



8th
Basic

9th
Advanced

Helping With Math

USA
GRADES

Division of Algebraic Expressions

*Suitable for students
aged 12-14*



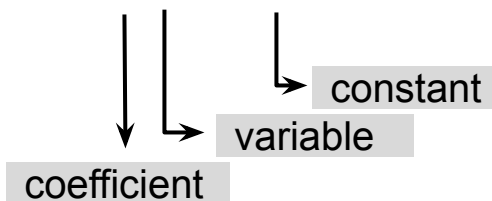
This pack is suitable for learners aged 12-14 years old or 8th to 9th graders (USA). The content covers fact files and relevant basic and advanced activities involving division of algebraic expressions.

Algebraic Expressions are:

- expressions that contain variables, coefficient and constants.
- combination of terms and at least one arithmetic operation such as addition, subtraction, multiplication and division.

Parts of Algebraic Expression

$$3a + 14$$



Division of algebraic expressions is done by dividing each term of the terms/variables by the other and then taking the quotient.



DIVIDING ALGEBRAIC EXPRESSIONS

How to divide algebraic terms or variables?

Step 1: If not yet in fractional form, write the division of the algebraic terms as a fraction.

Step 2: Simplify the coefficient.

Step 3: Cancel variables of the same type in the numerator and denominator.

How to divide Algebraic Expressions?

Step 1: Factorize the algebraic expressions.

Step 2: Cancel factors in the numerator and denominator when possible.

ILLUSTRATIVE EXAMPLES

1.) What is the quotient if $-2x^3 + 4x$ is divided by $2x$?

2.) What is the divisor if the quotient is $x + 6$ and the dividend $x^2 - 36$?

SOLUTION:

$$1.) \quad \frac{-2x^3 + 4x}{2x} = \frac{\cancel{-2x^3} + \cancel{4x}}{\cancel{2x}} = -x^2 + 2$$

$$2.) \quad \frac{x^2 - 49}{x + 7} = \frac{(x - 7) \cancel{(x + 7)}}{\cancel{x + 7}} = x - 7$$



TABLE OF ACTIVITIES

Ages 12-13 (Basic)		<u>8th Grade</u>
1	Get Started with Motorbike	
2	Car Quotient	
3	Up Up, Air Balloon	
4	Which Way To Go?	
5	The Challenging Train	
Ages 13-14 (Advanced)		<u>9th Grade</u>
6	Stepping on the Gas	
7	Taking a Break	
8	Fuel Meter	
9	Car Maneuver	
10	Full Speed Activated	



GET STARTED WITH MOTORBIKE

G8
Basic

Start our vehicle collection today with a motorbike. Purchase it on its lowest price by getting the quotient of the following terms.

1.) $\frac{6a}{6b}$

5.) $\frac{15jk}{10j}$

2.) $\frac{5cd}{2d}$

6.) $\frac{7m}{4n}$

3.) $\frac{6e}{2e}$

7.) $\frac{2p}{4}$

4.) $\frac{3f}{2fg}$

8.) $\frac{2rs}{10st}$



CAR QUOTIENT

G8
Basic

Get a chance to drive this limited edition sports car by matching column A to column B.

_____ 1.) $18t \div 6$

A. 12

_____ 2.) $24uv \div 4u$

B. $2w$

_____ 3.) $16w^2 \div 8w$

C. $3t$

_____ 4.) $-5xy \div 10x^2$

D. $-6x$

_____ 5.) $2xy \div x^2$

E. $6v$

_____ 6.) $3x^2 \div 4xy$

F. $\frac{2y}{x}$

_____ 7.) $-12xy \div 2y$

G. $\frac{3x}{4y}$

_____ 8.) $-72xy \div -6xy$

H. $\frac{-y}{2x}$



UP UP AIR BALLOON

G8
Basic

Help these men heat up the hot air balloon! Do that by filling in the blanks. What must be the algebraic expression to make the equation balance?



1.) $24x^3 \div \underline{\hspace{2cm}} = 3x^2$

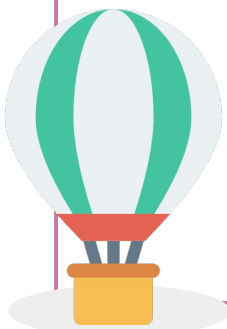
4.) $\underline{\hspace{2cm}} \div -6x^5y^6 = -15x^4y$

2.) $16x^4y^3 \div \underline{\hspace{2cm}} = 4x^2y^2$

5.) $\underline{\hspace{2cm}} \div -13xy^2 = -4x^2$

3.) $-72x^5y^4 \div \underline{\hspace{2cm}} = 6x^4y$

6.) $\underline{\hspace{2cm}} \div -512x^5y^2 = -1$



WHICH WAY TO GO?

G8
Basic

Make sure Vespo will be heading to the right direction by determining whether the following statements are correct. Write **TRUE** if it is correct, otherwise write **FALSE** and correct the statement.

1.) In division of algebraic expressions, we cannot divide different bases.

Answer:

2.) We add the exponents when we divide same bases.

Answer:

3.) If we divide $7x^3$ by $7x^3$, the answer is 0.

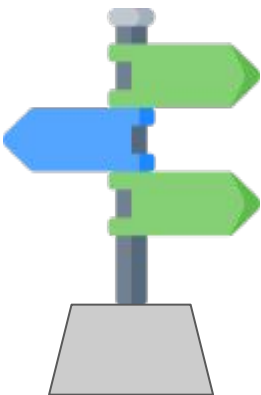
Answer:

4.) In division of algebraic expressions, we only divide numbers with common factors.

Answer:

5.) If we divide $5x^3$ by $15x^5$, the answer is $3x^2$.

Answer:



THE CHALLENGING TRAIN

G8
Basic

Want to try the challenging questions brought by this modern train? Make sure to answer them all before it gets to the next station!

1.) The area of a rectangular parking lot is $12x^5$. What is the length of the lot if its width is $2x^2$ in terms of x ?

2.) The area of a parallelogram shaped car accessory is x^{10} . If the base is x^4 , what is the height in terms of x ?

3.) The area of the base of a prism is expressed as $x - 3$, what is its height if the area is $x^3 + x^2 - 11x - 3$?



STEPPING ON THE GAS

G9
Advanced

Make sure to step on the gas for you to have the hustle of answering these modified TRUE or FALSE items.

1.) $(9x^2 - 3x) \div 6$ can be written as $\frac{9x^2}{6} \div \frac{-3x}{6}$.

2.) $9x^{-2} \div x^{-3}$ in simplest form is $\frac{9}{x}$.

3.) In simplifying the expression $14x^3y^5 \div 7x^8y^5$, variable x will be left in the **numerator**.

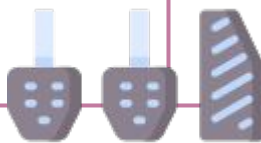
4.) The simplest form of the answer in $\frac{27x^3 + 9x}{-6x}$ is $-\frac{9x^2}{2} - \frac{3}{2}$.

1.

2.

3.

4.



TAKING A BREAK

G9
Advanced

Step on your car's break and solve these algebraic expressions. After solving, select which letter corresponds your answer.

1.)
$$\frac{6x + 10}{4}$$

2.)
$$\frac{2x^2 + 14x}{4x}$$



3.)
$$\frac{10x^8 - 25x^4 - 15x^2}{5x^3}$$

4.)
$$\frac{6x^2y + 3xy - 9x^2y^2}{3x^2y}$$

A.
$$2 + \frac{1}{x} - 3y$$

B.
$$2x^2 - 5x - \frac{3}{x}$$

C.
$$\frac{x}{2} + \frac{7}{2}$$

D.
$$\frac{3x}{2} + \frac{5}{2}$$



FUEL METER

G9
Advanced

Don't let your fuel run out so answer the following questions below and encircle your answer. Use the space for your solution.

1.) Simplify $15x^2y^5 \div 3xy^2$.

- A. $5xy^4$
- B. $5xy^3$
- C. $5x^3y^7$
- D. $5x^2y^2$

2.) What is the quotient if $-3x^3 + 6x$ is divided by $3x$?

- A. $-x^2 + 2x$
- B. $-x^2 - 2x$
- C. $-x^2 - 2$
- D. $-x^2 + 2$

3.) What is the divisor if the quotient is $x + 6$ and the dividend $x^2 - 36$?

- A. $x - 6$
- B. $x + 6$
- C. $x^2 - 6$
- D. $x^2 + 6$

4.) What is the dividend if the divisor is $x + 4$ and the quotient is $x - 3$?

- A. $x^2 + x + 12$
- B. $x^2 + x - 12$
- C. $x^2 - x + 12$
- D. $x^2 - x - 12$



CAR MANEUVER

G9
Advanced

Do a perfect car maneuver by getting the quotient of these algebraic expressions.

$$1) 18x^5 \div 2x \div 3x^2 = ?$$

$$2) 52x^4y^3 \div 13xy \div ? = 2xy^2$$

$$3) ? \div (15x^8y^5 \div 3x^3y^2) = 25x^4y$$

$$4) (48x^2y^3 \div 4xy) \div (30x^4y^5 \div 3x^4y^3) =$$



FULL SPEED ACTIVATED

G9
Advanced

You need to go full speed in order to answer these challenging questions. Do not forget to show your solution.

- 1.) The area of the rectangle garage is given by the algebraic expression $x^3 - 64$ and its length given by $x - 4$. Find the width of the garage.
- 2.) The distance covered by a car is given by the expression $6x^2 + 18x - 60$. The time taken by the car to cover this distance is given by the expression $x + 5$. Find the speed of the car.
- 3.) The volume of a rectangular car accessory is $(84x^2 - 36x)$ square meters. If its width is $4x$ meters, and its height is 3 meters, determine its length.



ANSWER GUIDE

Activity 1

1.) $\frac{a}{3}$

2.) $\frac{5c}{2}$

3.) 3

4.) $\frac{3}{2g}$

5.) $\frac{3k}{2}$

6.) $\frac{7m}{4n}$

7.) $\frac{p}{2}$

8.) $\frac{r}{5t}$

Activity 2

1.) C

2.) E

3.) B

4.) H

5.) F

6.) G

7.) D

8.) A

Activity 3

1.) $8x$

2.) $4x^2y$

3.) $-12xy^3$

4.) $90x^9y^7$

5.) $52x^3y^2$

6.) $512x^5y^2$

Activity 4

1.) True

2.) F - subtract

3.) F - 1

4.) True

5.) F - $\frac{1}{3}x^2$

Activity 5

1.) $6x^3$

2.) x^6

3.) $x^2 + 4x + 1$

Activity 6

1.) True

2.) $\frac{x}{9}$

3.) denominator

4.) True



ANSWER GUIDE

Activity 7

1.) D

2.) C

3.) B

4.) A

Activity 8

1.) B

2.) D

3.) A

4.) B

Activity 9

1.) $3x^2$

2.) $2x^2$

3.) $75x^9y^4$

4.) $\frac{6x}{5}$

Activity 10

1.) $x^2 + 4x + 16$

2.) $6x - 12$

3.) $7x - 3$



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