Name : _____

Exponents - Product Rule

T1S1

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

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

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

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

_____ _____ _____

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

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

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

_____ _____ _____

B) Find the value of x.

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

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

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

x = _____ x = _____ x = _____

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

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

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

x = _____ x = _____ x = _____

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

Name : _____

Answer key

T1S1

Exponents - Product Rule

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

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

$(-5)^{5}$

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

$\left(\frac{4}{5}\right)^{-15}$

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

$(1.4)^{-7}$

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

$\left(-\frac{7}{6}\right)^{12}$

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

$(-13)^{-19}$

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

8^{-18}

B) Find the value of x.

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

$x =$ **20**

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

$x =$ **–5**

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

$x =$ **8**

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

$x =$ **5.6**

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

$x =$ **–19**

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

$x =$ **–10**

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

Name : _____

Exponents - Product Rule

T1S2

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

1) $(2.5)^{9} \cdot (2.5)^{10}$

2) $(-12)^{-8} \cdot (-12)^{-5}$

3) $9^{6} \cdot 9^{-17}$

4) $14^{-16} \cdot 14^{-4}$

5) $\left(\frac{5}{9}\right)^{19} \cdot \left(\frac{5}{9}\right)^{-9}$

6) $(-3.6)^{3} \cdot (-3.6)^{5}$

B) Find the value of x.

1) $\left(-\frac{6}{5}\right)^{5} \cdot \left(-\frac{6}{5}\right)^{-x} = \left(-\frac{6}{5}\right)^{12}$

2) $(5.4)^{x} \cdot (5.4)^{15} = (5.4)^{19}$

3) $x^{5} \cdot 2^{4} = 2^{9}$

$x =$ _____

$x =$ _____

$x =$ _____

4) $(-6.8)^{x} \cdot (-6.8)^{0} = (-6.8)^{9}$

5) $(-7)^{-10} \cdot (-7)^{-x} = (-7)^{-4}$

6) $\left(\frac{1}{2}\right)^{x} \cdot \left(\frac{1}{2}\right)^{8} = \left(\frac{1}{2}\right)^{5}$

$x =$ _____

$x =$ _____

$x =$ _____

C) 1) Find the value of x, if $4^{x} \cdot 4^{7} = 4^{18}$.

i) 13 ii) −12 iii) 11 iv) 8

2) Which of the following equals $\left(\frac{2}{7}\right)^{17} \cdot \left(\frac{2}{7}\right)^{-10}$?

i) $\left(\frac{2}{7}\right)^{7}$ ii) $\left(\frac{2}{7}\right)^{-27}$ iii) $\left(\frac{2}{7}\right)^{27}$ iv) $\left(\frac{2}{7}\right)^{-7}$

Name : _____

Answer key

T1S2

Exponents - Product Rule

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

1) $(2.5)^9 \cdot (2.5)^{10}$

$(2.5)^{19}$

2) $(-12)^{-8} \cdot (-12)^{-5}$

$(-12)^{-13}$

3) $9^6 \cdot 9^{-17}$

9^{-11}

4) $14^{-16} \cdot 14^{-4}$

14^{-20}

5) $\left(\frac{5}{9}\right)^{19} \cdot \left(\frac{5}{9}\right)^{-9}$

$\left(\frac{5}{9}\right)^{10}$

6) $(-3.6)^3 \cdot (-3.6)^5$

$(-3.6)^8$

B) Find the value of x.

1) $\left(-\frac{6}{5}\right)^5 \cdot \left(-\frac{6}{5}\right)^{-x} = \left(-\frac{6}{5}\right)^{12}$

$x =$ **-7**

2) $(5.4)^x \cdot (5.4)^{15} = (5.4)^{19}$

$x =$ **4**

3) $x^5 \cdot 2^4 = 2^9$

$x =$ **2**

4) $(-6.8)^x \cdot (-6.8)^0 = (-6.8)^9$

$x =$ **9**

5) $(-7)^{-10} \cdot (-7)^{-x} = (-7)^{-4}$

$x =$ **-6**

6) $\left(\frac{1}{2}\right)^x \cdot \left(\frac{1}{2}\right)^8 = \left(\frac{1}{2}\right)^5$

$x =$ **-3**

C) 1) Find the value of x, if $4^x \cdot 4^7 = 4^{18}$.

i) 13 ii) −12 iii) 11 iv) 8

2) Which of the following equals $\left(\frac{2}{7}\right)^{17} \cdot \left(\frac{2}{7}\right)^{-10}$?

i) $\left(\frac{2}{7}\right)^7$ ii) $\left(\frac{2}{7}\right)^{-27}$ iii) $\left(\frac{2}{7}\right)^{27}$ iv) $\left(\frac{2}{7}\right)^{-7}$

Name : _____

Exponents - Product Rule

T1S3

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

1) $\left(-\frac{2}{9}\right)^{12} \cdot \left(-\frac{2}{9}\right)^{6}$

2) $(-4.1)^{3} \cdot (-4.1)^{5}$

3) $(-3)^{-8} \cdot (-3)^{-8}$

_____ _____ _____

4) $6^{-7} \cdot 6^{2}$

5) $17^{-4} \cdot 17^{-11}$

6) $\left(\frac{1}{8}\right)^{9} \cdot \left(\frac{1}{8}\right)^{-5}$

_____ _____ _____

B) Find the value of x.

1) $(9.2)^{-x} \cdot (9.2)^{7} = (9.2)^{9}$

2) $7^{x} \cdot 7^{2} = 7^{6}$

3) $\left(\frac{7}{5}\right)^{8} \cdot \left(\frac{7}{5}\right)^{x} = \left(\frac{7}{5}\right)^{5}$

x = _____ x = _____ x = _____

4) $16^{10} \cdot x^{4} = 16^{14}$

5) $(-15)^{13} \cdot (-15)^{-x} = (-15)^{6}$

6) $(-8.7)^{-18} \cdot (-8.7)^{x} = (-8.7)^{-8}$

x = _____ x = _____ x = _____

C) 1) Which of the following equals $\left(\frac{1}{4}\right)^{0} \cdot \left(\frac{1}{4}\right)^{-15}$?

i) $\left(\frac{1}{8}\right)^{-15}$ ii) $\left(\frac{1}{4}\right)^{-15}$ iii) $\left(\frac{1}{4}\right)^{15}$ iv) $\left(\frac{2}{4}\right)^{-15}$

2) Find the value of x, if $12^{-x} \cdot 12^{3} = 12^{-17}$.

i) 14 ii) −16 iii) 20 iv) −18

Name : _____

Answer key

T1S3

Exponents - Product Rule

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

1) $\left(-\frac{2}{9}\right)^{12} \cdot \left(-\frac{2}{9}\right)^{6}$

$\left(-\frac{2}{9}\right)^{18}$

2) $(-4.1)^{3} \cdot (-4.1)^{5}$

$(-4.1)^{8}$

3) $(-3)^{-8} \cdot (-3)^{-8}$

$(-3)^{-16}$

4) $6^{-7} \cdot 6^{2}$

6^{-5}

5) $17^{-4} \cdot 17^{-11}$

17^{-15}

6) $\left(\frac{1}{8}\right)^{9} \cdot \left(\frac{1}{8}\right)^{-5}$

$\left(\frac{1}{8}\right)^{4}$

B) Find the value of x.

1) $(9.2)^{-x} \cdot (9.2)^{7} = (9.2)^{9}$

$x =$ **–2**

2) $7^{x} \cdot 7^{2} = 7^{6}$

$x =$ **4**

3) $\left(\frac{7}{5}\right)^{8} \cdot \left(\frac{7}{5}\right)^{x} = \left(\frac{7}{5}\right)^{5}$

$x =$ **–3**

4) $16^{10} \cdot x^{4} = 16^{14}$

$x =$ **16**

5) $(-15)^{13} \cdot (-15)^{-x} = (-15)^{6}$

$x =$ **7**

6) $(-8.7)^{-18} \cdot (-8.7)^{x} = (-8.7)^{-8}$

$x =$ **10**

C) 1) Which of the following equals $\left(\frac{1}{4}\right)^{0} \cdot \left(\frac{1}{4}\right)^{-15}$?

i) $\left(\frac{1}{8}\right)^{-15}$ ii) ✓ $\left(\frac{1}{4}\right)^{-15}$ iii) $\left(\frac{1}{4}\right)^{15}$ iv) $\left(\frac{2}{4}\right)^{-15}$

2) Find the value of x, if $12^{-x} \cdot 12^{3} = 12^{-17}$.

i) 14 ii) –16 iii) ✓ 20 iv) –18