

**Exponents - Product Rule**

A) Use the product rule to rewrite each expression as a single exponent.

1) $(-5)^{-10} \cdot (-5)^{15}$

$$\{ -5 \} \underline{\hspace{1cm}}$$

2) $\left(\frac{4}{5}\right)^{-6} \cdot \left(\frac{4}{5}\right)^{-9}$

$$\left\{ \frac{4}{5} \right\} \underline{\hspace{1cm}}$$

3) $(1.4)^{-12} \cdot (1.4)^5$

$$\{ 1.4 \} \underline{\hspace{1cm}}$$

4) $\left(-\frac{7}{6}\right)^9 \cdot \left(-\frac{7}{6}\right)^3$

$$\left\{ - \right\} \underline{\hspace{1cm}}$$

5) $(-13)^0 \cdot (-13)^{-19}$

$$\{ -13 \} \underline{\hspace{1cm}}$$

6) $8^{-14} \cdot 8^{-4}$

$$\{ \quad \} \underline{\hspace{1cm}}$$

B) Find the value of x .

1) $10^x \cdot 10^{-9} = 10^{11}$

$$10 \underline{\hspace{1cm}} = 10 \underline{\hspace{1cm}}$$

$$x - 9 = 11$$

$$x = \underline{\hspace{2cm}}$$

2) $\left(-\frac{8}{7}\right)^{-x} \cdot \left(-\frac{8}{7}\right)^{-15} = \left(-\frac{8}{7}\right)^{-10}$

$$\left\{ \frac{-8}{7} \right\}^{-x-15} = \left\{ \frac{-8}{7} \right\}^{-10}$$

$$-x - 15 = -10$$

$$x = \underline{\hspace{2cm}}$$

3) $(-2.9)^{-13} \cdot (-2.9)^x = (-2.9)^{-5}$

$$-2.9^{-13+x} = -2.9^{-5}$$

$$-13 + x = -5$$

$$x = \underline{\hspace{2cm}}$$

4) $x^7 \cdot (5.6)^7 = (5.6)^{14}$

$$\{ x \}^7 = \{ 5.6 \}^{14-7}$$

$$x = \underline{\hspace{2cm}}$$

5) $(-20)^{16} \cdot (-20)^x = (-20)^{-3}$

$$\{ -20 \}^{16+x} = \{ -20 \}^{-3}$$

$$16 + x = -3$$

$$x = \underline{\hspace{2cm}}$$

6) $11^{-x} \cdot 11^6 = 11^{16}$

$$\{ 11 \}^{6-x} = \{ 11 \}^{16}$$

$$6 - x = 16$$

$$x = \underline{\hspace{2cm}}$$

C) 1) Which of the following equals $(-19)^{-12} \cdot (-19)^4$?

i) $(-19)^{-8}$

ii) $(-19)^8$

iii) $(-19)^{17}$

iv) $(-19)^{16}$

2) Find the value of x , if $(-4.5)^x \cdot (-4.5)^9 = (-4.5)^{11}$.

i) 20

ii) -5

iii) -3

iv) 2