

Chapter 7 Prerequisite Skills

1. Identify the coefficient, base, exponent, and power of each expression.

a) $(-3x)^4$ b) $-x^5$ c) x^{-3}

2. Evaluate each expression.

a) 2^3 b) $\left(\frac{2}{3}\right)^4$

c) $\frac{3}{6^2}$ d) $(-4)^3$

3. Evaluate each expression.

a) $xy^3 - x^2$, where $x = 3$ and $y = 2$

b) $-3x^2 + xy^5$, where $x = 1$ and $y = -2$

4. Simplify each expression. State the answer using positive exponents.

a) $(x^3y^{-5})^2$ b) $\frac{y^{-4}}{y^{-2}}$

c) $\left(\frac{g^{-1}}{g^0}\right)^3$ d) $(x^2y^{-5})^3$

e) $\frac{1}{s^2t^{-6}}$ f) $\left(\frac{n^4}{n^{-4}}\right)^{-3}$

5. What is the value of x in each equation?

a) $x^3 = 125$ b) $2^x = 64$ c) $(-4)^3 = x^3$

6. Evaluate each expression. Round your answers to four decimal places when possible.

a) $(0.5^2)^{-3}$ b) $[(5)(5^3)]^{-2}$

c) $\left[\left(\frac{2}{3}\right)^3\right]^{-3}$ d) $\left[\left(\frac{3}{4}\right)^{-4} \div \left(\frac{3}{4}\right)^2\right]^{-1}$

7. Simplify each expression as a power with a single, rational exponent.

a) $(x^3)\left(x^{\frac{7}{3}}\right)$ b) $\left(2b^{\frac{1}{5}}\right)\left(b^{\frac{9}{5}}\right)$

c) $\left(x^{\frac{1}{3}}y^4\right)^{\frac{1}{2}}$ d) $\left[\frac{(4n^2)}{(n^4)}\right]^{\frac{1}{2}}$

8. The intensity of light from a stage light decreases exponentially with the thickness of the coloured gels covering it. The intensity, I , in watts per square centimetre, can be calculated using the formula

$$I = 1200\left(\frac{4}{5}\right)^n, \text{ where } n \text{ is the number of}$$

coloured gels used. What is the intensity of light with the following number of gels?

a) 0 gels b) 2 gels c) 4 gels

9. Simplify, restating each expression using positive exponents.

a) $(x^3)\left(x^{\frac{2}{5}}\right)$ b) $\left[\frac{(x^{-2})}{(xy)^3}\right]^{1.5}$

c) $\frac{(m^{-2})^{\frac{2}{3}}}{\left(m^{\frac{1}{2}}\right)^5}$ d) $-(16s)^{0.25}$

10. Evaluate using a calculator. Express your answers to three decimal places where appropriate.

a) $(8^3)(8^{1.2})$ b) $\left(8^{\frac{2}{3}}\right)\left(16^{\frac{3}{2}}\right)$

c) $\left(\frac{9}{16}\right)^{\frac{1}{2}}$ d) $(7^3)^{\frac{2}{3}}$

11. A city with a population of 67 000 is losing 5% of its population each year. This situation can be represented by the equation $P = 67\,000(0.95)^n$, where P is the city's population and n is the number of years.

a) What will be the city's population in 5 years, 3 months?

b) If the rate of loss was the same in previous years, what was the population 3.5 years ago?

