Name : _____

T2S1

Exponents - Quotient Rule

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

1) $\dfrac{(-b)^{12}}{(-b)^{7}}$

2) $\dfrac{(-17)^{-11}}{(-17)^{-3}}$

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

_____ _____ _____

4) $\left(\dfrac{m}{3}\right)^{-16} \div \left(\dfrac{m}{3}\right)^{-10}$

5) $\dfrac{(-t)^{-8}}{(-t)^{4}}$

6) $\dfrac{(-9.2)^{12}}{(-9.2)^{-6}}$

_____ _____ _____

B) Find the value of x.

1) $\dfrac{d^{8}}{d^{-x}} = d^{17}$

2) $\left(-\dfrac{1}{a}\right)^{x} \div \left(-\dfrac{1}{a}\right)^{4} = \left(-\dfrac{1}{a}\right)^{-8}$

3) $\dfrac{(-12)^{-4}}{(-12)^{x}} = (-12)^{-10}$

x = _____ x = _____ x = _____

4) $\dfrac{x^{4}}{(-2.5)^{11}} = (-2.5)^{-7}$

5) $\dfrac{w^{x}}{w} = w^{11}$

6) $\dfrac{(-s)^{3}}{(-s)^{-x}} = (-s)^{2}$

x = _____ x = _____ x = _____

C) 1) Find the value of x, if $\dfrac{(5.2)^{-16}}{(5.2)^{-x}} = (5.2)^{-13}$.

i) −29 ii) 29 iii) −3 iv) 3

2) Which of the following equals $\dfrac{c^{0}}{c^{4}}$?

i) c^{-12} ii) c^{-4} iii) c^{4} iv) c^{0}

Name : _____

Answer key

T2S1

Exponents - Quotient Rule

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

1) $\frac{(-b)^{12}}{(-b)^{7}}$ — **$(-b)^{5}$**

2) $\frac{(-17)^{-11}}{(-17)^{-3}}$ — **$(-17)^{-8}$**

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

4) $\left(\frac{m}{3}\right)^{-16} \div \left(\frac{m}{3}\right)^{-10}$ — **$\left(\frac{m}{3}\right)^{-6}$**

5) $\frac{(-t)^{-8}}{(-t)^{4}}$ — **$(-t)^{-12}$**

6) $\frac{(-9.2)^{12}}{(-9.2)^{-6}}$ — **$(-9.2)^{18}$**

B) Find the value of x.

1) $\frac{d^{8}}{d^{-x}} = d^{17}$ — $x =$ **9**

2) $\left(-\frac{1}{a}\right)^{x} \div \left(-\frac{1}{a}\right)^{4} = \left(-\frac{1}{a}\right)^{-8}$ — $x =$ **−4**

3) $\frac{(-12)^{-4}}{(-12)^{x}} = (-12)^{-10}$ — $x =$ **6**

4) $\frac{x^{4}}{(-2.5)^{11}} = (-2.5)^{-7}$ — $x =$ **−2.5**

5) $\frac{w^{x}}{w} = w^{11}$ — $x =$ **12**

6) $\frac{(-s)^{3}}{(-s)^{-x}} = (-s)^{2}$ — $x =$ **−1**

C) 1) Find the value of x, if $\frac{(5.2)^{-16}}{(5.2)^{-x}} = (5.2)^{-13}$.

i) −29 ii) 29 iii) −3 iv) 3 ✓

2) Which of the following equals $\frac{c^{0}}{c^{4}}$?

i) c^{-12} ii) c^{-4} ✓ iii) c^{4} iv) c^{0}

Name : _____

Exponents - Quotient Rule

T2S2

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

1) $\frac{h^4}{h^7}$

2) $\left(-\frac{u}{v}\right)^{-8} \div \left(-\frac{u}{v}\right)^{5}$

3) $\frac{14^{-3}}{14^{0}}$

_____

_____

_____

4) $\frac{(-s)^{11}}{(-s)^{-6}}$

5) $\frac{(-1.1)^{-2}}{(-1.1)^{-7}}$

6) $\frac{k^{16}}{k^{14}}$

_____

_____

_____

B) Find the value of x.

1) $\frac{(-9)^{x}}{(-9)^{6}} = (-9)^{-8}$

2) $\frac{n^{-2}}{x^{-5}} = n^{3}$

3) $\frac{(8.5)^{-13}}{(8.5)^{-x}} = (8.5)^{-20}$

x = _____

x = _____

x = _____

4) $\left(\frac{p}{5}\right)^{15} \div \left(\frac{p}{5}\right)^{-x} = \left(\frac{p}{5}\right)^{19}$

5) $\frac{(-y)^{-x}}{(-y)^{9}} = -y$

6) $\frac{c^{7}}{c^{x}} = c^{-4}$

x = _____

x = _____

x = _____

C) 1) Which of the following equal $\left(-\frac{2}{r}\right)^{-2} \div \left(-\frac{2}{r}\right)^{-5}$?

i) $\left(-\frac{2}{r}\right)^{3}$

ii) $\left(-\frac{2}{r}\right)^{-7}$

iii) $\left(-\frac{2}{r}\right)^{-3}$

iv) $\left(-\frac{2}{r}\right)^{7}$

2) Find the value of x, if $\frac{(-q)^{17}}{(-q)^{x}} = (-q)^{20}$.

i) 3

ii) 37

iii) –3

iv) –37

Name : _____

Answer key

T2S2

Exponents - Quotient Rule

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

1) $\frac{h^4}{h^7}$

h^{-3}

2) $\left(-\frac{u}{v}\right)^{-8} \div \left(-\frac{u}{v}\right)^{5}$

$\left(-\frac{u}{v}\right)^{-13}$

3) $\frac{14^{-3}}{14^{0}}$

14^{-3}

4) $\frac{(-s)^{11}}{(-s)^{-6}}$

$(-s)^{17}$

5) $\frac{(-1.1)^{-2}}{(-1.1)^{-7}}$

$(-1.1)^{5}$

6) $\frac{k^{16}}{k^{14}}$

k^{2}

B) Find the value of x.

1) $\frac{(-9)^{x}}{(-9)^{6}} = (-9)^{-8}$

$x =$ **-2**

2) $\frac{n^{-2}}{x^{-5}} = n^{3}$

$x =$ **n**

3) $\frac{(8.5)^{-13}}{(8.5)^{-x}} = (8.5)^{-20}$

$x =$ **-7**

4) $\left(\frac{p}{5}\right)^{15} \div \left(\frac{p}{5}\right)^{-x} = \left(\frac{p}{5}\right)^{19}$

$x =$ **4**

5) $\frac{(-y)^{-x}}{(-y)^{9}} = -y$

$x =$ **-10**

6) $\frac{c^{7}}{c^{x}} = c^{-4}$

$x =$ **11**

C) 1) Which of the following equal $\left(-\frac{2}{r}\right)^{-2} \div \left(-\frac{2}{r}\right)^{-5}$?

i) ✓ $\left(-\frac{2}{r}\right)^{3}$ ii) $\left(-\frac{2}{r}\right)^{-7}$ iii) $\left(-\frac{2}{r}\right)^{-3}$ iv) $\left(-\frac{2}{r}\right)^{7}$

2) Find the value of x, if $\frac{(-q)^{17}}{(-q)^{x}} = (-q)^{20}$.

i) 3 ii) 37 iii) ✓ -3 iv) -37

Name : _____

Exponents - Quotient Rule

T2S3

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

1) $\dfrac{(-2.4)^{9}}{(-2.4)^{-4}}$

2) $\dfrac{v^{-10}}{v^{-15}}$

3) $\left(\dfrac{4}{c}\right)^{17} \div \left(\dfrac{4}{c}\right)^{5}$

_____ _____ _____

4) $\dfrac{y}{y^{7}}$

5) $\left(-\dfrac{s}{t}\right)^{-6} \div \left(-\dfrac{s}{t}\right)^{4}$

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

_____ _____ _____

B) Find the value of x.

1) $(-x)^{-14} \div \left(-\dfrac{n}{2}\right)^{2} = \left(-\dfrac{n}{2}\right)^{-16}$

2) $\dfrac{(-17)^{9}}{(-17)^{-x}} = (-17)^{12}$

3) $\dfrac{(-t)^{x}}{(-t)^{4}} = (-t)^{-9}$

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

4) $\dfrac{(-r)^{0}}{(-r)^{-x}} = (-r)^{-11}$

5) $\dfrac{g^{-4}}{g^{x}} = g^{-11}$

6) $\dfrac{(3.3)^{-x}}{3.3} = (3.3)^{-19}$

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

C) 1) Find the value of x, if $\left(\dfrac{b}{a}\right)^{x} \div \left(\dfrac{b}{a}\right)^{-2} = \left(\dfrac{b}{a}\right)^{17}$.

i) −15 ii) 15 iii) 19 iv) −19

2) Which of the following equals $\dfrac{(-u)^{-11}}{(-u)^{-9}}$?

i) $(-u)^{-2}$ ii) $(-u)^{-20}$ iii) $(-u)^{2}$ iv) $(-u)^{20}$

Name : _____

Answer key

T2S3

Exponents - Quotient Rule

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

1) $\dfrac{(-2.4)^{9}}{(-2.4)^{-4}}$ = **$(-2.4)^{13}$**

2) $\dfrac{v^{-10}}{v^{-15}}$ = **v^{5}**

3) $\left(\dfrac{4}{c}\right)^{17} \div \left(\dfrac{4}{c}\right)^{5}$ = **$\left(\dfrac{4}{c}\right)^{12}$**

4) $\dfrac{y}{y^{7}}$ = **y^{-6}**

5) $\left(-\dfrac{s}{t}\right)^{-6} \div \left(-\dfrac{s}{t}\right)^{4}$ = **$\left(-\dfrac{s}{t}\right)^{-10}$**

6) $\dfrac{(-p)^{-12}}{(-p)^{-3}}$ = **$(-p)^{-9}$**

B) Find the value of x.

1) $(-x)^{-14} \div \left(-\dfrac{n}{2}\right)^{2} = \left(-\dfrac{n}{2}\right)^{-16}$; x = **$\dfrac{n}{2}$**

2) $\dfrac{(-17)^{9}}{(-17)^{-x}} = (-17)^{12}$; x = **3**

3) $\dfrac{(-t)^{x}}{(-t)^{4}} = (-t)^{-9}$; x = **−5**

4) $\dfrac{(-r)^{0}}{(-r)^{-x}} = (-r)^{-11}$; x = **−11**

5) $\dfrac{g^{-4}}{g^{x}} = g^{-11}$; x = **7**

6) $\dfrac{(3.3)^{-x}}{3.3} = (3.3)^{-19}$; x = **18**

C) 1) Find the value of x, if $\left(\dfrac{b}{a}\right)^{x} \div \left(\dfrac{b}{a}\right)^{-2} = \left(\dfrac{b}{a}\right)^{17}$.

i) −15 ii) 15 ✓ iii) 19 iv) −19

2) Which of the following equals $\dfrac{(-u)^{-11}}{(-u)^{-9}}$?

i) $(-u)^{-2}$ ✓ ii) $(-u)^{-20}$ iii) $(-u)^{2}$ iv) $(-u)^{20}$