left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1} \times \left(\frac{5}{2}\right)^{-1}$$

$$\frac{16}{625}$$

4

$$\text{a) } (3^{-1} + 4^{-1} + 5^{-1})^0$$

$$1$$

$$\text{b) } (3^0 + 4^{-1}) \times 2^2$$

$$5$$