Name : _____

Exponents - Quotient Rule

T1S1

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

1) $\dfrac{(-5)^{17}}{(-5)^{7}}$

2) $\dfrac{(1.4)^{4}}{(1.4)^{-2}}$

3) $\dfrac{2^{-3}}{2^{-5}}$

_____ _____ _____

4) $\left(\dfrac{2}{3}\right)^{0} \div \left(\dfrac{2}{3}\right)^{-18}$

5) $\dfrac{(-17)^{2}}{(-17)^{8}}$

6) $\dfrac{(-3.8)^{-5}}{(-3.8)^{4}}$

_____ _____ _____

B) Find the value of x.

1) $\dfrac{(2.5)^{11}}{(2.5)^{-x}} = (2.5)^{15}$

2) $\left(\dfrac{7}{9}\right)^{x} \div \left(\dfrac{7}{9}\right)^{6} = \left(\dfrac{7}{9}\right)^{-8}$

3) $\dfrac{(-14)^{x}}{(-14)^{-8}} = (-14)^{3}$

x = _____ x = _____ x = _____

4) $\dfrac{x^{-1}}{(-19)^{-2}} = -19$

5) $\dfrac{3^{x}}{3^{7}} = 3^{-3}$

6) $\left(-\dfrac{4}{5}\right)^{18} \div \left(-\dfrac{4}{5}\right)^{-x} = \left(-\dfrac{4}{5}\right)^{14}$

x = _____ x = _____ x = _____

C) 1) Which of the following equals $\dfrac{(-12)^{10}}{(-12)^{2}}$?

i) $(-12)^{12}$ ii) $(-12)^{8}$ iii) $(-12)^{-8}$ iv) $(-12)^{-12}$

2) Find the value of x, if $\dfrac{(6.1)^{16}}{(6.1)^{-x}} = (6.1)^{19}$.

i) 3 ii) −3 iii) −35 iv) 35

Name : _____

Answer key

T1S1

Exponents - Quotient Rule

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

1) $\dfrac{(-5)^{17}}{(-5)^{7}}$ — **$(-5)^{10}$**

2) $\dfrac{(1.4)^{4}}{(1.4)^{-2}}$ — **$(1.4)^{6}$**

3) $\dfrac{2^{-3}}{2^{-5}}$ — **2^{2}**

4) $\left(\dfrac{2}{3}\right)^{0} \div \left(\dfrac{2}{3}\right)^{-18}$ — **$\left(\dfrac{2}{3}\right)^{18}$**

5) $\dfrac{(-17)^{2}}{(-17)^{8}}$ — **$(-17)^{-6}$**

6) $\dfrac{(-3.8)^{-5}}{(-3.8)^{4}}$ — **$(-3.8)^{-9}$**

B) Find the value of x.

1) $\dfrac{(2.5)^{11}}{(2.5)^{-x}} = (2.5)^{15}$ — $x =$ **4**

2) $\left(\dfrac{7}{9}\right)^{x} \div \left(\dfrac{7}{9}\right)^{6} = \left(\dfrac{7}{9}\right)^{-8}$ — $x =$ **−2**

3) $\dfrac{(-14)^{x}}{(-14)^{-8}} = (-14)^{3}$ — $x =$ **−5**

4) $\dfrac{x^{-1}}{(-19)^{-2}} = -19$ — $x =$ **−19**

5) $\dfrac{3^{x}}{3^{7}} = 3^{-3}$ — $x =$ **4**

6) $\left(-\dfrac{4}{5}\right)^{18} \div \left(-\dfrac{4}{5}\right)^{-x} = \left(-\dfrac{4}{5}\right)^{14}$ — $x =$ **−4**

C) 1) Which of the following equals $\dfrac{(-12)^{10}}{(-12)^{2}}$?

i) $(-12)^{12}$ ii) ✓ $(-12)^{8}$ iii) $(-12)^{-8}$ iv) $(-12)^{-12}$

2) Find the value of x, if $\dfrac{(6.1)^{16}}{(6.1)^{-x}} = (6.1)^{19}$.

i) ✓ 3 ii) −3 iii) −35 iv) 35

Name : _____

Exponents - Quotient Rule

T1S2

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

1) $\dfrac{(9.3)^{8}}{(9.3)^{3}}$

2) $\left(\dfrac{5}{7}\right)^{-9} \div \left(\dfrac{5}{7}\right)^{4}$

3) $\dfrac{(-18)^{-12}}{(-18)^{-6}}$

_____ _____ _____

4) $\dfrac{(-4)^{-6}}{(-4)^{13}}$

5) $\dfrac{11^{17}}{11^{15}}$

6) $\left(-\dfrac{3}{4}\right)^{7} \div \left(-\dfrac{3}{4}\right)^{-11}$

_____ _____ _____

B) Find the value of x.

1) $\dfrac{(-13)^{-4}}{(-13)^{x}} = (-13)^{-20}$

2) $\dfrac{(-8.2)^{-1}}{x^{-3}} = (-8.2)^{2}$

3) $\dfrac{9^{-x}}{9^{7}} = 9^{-19}$

x = _____ x = _____ x = _____

4) $\left(\dfrac{1}{6}\right)^{-x} \div \left(\dfrac{1}{6}\right)^{5} = \left(\dfrac{1}{6}\right)^{15}$

5) $\dfrac{(-2)^{9}}{(-2)^{-x}} = -2$

6) $\dfrac{(4.7)^{x}}{(4.7)^{13}} = (4.7)^{-13}$

x = _____ x = _____ x = _____

C) 1) Which of the following equals $\dfrac{(-3.5)^{-8}}{(-3.5)^{-7}}$?

i) $(-3.5)^{-1}$ ii) $(-7)^{-15}$ iii) -3.5 iv) $(-7)^{-1}$

2) Find the value of x, if $\left(-\dfrac{7}{2}\right)^{14} \div x^{-4} = \left(-\dfrac{7}{2}\right)^{18}$.

i) 7 ii) $\dfrac{7}{2}$ iii) $-\dfrac{7}{2}$ iv) -7

Name : _____

Answer key

T1S2

Exponents - Quotient Rule

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

1) $\dfrac{(9.3)^{8}}{(9.3)^{3}}$

$(9.3)^{5}$

2) $\left(\dfrac{5}{7}\right)^{-9} \div \left(\dfrac{5}{7}\right)^{4}$

$\left(\dfrac{5}{7}\right)^{-13}$

3) $\dfrac{(-18)^{-12}}{(-18)^{-6}}$

$(-18)^{-6}$

4) $\dfrac{(-4)^{-6}}{(-4)^{13}}$

$(-4)^{-19}$

5) $\dfrac{11^{17}}{11^{15}}$

11^{2}

6) $\left(-\dfrac{3}{4}\right)^{7} \div \left(-\dfrac{3}{4}\right)^{-11}$

$\left(-\dfrac{3}{4}\right)^{18}$

B) Find the value of x.

1) $\dfrac{(-13)^{-4}}{(-13)^{x}} = (-13)^{-20}$

$x =$ **16**

2) $\dfrac{(-8.2)^{-1}}{x^{-3}} = (-8.2)^{2}$

$x =$ **−8.2**

3) $\dfrac{9^{-x}}{9^{7}} = 9^{-19}$

$x =$ **12**

4) $\left(\dfrac{1}{6}\right)^{-x} \div \left(\dfrac{1}{6}\right)^{5} = \left(\dfrac{1}{6}\right)^{15}$

$x =$ **−20**

5) $\dfrac{(-2)^{9}}{(-2)^{-x}} = -2$

$x =$ **−8**

6) $\dfrac{(4.7)^{x}}{(4.7)^{13}} = (4.7)^{-13}$

$x =$ **0**

C) 1) Which of the following equals $\dfrac{(-3.5)^{-8}}{(-3.5)^{-7}}$?

i) $(-3.5)^{-1}$ ✓ ii) $(-7)^{-15}$ iii) -3.5 iv) $(-7)^{-1}$

2) Find the value of x, if $\left(-\dfrac{7}{2}\right)^{14} \div x^{-4} = \left(-\dfrac{7}{2}\right)^{18}$.

i) 7 ii) $\dfrac{7}{2}$ iii) $-\dfrac{7}{2}$ ✓ iv) -7

Name : _____

Exponents - Quotient Rule

T1S3

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

1) $\dfrac{7^{11}}{7^{-4}}$

2) $\dfrac{(-20)^{-15}}{(-20)^{-13}}$

3) $\left(-\dfrac{1}{2}\right)^{11} \div \left(-\dfrac{1}{2}\right)^{5}$

_____ _____ _____

4) $\dfrac{(-4.1)^{6}}{(-4.1)}$

5) $\left(\dfrac{3}{5}\right)^{-7} \div \left(\dfrac{3}{5}\right)^{2}$

6) $\dfrac{16^{-4}}{16^{19}}$

_____ _____ _____

B) Find the value of x.

1) $(-x)^{13} \div \left(\dfrac{5}{4}\right)^{-3} = \left(\dfrac{5}{4}\right)^{16}$

2) $\dfrac{(-8)^{14}}{(-8)^{-x}} = (-8)^{7}$

3) $\dfrac{(-5.6)^{x}}{(-5.6)^{11}} = (-5.6)^{-7}$

$x =$ _____ $x =$ _____ $x =$ _____

4) $\dfrac{(-11)^{x}}{(-11)^{-8}} = (-11)^{-10}$

5) $\dfrac{(7.9)^{-x}}{7.9} = (7.9)^{-20}$

6) $\dfrac{15^{8}}{15^{-x}} = 15^{3}$

$x =$ _____ $x =$ _____ $x =$ _____

C) 1) Find the value of x, if $\left(\dfrac{6}{7}\right)^{x} \div \left(\dfrac{6}{7}\right)^{0} = \left(\dfrac{6}{7}\right)^{15}$.

i) -15 ii) 0 iii) -18 iv) 15

2) Which of the following equals $\dfrac{13^{-16}}{13^{-5}}$?

i) 13^{-21} ii) 13^{-11} iii) 13^{11} iv) 13^{21}

Name : _____

Answer key

T1S3

Exponents - Quotient Rule

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

1) $\dfrac{7^{11}}{7^{-4}}$

7^{15}

2) $\dfrac{(-20)^{-15}}{(-20)^{-13}}$

$(-20)^{-2}$

3) $\left(-\dfrac{1}{2}\right)^{11} \div \left(-\dfrac{1}{2}\right)^{5}$

$\left(-\dfrac{1}{2}\right)^{6}$

4) $\dfrac{(-4.1)^{6}}{(-4.1)}$

$(-4.1)^{5}$

5) $\left(\dfrac{3}{5}\right)^{-7} \div \left(\dfrac{3}{5}\right)^{2}$

$\left(\dfrac{3}{5}\right)^{-9}$

6) $\dfrac{16^{-4}}{16^{19}}$

16^{-23}

B) Find the value of x.

1) $(-x)^{13} \div \left(\dfrac{5}{4}\right)^{-3} = \left(\dfrac{5}{4}\right)^{16}$

$x =$ **$-\dfrac{5}{4}$**

2) $\dfrac{(-8)^{14}}{(-8)^{-x}} = (-8)^{7}$

$x =$ **-7**

3) $\dfrac{(-5.6)^{x}}{(-5.6)^{11}} = (-5.6)^{-7}$

$x =$ **4**

4) $\dfrac{(-11)^{x}}{(-11)^{-8}} = (-11)^{-10}$

$x =$ **-18**

5) $\dfrac{(7.9)^{-x}}{7.9} = (7.9)^{-20}$

$x =$ **19**

6) $\dfrac{15^{8}}{15^{-x}} = 15^{3}$

$x =$ **-5**

C) 1) Find the value of x, if $\left(\dfrac{6}{7}\right)^{x} \div \left(\dfrac{6}{7}\right)^{0} = \left(\dfrac{6}{7}\right)^{15}$.

i) -15 ii) 0 iii) -18 iv) 15 ✓

2) Which of the following equals $\dfrac{13^{-16}}{13^{-5}}$?

i) 13^{-21} ii) 13^{-11} ✓ iii) 13^{11} iv) 13^{21}