Multiplying & Dividing Monomials

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Mathematics 9
Polynomials
Multiplying & Dividing Monomials

A. Definitions

1. **term:** a number and variable combined or a constant value.

2. **monomial:** an algebra expression with one term.

B. Examples

1. Multiply the following monomials.

a) $(4x)(5x)$

$= 20x^{1+1}$

$= \boxed{20x^2}$

b) $(-5m^2)(4m^3)$

$= -20m^{2+3}$

$= \boxed{-20m^5}$

c) $(-6z)(3x^2y)$

$= \boxed{-18x^2yz}$

d) $\left(\frac{2}{3}x^2\right)(15x^7)$

$= \frac{10}{1}x^{2+7}$

$= \boxed{10x^9}$

$\frac{2}{3} \times \frac{15}{1}$

e) $(3x^2y)(2x)(4xy)$

$= 24x^{2+1+1}y^{1+1}$

$= \boxed{24x^4y^2}$

f) $(4mnp)(2np)(-5m^2p^2)$

$= -40m^{1+2}n^{1+1}p^{1+1+2}$

$= \boxed{-40m^3n^2p^4}$

3. Divide the following monomials.

a) $\frac{10x^2}{5x}$

$= 2x^{2-1}$

$= \boxed{2x}$

b) $\frac{-16m^2n}{-2mn}$

$= 8m^{2-1}n^{1-1}$

$= 8mn^0$

$= 8m(1) = \boxed{8m}$

c) $-20x^2 \div 4x^2$

$= -5x^{2-2}$

$= -5x^0$

$= -5(1)$

$= \boxed{-5}$

d) $(-15mp) \div (-5p)$

$= 3mp^{1-1}$

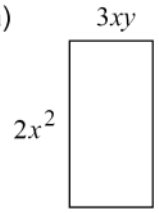
$= 3mp^0$

$= 3m(1)$

$= \boxed{3m}$

4. Write an expression to represent the area of the following shapes.

a)



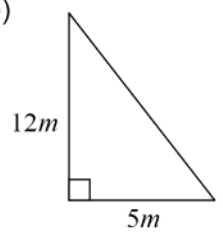
$A = lw$

$= (2x^2)(3xy)$

$= 6x^{2+1}y$

$= \boxed{6x^3y}$

b)



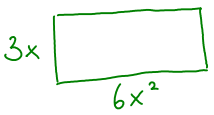
$A = \frac{bh}{2}$

$= \frac{(5m)(12m)}{2}$

$= \frac{60m^{1+1}}{2}$

$= \frac{60m^2}{2}$ $= \boxed{30m^2}$

4. A rectangle has a length of $6x^2$ and a width of $3x$. What is the area of the rectangle?



$A = lw$

$= (6x^2)(3x)$

$= 18x^{2+1}$

$= \boxed{18x^3}$

5. The area of a rectangle is $48m^3n$. If the length of the rectangle is $12mn$, what is the expression to represent the width?

w $\boxed{\frac{48m^3n}{12mn}}$

$A = lw$

$\frac{48m^3n}{12mn} = \frac{(12mn)(w)}{12mn}$

$= 4m^{3-1}n^{1-1}$

$= 4m^2n^0$

$= 4m^2(1)$

$= \boxed{4m^2}$

Assignment: Multiplying & Dividing Monomials Assignment

Name:_____

Multiplying & Dividing Monomials Assignment

1. Multiply the following.

a) $(5x)(4x)$

b) $(7x^2)(-3x^3)$

c) $(3xy)(2yz)$

d) $(7y^2)(4x^2)$

e) $(2y^2z)(-yz)$

f) $(4xy)(x^2y)$

g) $(6x^6)(-5x^6y)$

h) $(3pq)(-2p^3q)$

i) $(2abc)(-3bc)(4ac)$

j) $(3x^2y)(-3xy^3)(2x^2y^2z)$

2. Divide the following.

a) $\frac{10x^2}{5x}$

b) $\frac{20x^4}{-5x^2}$

c) $12m^5 \div 3m$

d) $\frac{6x^4y^2}{3xy}$

e) $-15a^2b^2c^2 \div 5ab$

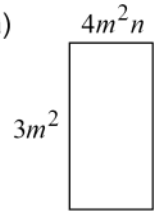
f) $-8ab^2c \div -4abc$

g) $\frac{28m^5n^2p^3}{-7m^2n^2p^2}$

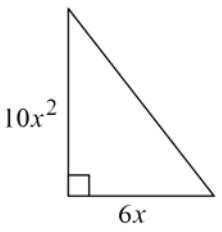
h) $\frac{-35x^7y^3z^4}{-5x^3yz^2}$

3. Write and expression to represent the area of the following shapes.

a)



b)



Answers

1. a) $20x^2$ b) $-21x^5$

   c) $6xy^2z$ d) $28x^2y^2$

   e) $-2y^3z^2$ f) $4x^3y^2$

   g) $-30x^{12}y$ h) $-6p^4q^2$

   i) $-24a^2b^2c^3$ j) $-18x^5y^6z$

2. a) $2x$ b) $-4x^2$

   c) $4m^4$ d) $2x^3y$

   e) $-3abc^2$ f) $2b$

   g) $-4m^3p$ h) $7x^4y^2z^2$

3. a) $12m^4n$ b) $30x^3$