Chapter 8. Polynomials

Ex. 8.2

Answer 1CU.

14503-8.2-1CU AID: 3575 | 10/11/2014

Consider the following product.

$54x^2y^3$

Monomial:

A monomial is a number or a variable or a product of a number and one or more variables.

And, an expression involving the division of variables is not a monomial.

To find two monomials whose product is the expression, $54x^2y^3$, write this product as follows.

$$\begin{aligned}54x^2y^3 &= (2\times 27)(xy)(xy^2)\\ &= (2xy)(27xy^2)\end{aligned}$$

Therefore the expression $54x^2y^3$ is a product of two monomials $\boxed{2xy, 27xy^2}$.

Answer 1RM.

An example of a geometry term that uses one of the prefixes mono, bi, tri, and poly is trinomial.

A trinomial is a group of three monomials.

Monomial means a single term.

For example, take

$3x^2 - 2x + 1$

This is a trinomial, since it is a combination of three monomials $3x^2, -2x, 1$.

Answer 2CU.

14503-8.2-2CU AID: 3575 | 10/11/2014

Consider the following expression.

$$\frac{a^3b^5}{a^2b^2}$$

Simplify this expression using negative exponents as follows.

$\frac{a^3b^5}{a^2b^2} = (a^3)(b^5)\left(\frac{1}{a^2}\right)\left(\frac{1}{b^2}\right)$ Write as a product of fractions

$= (a^3)(b^5)(a^{-2})(b^{-2})$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= (a^3 \cdot a^{-2})(b^5 \cdot b^{-2})$ Group powers with the same base

$= (a^{3-2})(b^{5-2})$ Use $a^m \cdot a^n = a^{m+n}$

$= ab^3$

Therefore, the simplified form of the given expression is $\boxed{ab^3}$.

Answer 2RM.

Monomial is a single term.

(a)

Binomial is a combination of two monomials, that is, it is a combination of two terms.

For example,

$$2x+1$$

This is a binomial, since it is a combination of two monomials $-2x, 1$.

(b)

A trinomial is a group of three monomials.

For example, take

$$3x^2 - 2x + 1$$

This is a trinomial, since it is a combination of three monomials $3x^2, -2x, 1$.

(c)

A polynomial is a group of more than one monomial (or) group of many monomials.

For example, take

$$8x^9 - 4x^5 + 3x^2 - 2x + 1$$

This is a polynomial, since it is a combination of five monomials $8x^9, -4x^5, 3x^2, -2x, 1$.

Answer 3CU.

Consider the following expression.

$$\frac{-4x^3}{x^5}$$

When simplifying the expression, Jamal and Emily used the rule, Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$ correctly.

At the same time, Jamal written the constant term -4 as it is in each simplified step, but Emily has written as,

$$-4 = \frac{1}{4}$$

This is wrong, so the Jamal is correct to simplify the expression $\frac{-4x^3}{x^5}$.

Answer 3RM.

(a)

The prefix semi- means half.

We can use this prefix to measure the area and perimeter of a circle.

For example, a perimeter of a semi-circle of radius 3 is $\pi(3) + 2(3) = 3\pi + 6$.

Or, the area of a semi-circle of radius 3 is $\frac{1}{2}\pi(3)^2 = \frac{9\pi}{2}$.

(b)

The prefix hexa- means six.

We can use this prefix for a figure having six line segments.

That is for hexagon, it is a group of six sides.

(c)

The prefix octa- means eight.

We can use this prefix for a figure having eight line segments.

That is for octagon, it is a group of eight sides.

Answer 4CU.

Consider the following expression.

$$\frac{7^8}{7^2}$$

To simplify this expression, use the quotient of powers, $\frac{a^m}{a^n} = a^{m-n}$ as follows.

$\frac{7^8}{7^2} = 7^{8-2}$ Put $a = 7, m = 8, n = 2$

$= 7^6$ Simplify

Therefore,

$$\frac{7^8}{7^2} = \boxed{7^6}$$

Answer 5CU.

Consider the following expression.

$$\frac{x^8 y^{12}}{x^2 y^7}$$

Simplify this expression as follows.

$\frac{x^8 y^{12}}{x^2 y^7} = \left(\frac{x^8}{x^2}\right)\left(\frac{y^{12}}{y^7}\right)$ Group powers that have the same base

$= \left(x^{8-2}\right)\left(y^{12-7}\right)$ Use quotient of powers, $\frac{a^m}{a^n} = a^{m-n}$

$= x^6 y^5$ Simplify

Therefore, the simplified form of the given expression is,

$$\frac{x^8 y^{12}}{x^2 y^7} = \boxed{x^6 y^5}$$

Answer 6CU.

Consider the following expression.

$$\left(\frac{2c^3d}{7z^2}\right)^3$$

Simplify this expression as follows.

$$\left(\frac{2c^3d}{7z^2}\right)^3 = \frac{\left(2c^3d\right)^3}{\left(7z^2\right)^3} \text{ Use } \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$= \frac{2^3\left(c^3\right)^3 d^3}{7^3\left(z^2\right)^3} \text{ Use } (ab)^m = a^m b^m$$

$$= \frac{8c^9d^3}{343z^6} \text{ Use } \left(a^m\right)^n = a^{mn}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{2c^3d}{7z^2}\right)^3 = \boxed{\frac{8c^9d^3}{343z^6}}$$

Answer 7CU.

Consider the following expression.

$$y^0\left(y^5\right)\left(y^{-9}\right)$$

Simplify this expression as follows.

$$y^0\left(y^5\right)\left(y^{-9}\right) = 1\left(y^5\right)\left(y^{-9}\right) \text{ Use } a^0 = 1$$

$$= \left(y^5\right)\left(\frac{1}{y^9}\right) \text{ Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \frac{y^5}{y^9}$$

$$= y^{5-9} \text{ Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}$$

$$= y^{-4}$$

$$= \frac{1}{y^4} \text{ Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

Therefore, the simplified form of the given expression is,

$$y^0\left(y^5\right)\left(y^{-9}\right) = \boxed{\frac{1}{y^4}}$$

Answer 8CU.

Consider the following expression.

$$13^{-2}$$

Simplify this expression as follows.

$13^{-2} = \frac{1}{13^2}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= \frac{1}{169}$ Write $13^2 = 169$

Therefore, the simplified form of the given expression is,

$$13^{-2} = \boxed{\frac{1}{169}}$$

Answer 9CU.

Consider the following expression.

$$\frac{c^{-5}}{d^3 g^{-8}}$$

Simplify this expression as follows.

$$\frac{c^{-5}}{d^3 g^{-8}} = \left(c^{-5}\right)\left(\frac{1}{d^3}\right)\left(\frac{1}{g^{-8}}\right)$$

$= \left(\frac{1}{c^5}\right)\left(\frac{1}{d^3}\right)\left(\frac{1}{\frac{1}{g^8}}\right)$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$$= \left(\frac{1}{c^5}\right)\left(\frac{1}{d^3}\right)\left(g^8\right)$$

$$= \frac{g^8}{c^5 d^3}$$

Therefore, the simplified form of the given expression is,

$$\frac{c^{-5}}{d^3 g^{-8}} = \boxed{\frac{g^8}{c^5 d^3}}$$

Answer 10CU.

Consider the following expression.

$$\frac{-5pq^7}{10p^6q^3}$$

Simplify this expression as follows.

$$\frac{-5pq^7}{10p^6q^3} = \left(\frac{-5}{10}\right)\left(\frac{p}{p^6}\right)\left(\frac{q^7}{q^3}\right)$$ Group powers with the same base

$$= \left(\frac{-1}{2}\right)\left(p^{1-6}\right)\left(q^{7-3}\right)$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= \left(\frac{-1}{2}\right)\left(p^{-5}\right)\left(q^4\right)$$ Simplify

$$= \left(\frac{-1}{2}\right)\left(\frac{1}{p^5}\right)\left(q^4\right)$$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$$= \frac{-q^4}{2p^5}$$

Therefore, the simplified form of the given expression is,

$$\frac{-5pq^7}{10p^6q^3} = \boxed{\frac{-q^4}{2p^5}}$$

Answer 11CU.

Consider the following expression.

$$\frac{\left(cd^{-2}\right)^3}{\left(c^4d^9\right)^{-2}}$$

Simplify this expression as follows.

$$\frac{\left(cd^{-2}\right)^3}{\left(c^4d^9\right)^{-2}} = \frac{(c)^3\left(d^{-2}\right)^3}{\left(c^4\right)^{-2}\left(d^9\right)^{-2}}$$ Use $(ab)^n = a^nb^n$

$$= \frac{\left(c^3\right)\left(d^{-6}\right)}{\left(c^{-8}\right)\left(d^{-18}\right)}$$ Use $\left(a^m\right)^n = a^{mn}$

$$= \left(\frac{c^3}{c^{-8}}\right)\left(\frac{d^{-6}}{d^{-18}}\right)$$ Group powers with the same base

$$= \left(c^{3-(-8)}\right)\left(d^{-6-(-18)}\right)$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= c^{11}d^{12}$$ Simplify

Therefore, the simplified form of the given expression is,

$$\frac{\left(cd^{-2}\right)^3}{\left(c^4d^9\right)^{-2}} = \boxed{c^{11}d^{12}}$$

Answer 12CU.

Consider the following expression.

$$\frac{\left(4m^{-3}n^{5}\right)^{0}}{mn}$$

Simplify this expression as follows.

$$\frac{\left(4m^{-3}n^{5}\right)^{0}}{mn}=\frac{1}{mn} \quad \text{Use } a^{0}=1$$

Therefore, the simplified form of the given expression is,

$$\frac{\left(4m^{-3}n^{5}\right)^{0}}{mn}=\boxed{\frac{1}{mn}}$$

Answer 13CU.

The volume of the cylinder with radius *r* and height *h* is,

$$\pi r^{2}h$$

And, the volume of the sphere with radius *r* is,

$$\frac{4}{3}\pi r^{3}$$

Then, the ratio of the volume of the cylinder to volume of the sphere is,

$$\frac{\pi r^{2}h}{\frac{4}{3}\pi r^{3}}=\frac{\cancel{\pi} r^{2}h}{\frac{4}{3}\cancel{\pi} r^{3}}$$

$$=\left(\frac{3}{4}\right)\left(\frac{r^{2}}{r^{3}}\right)(h) \quad \text{Group powers with the same base}$$

$$=\left(\frac{3}{4}\right)\left(r^{2-3}\right)(h) \quad \text{Use Quotient of powers } \frac{a^{m}}{a^{n}}=a^{m-n}$$

$$=\left(\frac{3}{4}\right)\left(r^{-1}\right)(h)$$

$$=\left(\frac{3}{4}\right)\left(\frac{1}{r}\right)(h) \quad \text{Use the negative exponent: } a^{-n}=\frac{1}{a^{n}}$$

$$=\boxed{\frac{3h}{4r}}$$

Answer 14PA.

Consider the following expression.

$$\frac{4^{12}}{4^2}$$

Simplify this expression as follows.

$$\frac{4^{12}}{4^2} = 4^{12-2} \text{ Use quotient of powers, } \frac{a^m}{a^n} = a^{m-n}$$

$$= 4^{10} \text{ Simplify}$$

Therefore, the simplified form of the given expression is,

$$\frac{4^{12}}{4^2} = \boxed{4^{10}}$$

Answer 15PA.

Consider the following expression.

$$\frac{3^{13}}{3^7}$$

Simplify this expression as follows.

$$\frac{3^{13}}{3^7} = 3^{13-7} \text{ Use quotient of powers, } \frac{a^m}{a^n} = a^{m-n}$$

$$= 3^6 \text{ Simplify}$$

Therefore, the simplified form of the given expression is,

$$\frac{3^{13}}{3^7} = \boxed{3^6}$$

Answer 16PA.

Consider the following expression.

$$\frac{p^7n^3}{p^4n^2}$$

Simplify this expression as follows.

$$\frac{p^7n^3}{p^4n^2} = \left(\frac{p^7}{p^4}\right)\left(\frac{n^3}{n^2}\right) \text{ Group powers with the same base}$$

$$= \left(p^{7-4}\right)\left(n^{3-2}\right) \text{ Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}$$

$$= \left(p^3\right)\left(n^1\right) \text{ Simplify}$$

$$= p^3n$$

Therefore, the simplified form of the given expression is,

$$\frac{p^7n^3}{p^4n^2} = \boxed{p^3n}$$

Answer 17PA.

Consider the following expression.

$$\frac{y^3z^9}{yz^2}$$

Simplify this expression as follows.

$$\frac{y^3z^9}{yz^2}=\left(\frac{y^3}{y}\right)\left(\frac{z^9}{z^2}\right) \text{ Group powers with the same base}$$

$$=\left(y^{3-1}\right)\left(z^{9-2}\right) \text{ Use Quotient of powers } \frac{a^m}{a^n}=a^{m-n}$$

$$=\left(y^2\right)\left(z^7\right) \text{ Simplify}$$

$$=y^2z^7$$

Therefore, the simplified form of the given expression is,

$$\frac{y^3z^9}{yz^2}=\boxed{y^2z^7}$$

Answer 18PA.

Consider the following expression.

$$\left(\frac{5b^4n}{2a^6}\right)^2$$

Simplify this expression as follows.

$$\left(\frac{5b^4n}{2a^6}\right)^2=\frac{\left(5b^4n\right)^2}{\left(2a^6\right)^2} \text{ Use } \left(\frac{a}{b}\right)^n=\frac{a^n}{b^n}$$

$$=\frac{5^2\left(b^4\right)^2n^2}{2^2\left(a^6\right)^2} \text{ Use } (ab)^n=a^nb^n$$

$$=\frac{25\left(b^8\right)n^2}{4\left(a^{12}\right)} \text{ Use } \left(a^m\right)^n=a^{mn}$$

$$=\frac{25b^8n^2}{4a^{12}}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{5b^4n}{2a^6}\right)^2=\boxed{\frac{25b^8n^2}{4a^{12}}}$$

Answer 19PA.

Consider the following expression.

$$\left(\frac{3m^7}{4x^5y^3}\right)^4$$

Simplify this expression as follows.

$$\left(\frac{3m^7}{4x^5y^3}\right)^4 = \frac{\left(3m^7\right)^4}{\left(4x^5y^3\right)^4} \quad \text{Use } \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$= \frac{3^4\left(m^7\right)^4}{4^4\left(x^5\right)^4\left(y^3\right)^4} \quad \text{Use } (ab)^n = a^n b^n$$

$$= \frac{3^4\left(m^{28}\right)}{4^4 x^{20} y^{12}} \quad \text{Use } \left(a^m\right)^n = a^{mn}$$

$$= \frac{81m^{28}}{256x^{20}y^{12}} \quad \text{Simplify}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{3m^7}{4x^5y^3}\right)^4 = \boxed{\frac{81m^{28}}{256x^{20}y^{12}}}$$

Answer 20PA.

Consider the following expression.

$$\frac{-2a^3}{10a^8}$$

Simplify this expression as follows.

$$\frac{-2a^3}{10a^8} = \left(\frac{-2}{10}\right)\left(\frac{a^3}{a^8}\right) \quad \text{Group powers with the same base}$$

$$= \left(\frac{-1}{5}\right)\left(a^{3-8}\right) \quad \text{Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}$$

$$= \left(\frac{-1}{5}\right)\left(a^{-5}\right) \quad \text{Use } \left(a^m\right)^n = a^{mn}$$

$$= \left(\frac{-1}{5}\right)\left(\frac{1}{a^5}\right) \quad \text{Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \frac{-1}{5a^5}$$

Therefore, the simplified form of the given expression is,

$$\frac{-2a^3}{10a^8} = \boxed{\frac{-1}{5a^5}}$$

Answer 21PA.

Consider the following expression.

$$\frac{15b}{45b^5}$$

Simplify this expression as follows.

$$\frac{15b}{45b^5}=\left(\frac{15}{45}\right)\left(\frac{b}{b^5}\right)$$ Group powers with the same base

$$=\left(\frac{\overset{1}{\cancel{15}}}{\underset{3}{\cancel{45}}}\right)\left(b^{1-5}\right)$$ Use Quotient of powers $\frac{a^m}{a^n}=a^{m-n}$

$$=\left(\frac{1}{3}\right)\left(b^{-4}\right)$$ Simplify

$$=\left(\frac{1}{3}\right)\left(\frac{1}{b^4}\right)$$ Use the negative exponent: $a^{-n}=\frac{1}{a^n}$

$$=\frac{1}{3b^4}$$

Therefore, the simplified form of the given expression is,

$$\frac{15b}{45b^5}=\boxed{\frac{1}{3b^4}}$$

Answer 22PA.

Consider the following expression.

$$x^3y^0x^{-7}$$

Simplify this expression as follows.

$$x^3y^0x^{-7}=\left(x^3x^{-7}\right)y^0$$ Group powers with the same base

$$=\left(x^{3-7}\right)y^0$$ Use product of powers: $a^m\cdot a^n=a^{m+n}$

$$=\left(x^{-4}\right)(1)$$ Use $a^0=1$

$$=\frac{1}{x^4}$$ Use the negative exponent: $a^{-n}=\frac{1}{a^n}$

Therefore, the simplified form of the given expression is,

$$x^3y^0x^{-7}=\boxed{\frac{1}{x^4}}$$

Answer 23PA.

Consider the following expression.

$$n^2(p^{-4})(n^{-5})$$

Simplify this expression as follows.

$n^2(p^{-4})(n^{-5}) = (n^2 n^{-5})(p^{-4})$ Group powers with the same base

$= (n^{2-5})(p^{-4})$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= (n^{-3})(p^{-4})$ Use $a^0 = 1$

$= \left(\frac{1}{n^3}\right)\left(\frac{1}{p^4}\right)$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= \frac{1}{n^3 p^4}$

Therefore, the simplified form of the given expression is,

$$n^2(p^{-4})(n^{-5}) = \boxed{\frac{1}{n^3 p^4}}$$

Answer 24PA.

Consider the following expression.

$$6^{-2}$$

Simplify this expression as follows.

$6^{-2} = \frac{1}{6^2}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= \frac{1}{36}$ Simplify

Therefore, the simplified form of the given expression is,

$$6^{-2} = \boxed{\frac{1}{36}}$$

Answer 25PA.

Consider the following expression.

$$5^{-3}$$

Simplify this expression as follows.

$5^{-3} = \frac{1}{5^3}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= \frac{1}{125}$ Use $5^3 = 5 \cdot 5 \cdot 5 (3 \text{ times})$

Therefore, the simplified form of the given expression is,

$$5^{-3} = \boxed{\frac{1}{125}}$$

Answer 26PA.

Consider the following expression.

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

Simplify this expression as follows.

$\left(\frac{4}{5}\right)^{-2} = \frac{1}{\left(\frac{5}{4}\right)^2}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$= \frac{1}{\frac{5^2}{4^2}}$ Use $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

$= \frac{1}{\frac{25}{16}}$ Simplify

$= \frac{16}{25}$

Therefore, the simplified form of the given expression is,

$$\left(\frac{4}{5}\right)^{-2} = \boxed{\frac{16}{25}}$$

Answer 27PA.

Consider the following expression.

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

Simplify this expression as follows.

$$\left(\frac{3}{2}\right)^{-3} = \frac{1}{\left(\frac{3}{2}\right)^{3}} \quad \text{Use the negative exponent: } a^{-n} = \frac{1}{a^{n}}$$

$$= \frac{1}{\left(\frac{3^3}{2^3}\right)} \quad \text{Use } \left(\frac{a}{b}\right)^{n} = \frac{a^n}{b^n}$$

$$= \frac{1}{\left(\frac{27}{8}\right)} \quad \text{Write } 3^3 = 3\cdot3\cdot3(3 \text{ times}) = 27, 2^3 = 2\cdot2\cdot2(3 \text{ times}) = 8$$

$$= \frac{8}{27}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{3}{2}\right)^{-3} = \boxed{\frac{8}{27}}$$

Answer 28PA.

Consider the following expression.

$$\frac{28a^7c^{-4}}{7a^3b^0c^{-8}}$$

Simplify this expression as follows.

$$\frac{28a^7c^{-4}}{7a^3b^0c^{-8}} = \left(\frac{28}{7}\right)\left(\frac{a^7}{a^3}\right)\left(\frac{1}{b^0}\right)\left(\frac{c^{-4}}{c^{-8}}\right) \quad \text{Group powers with the same base}$$

$$= \left(\frac{\overset{4}{\cancel{28}}}{\underset{1}{\cancel{7}}}\right)\left(a^{7-3}\right)\left(\frac{1}{1}\right)\left(c^{-4+8}\right) \quad \text{Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}, a^0 = 1, a \neq 0$$

$$= 4\left(a^4\right)\left(c^4\right) \quad \text{Simplify}$$

Therefore, the simplified form of the given expression is,

$$\frac{28a^7c^{-4}}{7a^3b^0c^{-8}} = \boxed{4a^4c^4}$$

Answer 29PA.

Consider the following expression.

$$\frac{30h^{-2}k^{14}}{5hk^{-3}}$$

Simplify this expression as follows.

$$\frac{30h^{-2}k^{14}}{5hk^{-3}}=\left(\frac{30}{5}\right)\left(\frac{h^{-2}}{h}\right)\left(\frac{k^{14}}{k^{-3}}\right) \text{ Group powers with the same base}$$

$$=\left(\frac{\cancel{30}^{\,6}}{\cancel{5}_{\,1}}\right)\left(h^{-2-1}\right)\left(k^{14-(-3)}\right) \text{ Use Quotient of powers } \frac{a^m}{a^n}=a^{m-n}$$

$$=(6)\left(h^{-3}\right)\left(k^{17}\right) \text{ Simplify}$$

$$=(6)\left(\frac{1}{h^3}\right)\left(k^{17}\right) \text{ Use the negative exponent: } a^{-n}=\frac{1}{a^n}$$

$$=\frac{6k^{17}}{h^3}$$

Therefore, the simplified form of the given expression is,

$$\frac{30h^{-2}k^{14}}{5hk^{-3}}=\boxed{\frac{6k^{17}}{h^3}}$$

Answer 30PA.

Consider the following expression.

$$\frac{18x^3y^4z^7}{-2x^2yz}$$

Simplify this expression as follows.

$$\frac{18x^3y^4z^7}{-2x^2yz}=\left(\frac{18}{-2}\right)\left(\frac{x^3}{x^2}\right)\left(\frac{y^4}{y}\right)\left(\frac{z^7}{z}\right) \text{ Group powers with the same base}$$

$$=-\left(\frac{\cancel{18}^{\,9}}{\cancel{2}_{\,1}}\right)\left(x^{3-2}\right)\left(y^{4-1}\right)\left(z^{7-1}\right) \text{ Use Quotient of powers } \frac{a^m}{a^n}=a^{m-n}$$

$$=-(9)\left(x^1\right)\left(y^3\right)\left(z^6\right) \text{ Simplify}$$

$$=9xy^3z^6$$

Therefore, the simplified form of the given expression is,

$$\frac{18x^3y^4z^7}{-2x^2yz}=\boxed{9xy^3z^6}$$

Answer 31PA.

Consider the following expression.

$$\frac{-19y^0z^4}{-3z^{16}}$$

Simplify this expression as follows.

$$\frac{-19y^0z^4}{-3z^{16}} = \left(\frac{-19}{-3}\right)\left(y^0\right)\left(\frac{z^4}{z^{16}}\right) \text{ Group powers with the same base}$$

$$= \left(\frac{19}{3}\right)(1)\left(z^{4-16}\right) \text{ Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}, a^0 = 1, a \neq 0$$

$$= \left(\frac{19}{3}\right)\left(z^{-12}\right) \text{ Simplify}$$

$$= \left(\frac{19}{3}\right)\left(\frac{1}{z^{12}}\right) \text{ Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

Therefore, the simplified form of the given expression is,

$$\frac{-19y^0z^4}{-3z^{16}} = \boxed{\frac{19}{3z^{12}}}$$

Answer 32PA.

Consider the following expression.

$$\frac{\left(5r^{-2}\right)^{-2}}{\left(2r^3\right)^2}$$

Simplify this expression as follows.

$$\frac{\left(5r^{-2}\right)^{-2}}{\left(2r^3\right)^2} = \frac{1}{\left(2r^3\right)^2} \times \frac{1}{\left(5r^{-2}\right)^2} \text{ Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \frac{1}{2^2\left(r^3\right)^2} \times \frac{1}{5^2\left(r^{-2}\right)^2} \text{ Use } (ab)^n = a^nb^n$$

$$= \frac{1}{24\left(r^6\right)} \times \frac{1}{25\left(r^{-4}\right)} \text{ Use power of a power } \left(a^m\right)^n = a^{mn}$$

$$= \frac{1}{24 \times 25} \times \frac{1}{\left(r^6r^{-4}\right)} \text{ Group powers with the same base}$$

$$= \frac{1}{600} \times \frac{1}{r^2} \text{ Use } a^m \cdot a^n = a^{m+n}$$

Therefore, the simplified form of the given expression is,

$$\frac{\left(5r^{-2}\right)^{-2}}{\left(2r^3\right)^2} = \boxed{\frac{1}{600r^2}}$$

Answer 33PA.

Consider the following expression.

$$\frac{p^{-4}q^{-3}}{\left(p^{5}q^{2}\right)^{-1}}$$

Simplify this expression as follows.

$$\frac{p^{-4}q^{-3}}{\left(p^{5}q^{2}\right)^{-1}}=\frac{p^{-4}q^{-3}}{p^{-5}q^{-2}} \text{ Use } (ab)^{n}=a^{n}b^{n}$$

$$=\left(\frac{p^{-4}}{p^{-5}}\right)\left(\frac{q^{-3}}{q^{-2}}\right) \text{ Group powers with the same base}$$

$$=\left(p^{-4-(-5)}\right)\left(q^{-3-(-2)}\right) \text{ Use Quotient of powers } \frac{a^{m}}{a^{n}}=a^{m-n}$$

$$=\left(p^{1}\right)\left(q^{-1}\right) \text{ Simplify}$$

$$=(p)\left(\frac{1}{q}\right) \text{ Use the negative exponent: } a^{-n}=\frac{1}{a^{n}}$$

Therefore, the simplified form of the given expression is,

$$\frac{p^{-4}q^{-3}}{\left(p^{5}q^{2}\right)^{-1}}=\boxed{\frac{p}{q}}$$

Answer 34PA.

Consider the following expression.

$$\left(\frac{r^{-2}t^{5}}{t^{-1}}\right)^{0}$$

Simplify this expression as follows.

$$\left(\frac{r^{-2}t^{5}}{t^{-1}}\right)^{0}=1 \text{ Use } a^{0}=1 \text{ for } a\neq 0$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{r^{-2}t^{5}}{t^{-1}}\right)^{0}=\boxed{1}$$

Answer 35PA.

Consider the following expression.

$$\left(\frac{4c^{-2}d}{b^{-2}c^{3}d^{-1}}\right)^{0}$$

Simplify this expression as follows.

$$\left(\frac{4c^{-2}d}{b^{-2}c^{3}d^{-1}}\right)^{0}=1 \text{ Use } a^{0}=1 \text{ for } a\neq 0$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{4c^{-2}d}{b^{-2}c^{3}d^{-1}}\right)^{0}=\boxed{1}$$

Answer 36PA.

Consider the following expression.

$$\left(\frac{5b^{-2}n^4}{n^2z^{-3}}\right)^{-1}$$

Simplify this expression as follows.

$$\left(\frac{5b^{-2}n^4}{n^2z^{-3}}\right)^{-1} = \frac{1}{\frac{5b^{-2}n^4}{n^2z^{-3}}} \quad \text{Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \frac{n^2z^{-3}}{5b^{-2}n^4}$$

$$= \left(\frac{1}{5}\right)\left(\frac{1}{b^{-2}}\right)\left(\frac{n^2}{n^4}\right)\left(z^{-3}\right) \quad \text{Group powers with the same base}$$

$$= \left(\frac{1}{5}\right)\left(b^2\right)\left(n^{2-4}\right)\left(z^{-3}\right) \quad \text{Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}$$

$$= \left(\frac{1}{5}\right)\left(b^2\right)\left(n^{-2}\right)\left(\frac{1}{z^3}\right) \quad \text{Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \left(\frac{1}{5}\right)\left(b^2\right)\left(\frac{1}{n^2}\right)\left(\frac{1}{z^3}\right) \quad \text{Use the negative exponent: } a^{-n} = \frac{1}{a^n}$$

$$= \frac{b^2}{5n^2z^3}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{5b^{-2}n^4}{n^2z^{-3}}\right)^{-1} = \boxed{\frac{b^2}{5n^2z^3}}$$

Answer 37PA.

Consider the following expression.

$$\left(\frac{2a^{-2}bc^{-1}}{3ab^{-2}}\right)^{-3}$$

Simplify this expression as follows.

$$\left(\frac{2a^{-2}bc^{-1}}{3ab^{-2}}\right)^{-3} = \frac{1}{\left(\frac{2a^{-2}bc^{-1}}{3ab^{-2}}\right)^{3}}$$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$$= \frac{1}{\frac{\left(2a^{-2}bc^{-1}\right)^3}{\left(3ab^{-2}\right)^3}}$$ Use $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

$$= \frac{\left(3ab^{-2}\right)^3}{\left(2a^{-2}bc^{-1}\right)^3}$$

$$= \frac{3^3a^3\left(b^{-2}\right)^3}{2^3\left(a^{-2}\right)^3b^3\left(c^{-1}\right)^3}$$ Use $(ab)^n = a^nb^n$

$$= \frac{3^3a^3b^{-6}}{2^3a^{-6}b^3c^{-3}}$$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$$= \left(\frac{3^3}{2^3}\right)\left(\frac{a^3}{a^{-6}}\right)\left(\frac{b^{-6}}{b^3}\right)\left(\frac{1}{c^{-3}}\right)$$ Group powers with the same base

$$= \left(\frac{27}{8}\right)\left(a^{3-(-6)}\right)\left(b^{-6-3}\right)\left(c^3\right)$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= \left(\frac{27}{8}\right)\left(a^9\right)\left(\frac{1}{b^9}\right)\left(c^3\right)$$

$$= \frac{27a^9c^3}{8b^9}$$

Therefore, the simplified form of the given expression is,

$$\left(\frac{2a^{-2}bc^{-1}}{3ab^{-2}}\right)^{-3} = \boxed{\frac{27a^9c^3}{8b^9}}$$

Answer 38PA.

The area of a rectangle is,

$$A = 24x^5y^3 \text{ square units}$$

And, the width of this rectangle is,

$$b = 8x^3y^2 \text{units}$$

Find the length of this rectangle as follows.

The area of a rectangle is,

$$A = (\text{length})(\text{width})$$
$$A = lb$$

Put the values of *A* and *b* in this equation, we get

$$24x^5y^3 = l(8x^3y^2)$$

$l = \dfrac{24x^5y^3}{8x^3y^2}$ Divide both sides by $8x^3y^2$

$= \left(\dfrac{24}{8}\right)\left(\dfrac{x^5}{x^3}\right)\left(\dfrac{y^3}{y^2}\right)$ Group powers with the same base

$= (3)(x^{5-3})(y^{3-2})$ Use Quotient of powers $\dfrac{a^m}{a^n} = a^{m-n}$

$$= (3)(x^2)(y^1)$$

$$= 3x^2y$$

Therefore, the length of the rectangle is $\boxed{3x^2y \text{ units}}$

Answer 39PA.

The area of a triangle is,

$$A = 100a^3b \text{ square units}$$

And, the base of this triangle is,

$$b = 20a^2 \text{units}$$

Find the height of this triangle as follows.

The area of a rectangle is,

$$A = \frac{1}{2}(\text{base})(\text{height})$$

$$A = \frac{1}{2}bh$$

Put the values of *A* and *b* in this equation, we get

$$100a^3b = \frac{1}{2}(20a^2)h$$

$$100a^3b = \frac{1}{\cancel{2}_1}\left(\cancel{20}^{10}a^2\right)h$$

$$100a^3b = (10a^2)h$$

$$h = \frac{100a^3b}{10a^2} \text{ Divide both sides by } 10a^2$$

$$= \left(\frac{100}{10}\right)\left(\frac{a^3}{a^2}\right)(b) \text{ Group powers with the same base}$$

$$= (10)(a^{3-2})(b) \text{ Use Quotient of powers } \frac{a^m}{a^n} = a^{m-n}$$

$$= (10)(a)(b)$$

$$= 10ab$$

Therefore, the height of the triangle is $\boxed{10ab \text{ units}}$

Answer 40PA.

The intensity of the sound heavy traffic is 10^{-3} watts/square meter.

And, the intensity of the sound normal conversation is 10^{-6} watts/square meter.

Let n be the number of times the sound heavy traffic is more intense than the sound normal conversation.

Then, we have

$$10^{-3} = n\left(10^{-6}\right)$$

$$n = \frac{10^{-3}}{10^{-6}}$$ Divide by 10^{-6}

$$= 10^{-3-(-6)}$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= 10^3$$

Therefore, the sound heavy traffic is $\boxed{10^3}$ times more intense than the sound normal conversation.

Answer 41PA.

The intensity of the sound noisy kitchen is 10^{-2} watts/square meter.

Let s be the intensity sound which is 10,000 times as loud as a noisy kitchen.

Then, we have

$$s = 10,000 \times 10^{-2}$$

$$= 10,000 \times \frac{1}{10^2}$$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$$= 10,000 \times \frac{1}{100}$$

$$= \overset{100}{\cancel{10,000}} \times \frac{1}{\underset{1}{\cancel{100}}}$$ Divide by 100

$$= 100$$

$$= 10^2$$

From the table, we observe that the sound of the jet plane is 10,000 times as loud as a noisy kitchen.

Answer 42PA.

The intensity of the sound whisper is 10^{-9} watts/square meter.

And, the intensity of the sound normal conversation is 10^{-6} watts/square meter.

The ratio of intensity of the sound whisper to intensity of the sound normal conversation is,

$\frac{10^{-9}}{10^{-6}} = 10^{-9-(-6)}$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$= 10^{-3}$

$= \frac{1}{10^3}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

Therefore, the intensity of the sound whisper is 10^3 times less than the intensity of the sound normal conversation.

Answer 43PA.

The probability of tossing a coin 2 times and getting 2 heads is,

$$\frac{1}{2} \cdot \frac{1}{2} = \left(\frac{1}{2}\right)^2$$

In the same way, the probability of tossing a coin *n* times and getting *n* heads is,

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \cdots \cdot \frac{1}{2} (n \text{ times}) = \boxed{\left(\frac{1}{2}\right)^n}$$

Answer 44PA.

The probability of tossing a coin *n* times and getting *n* heads is,

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \cdots \cdot \frac{1}{2} (n \text{ times}) = \left(\frac{1}{2}\right)^n$$

$= \frac{1^n}{2^n}$ Use $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

$= \frac{1}{2^n}$ Write $1^n = 1$

$= 2^{-n}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

Therefore, the probability of tossing a coin *n* times and getting *n* heads in power of 2 is $\boxed{2^{-n}}$.

Answer 45PA.

Given that the range of the wavelengths of visible light is,

10^{-5} to 10^{-4} cm

Now write the number $10^{-5}, 10^{-4}$ as follows.

$10^{-5} = \frac{1}{10^5}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$10^{-4} = \frac{1}{10^4}$

Therefore, the range of the wavelengths of visible light in positive exponents is,

$$10^{-5} \text{ to } 10^{-4} \text{ cm} = \boxed{\frac{1}{10^5} \text{ to } \frac{1}{10^4} \text{ cm}}$$

Answer 46PA.

Given that the range of X-rays of visible light is,

10^{-7} to 10^{-9} cm

Now write the number $10^{-7}, 10^{-9}$ as follows.

$10^{-7} = \frac{1}{10^7}$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$10^{-9} = \frac{1}{10^9}$

Therefore, the range of X-rays of visible light in positive exponents is,

$$10^{-7} \text{ to } 10^{-9} \text{ cm} = \boxed{\frac{1}{10^7} \text{ to } \frac{1}{10^9} \text{ cm}}$$

Answer 47PA.

Consider the following expression.

$a^n\left(a^3\right)$

Simplify this expression as follows.

$a^n\left(a^3\right) = a^n a^3$ Group powers with the same base

$= a^{n+3}$ Use product of powers $a^m a^n = a^{m+n}$

Therefore, the simplified form of the given expression is,

$$a^n\left(a^3\right) = \boxed{a^{n+3}}$$

Answer 48PA.

Consider the following expression.

$$\left(5^{4x-3}\right)\left(5^{2x+1}\right)$$

Simplify this expression as follows.

$\left(5^{4x-3}\right)\left(5^{2x+1}\right)=5^{4x-3}5^{2x+1}$ Group powers with the same base

$=5^{4x-3+2x+1}$ Use product of powers $a^m a^n = a^{m+n}$

$=5^{6x-2}$

Therefore, the simplified form of the given expression is,

$$\left(5^{4x-3}\right)\left(5^{2x+1}\right)=\boxed{5^{6x-2}}$$

Answer 49PA.

Consider the following expression.

$$\frac{c^{x+7}}{c^{x-4}}$$

Simplify this expression as follows.

$\frac{c^{x+7}}{c^{x-4}}=c^{x+7-(x-4)}$ Use Quotient of powers $\frac{a^m}{a^n}=a^{m-n}$

$=c^{11}$

Therefore, the simplified form of the given expression is,

$$\frac{c^{x+7}}{c^{x-4}}=\boxed{c^{11}}$$

Answer 50PA.

Consider the following expression.

$$\frac{3b^{2n-9}}{b^{3(n-3)}}$$

Simplify this expression as follows.

$$\frac{3b^{2n-9}}{b^{3(n-3)}} = (3)\frac{b^{2n-9}}{b^{3n-9}}$$ Simplify the denominator

$$= (3)b^{2n-9-(3n-9)}$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= 3b^{2n-9-3n+9}$$ Simplify

$$= 3b^{-n}$$

$$= 3\left(\frac{1}{b^n}\right)$$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

Therefore, the simplified form of the given expression is,

$$\frac{3b^{2n-9}}{b^{3(n-3)}} = \boxed{\frac{3}{b^n}}$$

Answer 51PA.

We can compare pH levels by finding the ratio of one pH level to another in terms of the concentration c of hydrogen ions $c = \left(\frac{1}{10}\right)^{\text{pH}}$.

For example:

To compare a pH of 9 with a pH of 10, it is need to simplify the quotient of powers as follows.

$$\frac{\left(\frac{1}{10}\right)^9}{\left(\frac{1}{10}\right)^{10}} = \left(\frac{1}{10}\right)^{9-10}$$

$$= \left(\frac{1}{10}\right)^{-1}$$ Simplify

$$= \frac{1}{\left(\frac{1}{10}\right)^1}$$ Use the negative exponent: $a^{-n} = \frac{1}{a^n}$

$$= 10$$

Therefore, the pH of 9 is 10 times more acidic than the pH of 10.

Answer 52PAQ.

Consider the following expression.

$$\frac{2^2 \cdot 2^3}{2^{-2} \cdot 2^{-3}}$$

Simplify this expression as follows.

$$\frac{2^2 \cdot 2^3}{2^{-2} \cdot 2^{-3}} = \frac{2^{2+3}}{2^{-2-3}}$$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$$= \frac{2^5}{2^{-5}}$$ Simplify

$$= 2^{5-(-5)}$$ Use Quotient of powers $\frac{a^m}{a^n} = a^{m-n}$

$$= 2^{10}$$

Therefore, the simplified form of the given expression is,

$$\frac{2^2 \cdot 2^3}{2^{-2} \cdot 2^{-3}} = 2^{10}$$

So, the correct choice is (A).

Answer 23PA.

Consider the following pattern of numbers.

$$3^5 = 243, 3^4 = 81, 3^3 = 27, 3^2 = 9, \cdots$$

From this pattern, we observe that

The second number 81 is obtained by dividing the first number 243 by 3.

The third number 27 is obtained by dividing the second number 81 by 3.

The fourth number 9 is obtained by dividing the third number 27 by 3.

That is, each number is obtained by dividing the previous number by 3.

Therefore, we can complete the pattern as follows.

$$3^5 = 243, 3^4 = 81, 3^3 = 27, 3^2 = 9, 3^1 = 3, 3^0 = 1$$

So, $3^0 = 1$

Answer 54MYS.

Consider the following expression.

$$\left(m^3n\right)\left(mn^2\right)$$

Simplify this expression as follows.

$\left(m^3n\right)\left(mn^2\right)=\left(m^3m\right)\left(nn^2\right)$ Group powers with the same base

$=\left(m^{3+1}\right)\left(n^{2+1}\right)$ Use product of powers $a^m a^n=a^{m+n}$

$=m^4n^3$ Simplify

Therefore, the simplified form of the given expression is,

$$\left(m^3n\right)\left(mn^2\right)=\boxed{m^4n^3}$$

Answer 55MYS.

Consider the following expression.

$$\left(3x^4y^3\right)\left(4x^4y\right)$$

Simplify this expression as follows.

$\left(3x^4y^3\right)\left(4x^4y\right)=(3\cdot 4)\left(x^4\cdot x^4\right)\left(y\cdot y^3\right)$ Group powers with the same base

$=(12)\left(x^{4+4}\right)\left(y^{1+3}\right)$ Use product of powers $a^m a^n=a^{m+n}$

$=12\left(x^8\right)\left(y^4\right)$ Simplify

Therefore, the simplified form of the given expression is,

$$\left(3x^4y^3\right)\left(4x^4y\right)=\boxed{12x^8y^4}$$

Answer 56MYS.

Consider the following expression.

$$\left(a^3x^2\right)^4$$

Simplify this expression as follows.

$\left(a^3x^2\right)^4=\left(a^3\right)^4\left(x^2\right)^4$ Use $(ab)^n=a^nb^n$

$=\left(a^{12}\right)\left(x^8\right)$ Use power of a power $\left(a^m\right)^n=a^{mn}$

$=a^{12}x^8$ Simplify

Therefore, the simplified form of the given expression is,

$$\left(a^3x^2\right)^4=\boxed{a^{12}x^8}$$

Answer 57MYS.

Consider the following expression.

$$\left(3cd^5\right)^2$$

Simplify this expression as follows.

$\left(3cd^5\right)^2 = 3^2c^2\left(d^5\right)^2$ Use $(abc)^n = a^nb^nc^n$

$= 9c^2\left(d^{10}\right)$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$= 9c^2d^{10}$ Simplify

Therefore, the simplified form of the given expression is,

$$\left(3cd^5\right)^2 = \boxed{9c^2d^{10}}$$

Answer 58MYS.

Consider the following expression.

$$\left[\left(2^3\right)^2\right]^2$$

Simplify this expression as follows.

$\left[\left(2^3\right)^2\right]^2 = \left[2^6\right]^2$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$= 2^{12}$ Use power of a power $\left(a^m\right)^n = a^{mn}$

Therefore, the simplified form of the given expression is,

$$\left[\left(2^3\right)^2\right]^2 = \boxed{2^{12}}$$

Answer 59MYS.

Consider the following expression.

$$(-3ab)^3\left(2b^3\right)^2$$

Simplify this expression as follows.

$(-3ab)^3\left(2b^3\right)^2 = \left((-3)^3a^3b^3\right)\left(2^2\left(b^3\right)^2\right)$ Use $(ab)^n = a^nb^n$

$= \left(-27a^3b^3\right)\left(4\left(b^3\right)^2\right)$ Simplify

$= \left(-27a^3b^3\right)\left(4b^6\right)$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$= (-27\cdot 4)a^3\left(b^3\cdot b^6\right)$ Group powers with the same base

$= (-108)a^3\left(b^{3+6}\right)$ Use product of powers: $a^m\cdot a^n = a^{m+n}$

$= -108a^3b^9$

Therefore, the simplified form of the given expression is,

$$(-3ab)^3\left(2b^3\right)^2 = \boxed{-108a^3b^9}$$

Answer 60MYS.

Consider that, oz of mozzarella cheese has 147 mg of calcium.

Then x oz of mozzarella cheese has $147x\,\text{mg}$ of calcium

Also, oz of Swiss cheese has 219 mg of calcium.

Then y oz of Swiss cheese has $219y\,\text{mg}$ of calcium

It is given that we should take at least 1200 mg of calcium each day between the ages of 11 and 18.

Therefore,

$$147x\,\text{mg} + 219y\,\text{mg} \geq 1200\,\text{mg}$$

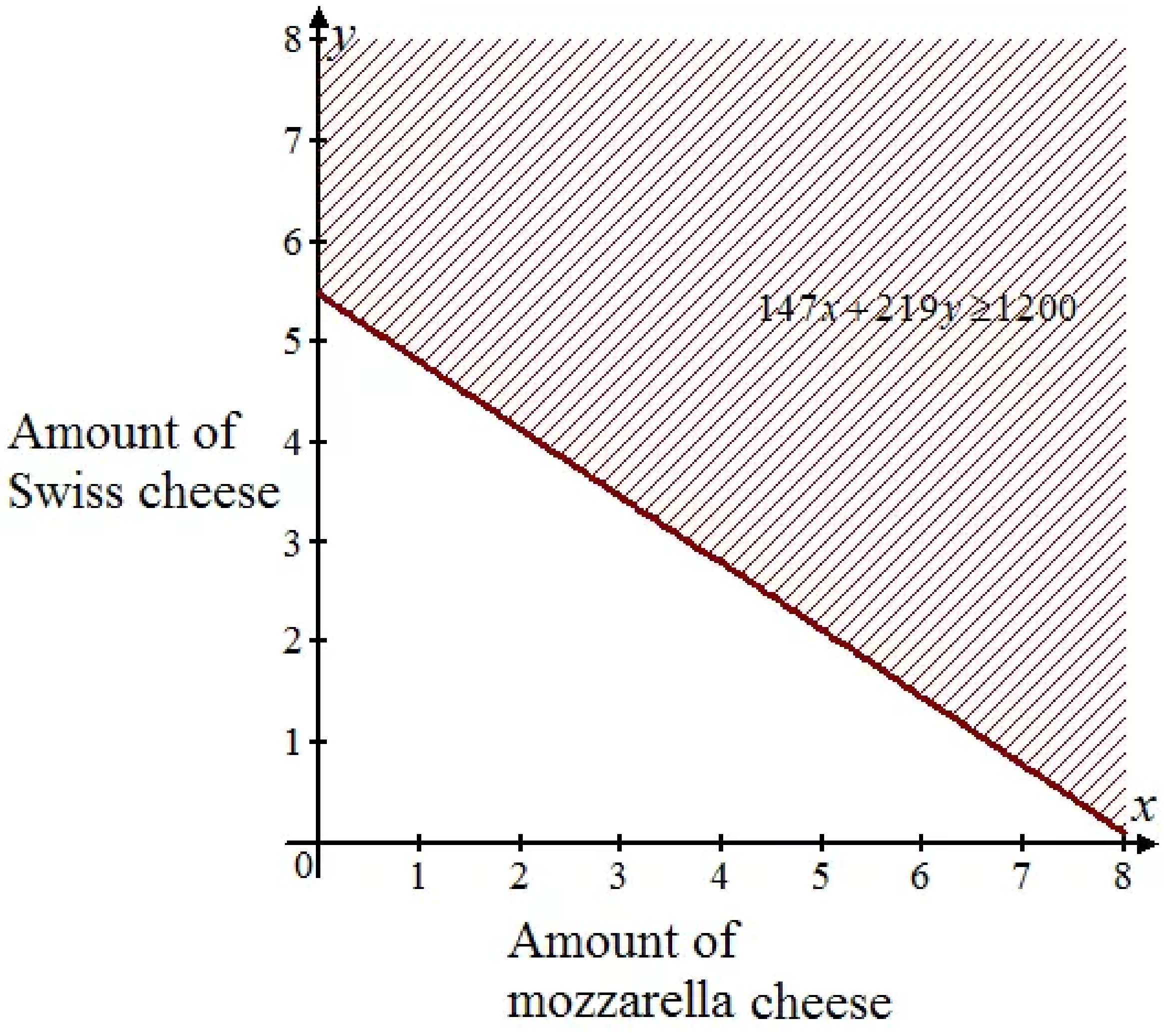
Or

$$147x + 219y \geq 1200$$

If we want to eat not more than 8 oz of cheese, then we have

$$x + y \leq 8$$

The graph of the possible amounts of each type of cheese we can eat and still get our daily requirement is shown below:



Answer 61MYS.

Consider that, oz of mozzarella cheese has 147 mg of calcium.

Then x oz of mozzarella cheese has $147x$ mg of calcium

Also, oz of Swiss cheese has 219 mg of calcium.

Then y oz of Swiss cheese has $219y$ mg of calcium

It is given that we should take at least 1200 mg of calcium each day between the ages of 11 and 18.

Therefore,

$$147x \text{ mg} + 219y \text{ mg} \geq 1200 \text{ mg}$$

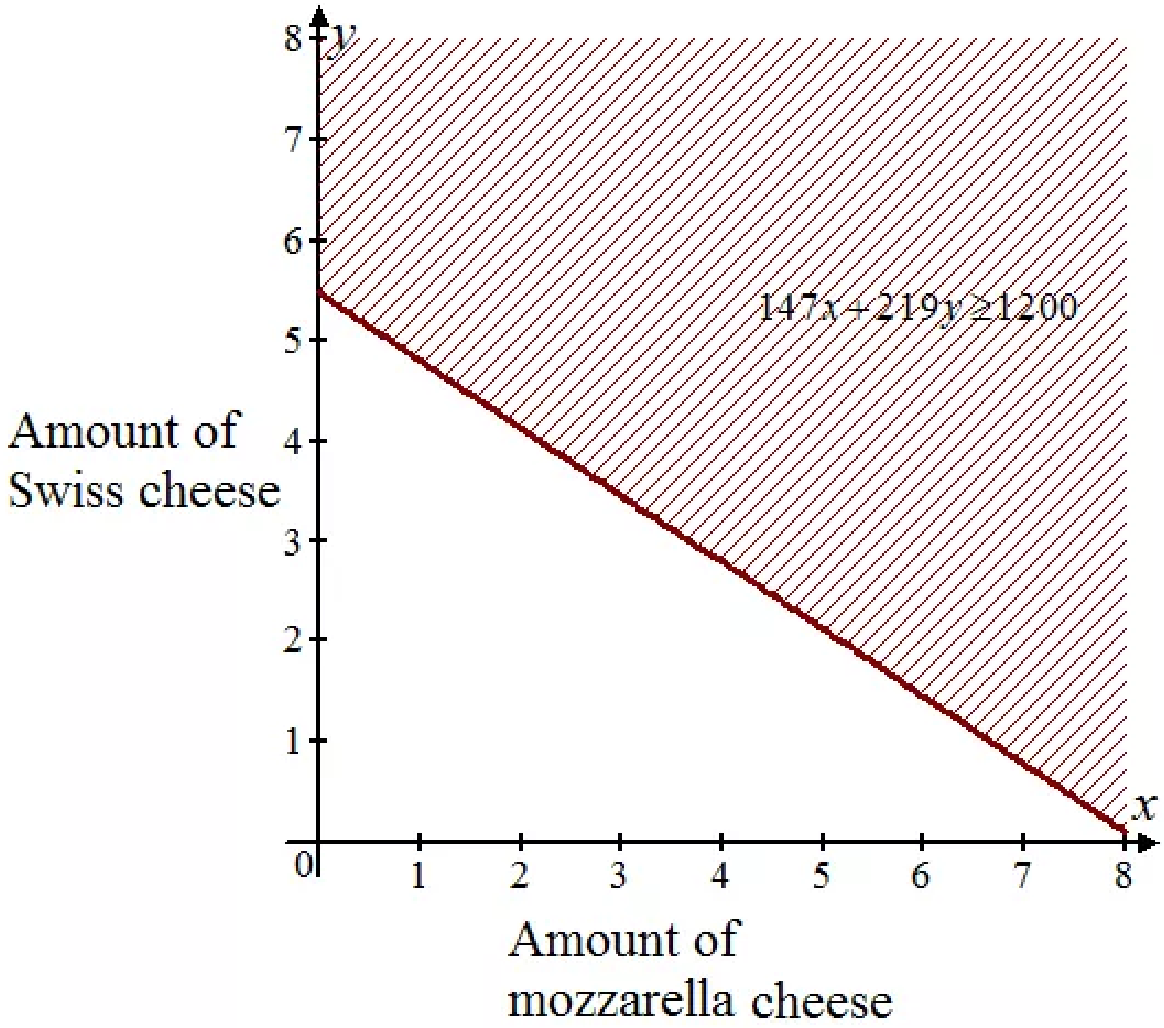
Or

$$147x + 219y \geq 1200$$

If we want to eat not more than 8 oz of cheese, then we have

$$x + y \leq 8$$

The graph of the possible amounts of each type of cheese we can eat and still get our daily requirement is shown below:



We can find the possible solutions satisfying $147x+219y\geq 1200$ as follows.

Three possible solutions (x,y):

1. Put $x=3, y=4$ in $147x+219y\geq 1200$, we have $147(3)+219(4)\geq 1317$, true

2. Put $x=4, y=3$ in $147x+219y\geq 1200$, we have $147(4)+219(3)\geq 1245$, true

3. Put $x=5, y=3$ in $147x+219y\geq 1200$, we have $147(5)+219(3)\geq 1392$, true

Therefore, the possible solutions are $\boxed{(3,4),(4,3),(5,3)}$

Answer 62MYS.

Consider that the slope of a line is 1, and its *y*-intercept is -4.

The equation of a line whose slope *a* and *y*-intercept *b* is,

$y=ax+b$

Put $a=1, b=-4$ in this equation.

$y=x-4$

Therefore, the equation of the required line is,

$\boxed{y=x-4}$

Answer 63MYS.

Consider that the slope of a line is -2, and its *y*-intercept is 3.

The equation of a line whose slope *a* and *y*-intercept *b* is,

$y=ax+b$

Put $a=-2, b=3$ in this equation.

$y=-2x+3$

Therefore, the equation of the required line is,

$\boxed{y=-2x+3}$

Answer 64MYS.

Consider that the slope of a line is $-\frac{1}{3}$, and its *y*-intercept is -1.

The equation of a line whose slope *a* and *y*-intercept *b* is,

$$y = ax + b$$

Put $a = -\frac{1}{3}, b = -1$ in this equation.

$$y = -\frac{1}{3}x - 1$$

Therefore, the equation of the required line is,

$$\boxed{y = -\frac{1}{3}x - 1}$$

Answer 65MYS.

Consider that the slope of a line is $\frac{3}{2}$, and its *y*-intercept is 2.

The equation of a line whose slope *a* and *y*-intercept *b* is,

$$y = ax + b$$

Put $a = \frac{3}{2}, b = 2$ in this equation.

$$y = \frac{3}{2}x + 2$$

Therefore, the equation of the required line is,

$$\boxed{y = \frac{3}{2}x + 2}$$

Answer 66MYS.

Consider the following equation.

$$2y = x + 10$$

To find *x*-intercept, put $y = 0$ in this equation.

$$0 = x + 10$$
$$x = -10$$

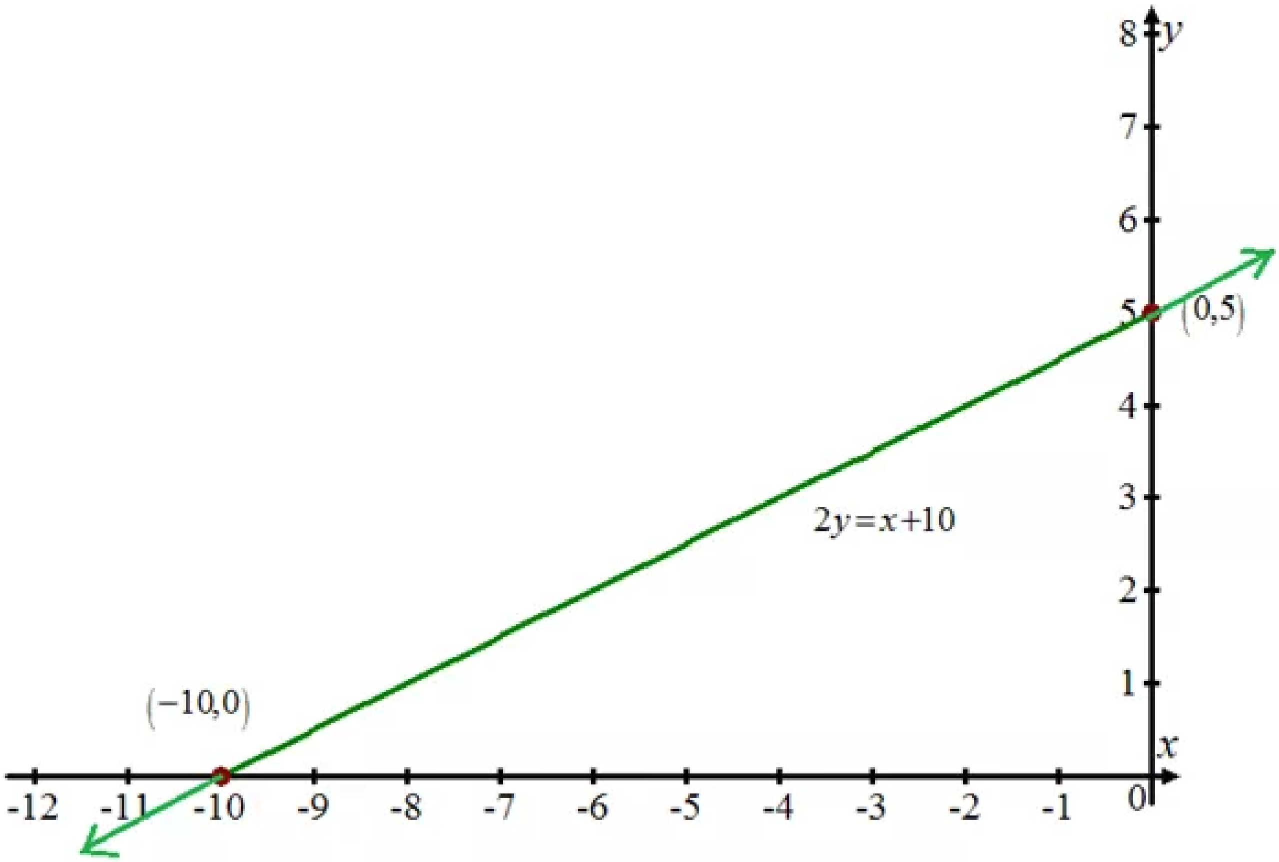
Therefore, the *x*-intercept is $(-10, 0)$.

To find *y*-intercept, put $x = 0$ in this equation.

$$2y = 10$$
$$y = 5$$

Therefore, the *y*-intercept is $(0, 5)$.

The graph of the equation $2y = x + 10$ can be obtained by joining its intercepts $(-10, 0)$, and $(0, 5)$.



Answer 67MYS.

Consider the following equation.

$$4x - y = 12$$

To find *x*-intercept, put $y = 0$ in this equation.

$$4x - 0 = 12$$
$$x = 3$$

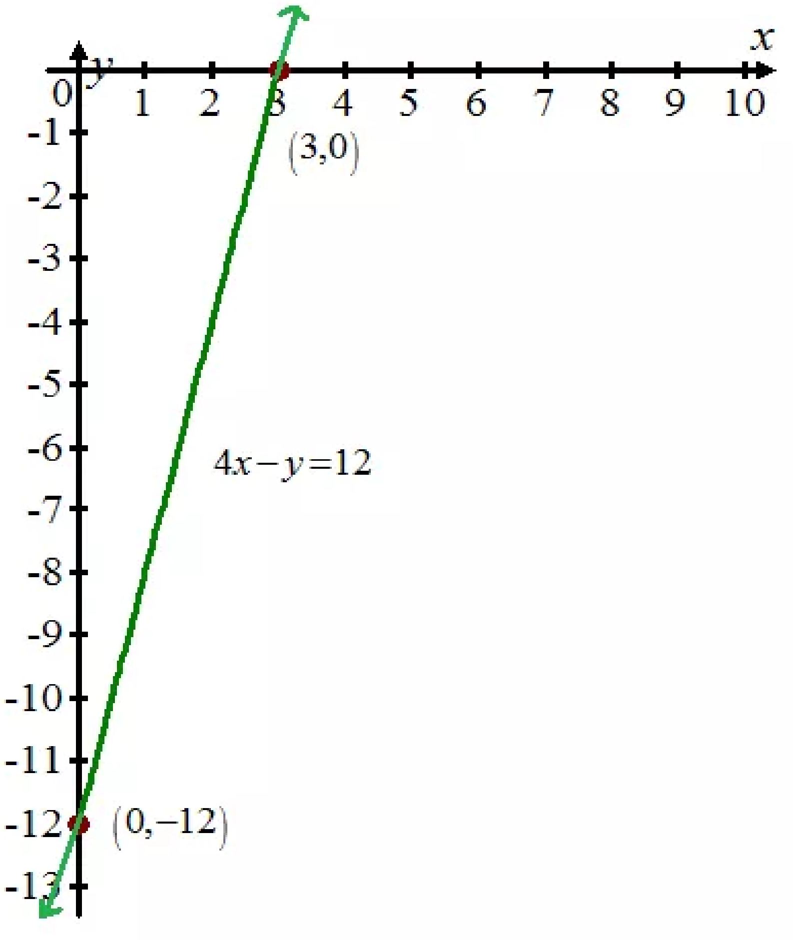
Therefore, the *x*-intercept is $(3, 0)$.

To find *y*-intercept, put $x = 0$ in this equation.

$$4(0) - y = 12$$
$$y = -12$$

Therefore, the *y*-intercept is $(0, -12)$.

The graph of the equation $4x-y=12$ can be obtained by joining its intercepts $(3,0)$, and $(0,-12)$.



Answer 68MYS.

Consider the following equation.

$$2x=7-3y$$

To find *x*-intercept, put $y=0$ in this equation.

$$2x=7-3(0)$$

$$x=\frac{7}{2}$$

Therefore, the *x*-intercept is $\left(\frac{7}{2},0\right)$.

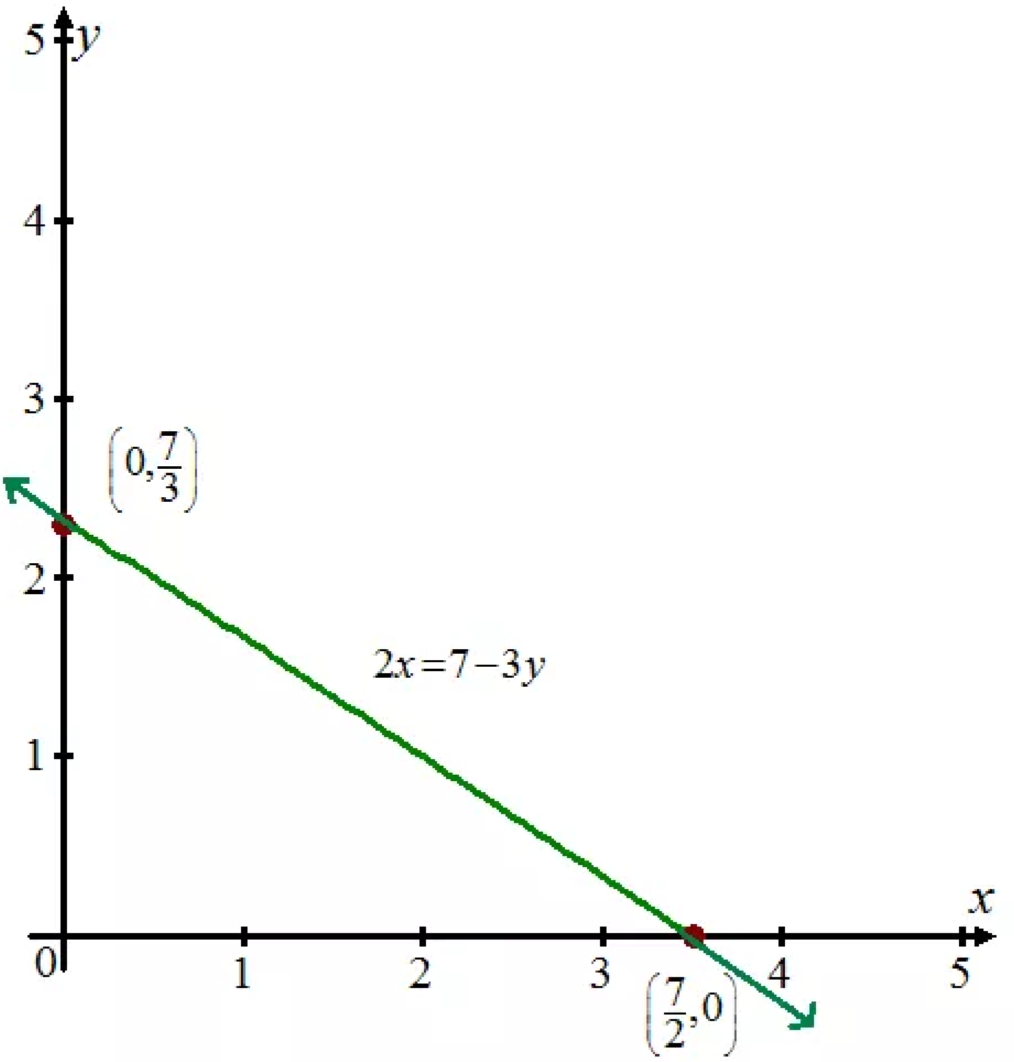
To find *y*-intercept, put $x=0$ in this equation.

$$2(0)=7-3y$$

$$y=\frac{7}{3}$$

Therefore, the *y*-intercept is $\left(0,\frac{7}{3}\right)$.

The graph of the equation $2x = 7 - 3y$ can be obtained by joining its intercepts $\left(\frac{7}{2}, 0\right)$, and $\left(0, \frac{7}{3}\right)$.



Answer 69MYS.

Consider the following square root.

$\pm\sqrt{121}$

To simplify this square root, write this as follows.

$\pm\sqrt{121} = \pm\sqrt{11^2}$ Write $121 = 11^2$

$= \pm\left(11^2\right)^{\frac{1}{2}}$

$= \pm 11^{2\cdot\frac{1}{2}}$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$= \pm 11^1$

$= \pm 11$

Therefore, $\pm\sqrt{121} = \boxed{\pm 11}$

Answer 70MYS.

Consider the following square root.

$\sqrt{3.24}$

To simplify this square root, write this as follows.

$\sqrt{3.24} = \sqrt{(1.8)^2}$ Write $3.24 = (1.8)^2$

$= \left((1.8)^2\right)^{\frac{1}{2}}$

$= (1.8)^{2\cdot\frac{1}{2}}$ Use power of a power $\left(a^m\right)^n = a^{mn}$

$= (1.8)^1$

$= 1.8$

Therefore, $\sqrt{3.24} = \boxed{1.8}$

Answer 71MYS.

Consider the following square root.

$-\sqrt{52}$

To simplify this square root, write this as follows.

$-\sqrt{52} = -\sqrt{13\cdot 4}$ Write $52 = 13\times 4$

$= -\sqrt{13\cdot 2^2}$

$= -\sqrt{13}\times\sqrt{2^2}$ Use $\sqrt{ab} = \sqrt{a}\sqrt{b}$

$= -\sqrt{13}\times 2$

$= -2\sqrt{13}$

$= -7.211102551$

≈ -7.21

Therefore, $-\sqrt{52} \approx \boxed{-7.21}$

Answer 72MYS.

Consider the following product of two numbers.

$10^2 \times 10^3$

To write this product as 10^n, simplify this product as follows.

$10^2 \times 10^3 = 10^{2+3}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^5$

Therefore, $10^2 \times 10^3 = \boxed{10^5}$

Answer 73MYS.

Consider the following product of two numbers.

$10^{-8} \times 10^{-5}$

To write this product as 10^n, simplify this product as follows.

$10^{-8} \times 10^{-5} = 10^{-8+(-5)}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^{-13}$

Therefore, $10^{-8} \times 10^{-5} = \boxed{10^{-13}}$

Answer 74MYS.

Consider the following product of two numbers.

$10^{-6} \times 10^9$

To write this product as 10^n, simplify this product as follows.

$10^{-6} \times 10^9 = 10^{-6+9}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^3$

Therefore, $10^{-6} \times 10^9 = \boxed{10^3}$

Answer 75MYS.

Consider the following product of two numbers.

$10^8 \times 10^{-1}$

To write this product as 10^n, simplify this product as follows.

$10^8 \times 10^{-1} = 10^{8+(-1)}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^7$

Therefore, $10^8 \times 10^{-1} = \boxed{10^7}$

Answer 76MYS.

Consider the following product of two numbers.

$10^4 \times 10^{-4}$

To write this product as 10^n, simplify this product as follows.

$10^4 \times 10^{-4} = 10^{4+(-4)}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^0$

Therefore, $10^4 \times 10^{-4} = \boxed{10^0}$

Answer 77MYS.

Consider the following product of two numbers.

$10^{-12} \times 10$

To write this product as 10^n, simplify this product as follows.

$10^{-12} \times 10^1 = 10^{-12+1}$ Use product of powers: $a^m \cdot a^n = a^{m+n}$

$= 10^{-11}$

Therefore, $10^{-12} \times 10 = \boxed{10^{-11}}$