

$$1. \quad a. \quad \frac{x^7}{x^{-3}} = x^{7-(-3)} \\ = x^{10}$$

$$b. \quad \frac{y^{-2}}{y^{-5}} = y^{-2-(-5)} \\ = y^3$$

$$c. \quad \frac{6^2}{6^{-1}} = 6^{2-(-1)} \\ = 6^3 \\ = 216$$

$$d. \quad \frac{(-2)^{-3}}{(-2)^{-5}} = (-2)^{-3-(-5)} \\ = (-2)^2 \\ = 4$$

$$e. \quad \frac{2}{2^{-2}} = 2^{1-(-2)} \\ = 2^3 \\ = 8$$

$$2. \quad a. \quad \frac{x^7}{x^{-3}} = x^7 x^3 \\ = x^{10}$$

$$b. \quad \frac{y^{-2}}{y^{-5}} = \frac{y^5}{y^2} \\ = y^3$$

$$c. \quad \frac{6^2}{6^{-1}} = 6^2 \cdot 6^1 \\ = 216$$

$$d. \quad \frac{(-2)^{-3}}{(-2)^{-5}} = \frac{(-2)^5}{(-2)^3} \\ = \frac{-32}{-8} \\ = 4$$

$$e. \quad \frac{2}{2^{-2}} = 2 \cdot 2^2 \\ = 8$$

$$3. \quad a. \quad \frac{x^{-7}}{x^{13}} = \frac{1}{x^{13-(-7)}} \\ = \frac{1}{x^{20}}$$

$$b. \quad \frac{y^{-2}}{y^5} = \frac{1}{y^{5-(-2)}} \\ = \frac{1}{y^7}$$

$$c. \quad \frac{6^{-2}}{6^{-1}} = \frac{1}{6^{-1-(-2)}} \\ = \frac{1}{6^1} \\ = \frac{1}{6}$$

$$d. \quad \frac{(-2)^{-7}}{(-2)^{-5}} = \frac{1}{(-2)^{-5-(-7)}} \\ = \frac{1}{(-2)^2} \\ = \frac{1}{4}$$

$$e. \quad \frac{2^{-5}}{2} = \frac{1}{2^{1-(-5)}} \\ = \frac{1}{2^6} \\ = \frac{1}{64}$$

$$4. \quad a. \quad \frac{x^{-7}}{x^{13}} = \frac{1}{x^{13} x^7} \\ = \frac{1}{x^{20}}$$

$$b. \quad \frac{y^{-2}}{y^5} = \frac{1}{y^5 y^2} \\ = \frac{1}{y^7}$$

$$c. \quad \frac{6^{-2}}{6^{-1}} = \frac{6^1}{6^2} \\ = \frac{6}{36} \\ = \frac{1}{6}$$

$$d. \quad \frac{(-2)^{-7}}{(-2)^{-5}} = \frac{(-2)^5}{(-2)^7} \\ = \frac{-32}{-128} \\ = \frac{1}{4}$$

$$e. \quad \frac{2^{-5}}{2} = \frac{1}{2 \cdot 2^5} \\ = \frac{1}{2 \cdot 32} \\ = \frac{1}{64}$$

$$5. \quad a. \quad x y^{-2} = x \cdot \frac{1}{y^2} \\ = \frac{x}{y^2}$$

$$b. \quad 8 y^{-2} = 8 \cdot \frac{1}{y^2} \\ = \frac{8}{y^2}$$

$$c. \quad a b^{-1} = a \cdot \frac{1}{b^1} \\ = \frac{a}{b}$$

$$d. \quad -6 b^{-1} = -6 \cdot \frac{1}{b^1} \\ = -\frac{6}{b}$$

$$e. \quad p q^0 = p \cdot 1 \\ = p$$

$$f. \quad 12 q^0 = 12 \cdot 1 \\ = 12$$

$$g. \quad \frac{t}{x^{-3}} = t x^3$$

$$h. \quad \frac{93}{x^{-3}} = 93 x^3$$

$$i. \quad \frac{1}{x y^{-8}} = \frac{y^8}{x}$$

$$j. \quad \frac{1}{7 y^{-8}} = \frac{y^8}{7}$$

$$k. \quad \frac{1}{a b^{-28}} = \frac{b^{28}}{a}$$

$$l. \quad \frac{1}{2 b^{-28}} = \frac{b^{28}}{2}$$

$$m. \quad \frac{x^{-2}}{y^{-3}} = \frac{y^3}{x^2}$$

$$n. \quad \frac{x^2}{y^{-3}} = x^2 y^3$$

$$o. \quad \frac{x^{-2}}{y^3} = \frac{1}{x^2 y^3}$$

$$p. \quad \frac{6^{-2}}{y^{-3}} = \frac{y^3}{6^2} \\ = \frac{y^3}{36}$$

$$q. \quad \frac{6^2}{y^{-3}} = 36 y^3$$

$$r. \quad \frac{6^{-2}}{y^3} = \frac{1}{6^2 y^3} \\ = \frac{1}{36 y^3}$$

$$5. \quad \text{s.} \quad \frac{x^{-2}}{2^{-3}} = \frac{2^3}{x^2} \\ = \frac{8}{x^2}$$

$$\text{t.} \quad \frac{x^2}{2^{-3}} = 2^3 x^2 \\ = 8x^2$$

$$\text{u.} \quad \frac{x^{-2}}{2^3} = \frac{1}{8x^2}$$

$$\text{v.} \quad \frac{6^{-2}}{2^{-3}} = \frac{2^3}{6^2} \\ = \frac{8}{36} \\ = \frac{2}{9}$$

$$\text{w.} \quad \frac{6^2}{2^{-3}} = 6^2 \cdot 2^3 \\ = 36 \cdot 8 \\ = 288$$

$$\text{x.} \quad \frac{6^{-2}}{2^3} = \frac{1}{2^3 \cdot 6^2} \\ = \frac{1}{288}$$

$$\text{y.} \quad (xy)^{-2} = \frac{1}{(xy)^2} \\ = \frac{1}{x^2 y^2}$$

or, as an alternative solution,

$$(xy)^{-2} = x^{-2} y^{-2} \\ = \frac{1}{x^2} \cdot \frac{1}{y^2} \\ = \frac{1}{x^2 y^2}$$

$$\text{z.} \quad (8y)^{-2} = \frac{1}{(8y)^2} \\ = \frac{1}{8^2 y^2} \\ = \frac{1}{64 y^2}$$

or, as an alternative solution,

$$(8y)^{-2} = 8^{-2} y^{-2} \\ = \frac{1}{8^2} \cdot \frac{1}{y^2} \\ = \frac{1}{64 y^2}$$

$$\text{A.} \quad (ab)^{-7} = \frac{1}{(ab)^7} \\ = \frac{1}{a^7 b^7}$$

or, as an alternative solution,

$$(ab)^{-7} = a^{-7} b^{-7} \\ = \frac{1}{a^7} \cdot \frac{1}{b^7} \\ = \frac{1}{a^7 b^7}$$

$$\text{B.} \quad (-2b)^{-7} = \frac{1}{(-2b)^7} \\ = \frac{1}{(-2)^7 b^7} \\ = -\frac{1}{128 b^7}$$

or, as an alternative solution,

$$(-2b)^{-7} = (-2)^{-7} b^{-7} \\ = \frac{1}{(-2)^7} \cdot \frac{1}{b^7} \\ = -\frac{1}{128 b^7}$$

5. C.  $(pq)^0 = 1$  D.  $(2q)^0 = 1$

E.  $\left(\frac{t}{x^{-3}}\right)^{-1} = \frac{x^{-3}}{t}$  or, as an A.S.,  $\left(\frac{t}{x^{-3}}\right)^{-1} = \frac{t^{-1}}{x^3}$ , or even  $\left(\frac{t}{x^{-3}}\right)^{-1} = (tx^3)^{-1}$   
 $= \frac{1}{tx^3}$   $= \frac{1}{tx^3}$   $= \frac{1}{tx^3}$

F.  $\left(\frac{93}{x^{-3}}\right)^{-1} = \frac{x^{-3}}{93}$  or, as an alternative solution,  $\left(\frac{93}{x^{-3}}\right)^{-1} = \frac{93^{-1}}{x^3}$   
 $= \frac{1}{93x^3}$   $= \frac{1}{93x^3}$

G.  $\frac{1}{(xy^{-8})^{-2}} = \frac{1}{x^{-2}y^{16}}$  or, as an alternative solution,  $\frac{1}{(xy^{-8})^{-2}} = (xy^{-8})^2$   
 $= \frac{x^2}{y^{16}}$   $= x^2y^{-16}$   
 $= \frac{x^2}{y^{16}}$

H.  $\frac{1}{(7y^{-8})^{-2}} = \frac{1}{7^{-2}y^{16}}$  or, as an alternative solution,  $\frac{1}{(7y^{-8})^{-2}} = (7y^{-8})^2$   
 $= \frac{7^2}{y^{16}}$   $= 7^2y^{-16}$   
 $= \frac{49}{y^{16}}$   $= \frac{49}{y^{16}}$

I.  $\left(\frac{1}{ab^{-28}}\right)^{-2} = \frac{1^{-2}}{a^{-2}b^{56}}$  or, as an alternative solution,  $\left(\frac{1}{ab^{-28}}\right)^{-2} = \left(\frac{ab^{-28}}{1}\right)^2$   
 $= \frac{1 \cdot a^2}{b^{56}}$   $= a^2b^{-56}$   
 $= \frac{a^2}{b^{56}}$   $= \frac{a^2}{b^{56}}$

$$\begin{array}{ll}
 \text{5. J. } \left(\frac{1}{2b^{-28}}\right)^{-2} = \frac{1^{-2}}{2^{-2} b^{56}} & \left(\frac{1}{2b^{-28}}\right)^{-2} = \left(\frac{2b^{-28}}{1}\right)^2 \\
 = \frac{1 \cdot 2^2}{b^{56}} & \text{or, as an alternative solution,} \quad = 2^2 b^{-56} \\
 = \frac{4}{b^{56}} & = \frac{4}{b^{56}}
 \end{array}$$

$$\begin{array}{l}
 \text{K. } \frac{1}{6^{-2}} = 6^2 \\
 = 36
 \end{array}$$

$$\begin{array}{l}
 \text{L. } -\frac{2^{-1}}{3} = -\frac{1}{2^1 \cdot 3} \\
 = -\frac{1}{6}
 \end{array}$$

$$\text{M. } -3^0 = -1$$

$$\begin{array}{l}
 \text{N. } (-7)^{-2} = \frac{1}{(-7)^2} \\
 = \frac{1}{49}
 \end{array}$$

$$\begin{array}{l}
 \text{O. } -8^{-2} = -\frac{1}{8^2} \\
 = -\frac{1}{64}
 \end{array}$$

$$\begin{array}{l}
 \text{P. } -6^{-2} - 6^{-2} = -\frac{1}{6^2} - \frac{1}{6^2} \\
 = -\frac{1}{36} - \frac{1}{36} \\
 = -\frac{1}{18}
 \end{array}$$

$$\begin{array}{l}
 \text{Q. } \frac{(3^{-1}x^{-2})^2}{(3xy^{-3})^{-2}} = \frac{3^{-2}x^{-4}}{3^{-2}x^{-2}y^6} \\
 = \frac{3^2x^2}{3^2x^4y^6} \\
 = \frac{1}{x^2y^6}
 \end{array}$$

$$\begin{array}{l}
 \text{R. } \left(-\frac{2x^2y^4}{4^{-1}y^{-3}}\right)^{-2} = \frac{2^{-2}x^{-4}y^{-8}}{4^2y^6} \\
 = \frac{1}{2^2 \cdot 4^2 x^4 y^6 y^8} \\
 = \frac{1}{64x^4y^{14}}
 \end{array}$$

$$\begin{array}{ll}
 \text{S. } \left(\frac{x^{-2}}{y^3}\right)^{-1} = \frac{x^2}{y^{-3}} & \text{or, as an alternative solution, } \left(\frac{x^{-2}}{y^3}\right)^{-1} = \left(\frac{y^3}{x^{-2}}\right)^1 \\
 = x^2 y^3 & = x^2 y^3
 \end{array}$$

$$\begin{array}{ll}
 \text{T. } \frac{(-6^{-2})^{-1}}{(-y^{-3})^{-2}} = \frac{-6^2}{y^6} & \frac{(-6^{-2})^{-1}}{(-y^{-3})^{-2}} = \frac{(-y^{-3})^2}{(-6^{-2})^1} \\
 & = \frac{y^{-6}}{-6^{-2}} \\
 & = \frac{6^2}{-y^6} \\
 & = -\frac{36}{y^6}
 \end{array}$$

or, as an alternative solution,