**MULTIPLYING REAL NUMBERS**

* The product of two real numbers with the same sign is positive.

$$-a⋅\left(-b\right)=ab$$

* The product of two real numbers with different signs is negative.

$$a⋅\left(-b\right)=-ab$$

**Sample Problem 1**: Find the product.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$-4\left(6\right)$$ |  | $$\left(-21\right)\left(-3\right)$$ |  | $$11\left(-7\right)$$ |
|  | $$=-24$$ |  | $$=63$$ |  | $$=-77$$ |

**Sample Problem 2**: Simplify each expression.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$3\left(-4x\right)-15x$$ |  | $$3s\left(-8r\right)$$ |  | $$\left(8x\right)\left(-9y\right)-12xy$$ |
|  | $$=-12x-15x$$ |  | $$=-24sr$$ |  | $$=-72xy-12xy$$ |
|  | $$=-27x$$ |  |  |  | $$=-84xy$$ |

**Sample Problem 3**: Evaluate each expression if $n=\frac{2}{5}$.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$n^{2}\left(-\frac{5}{8}\right)$$ |  | $$5n$$ |  | $$15n+6$$ |
|  | $$=\left(\frac{2}{5}\right)^{2}\left(-\frac{5}{8}\right)$$ |  | $$=5\left(\frac{2}{5}\right)$$ |  | $$=15\left(\frac{2}{5}\right)+6$$ |
|  | $$=\frac{4}{25}\left(-\frac{5}{8}\right)$$ |  | $$=2$$ |  | $$=3\left(2\right)+6$$ |
|  | $$=-\frac{1}{10}$$ |  |  |  | $$=6+6$$ |
|  |  |  |  |  | $$=12$$ |

**Sample Problem 4**: An average person need to drink 3 liters of water a day. How many liters of water an average person drinks in a month?

$$3\left(30\right)=90 liters$$

**DIVISION RULE**

To divide a number $a$ by a nonzero number $b$, multiply $a$ by the reciprocal of $b$.

$$a÷b=a⋅\frac{1}{b}$$

The result is the quotient of $a$ and $b$.

**Sample Problem 5**: Find the quotient.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$-66÷11$$ |  | $$\frac{48}{-3}$$ |  | $$\frac{1}{^{3}/\_{4}}$$ |
|  | $$=-\frac{66}{11}$$ |  | $$=-16$$ |  | $$=1÷\frac{3}{4}$$ |
|  | $$=-6$$ |  |  |  | $$=1⋅\frac{4}{3}$$ |
|  |  |  |  |  | $$=\frac{4}{3}$$ |

**THE SIGN OF A QUOTIENT**

* The quotient of two numbers with the same sign is positive

$$-a÷\left(-b\right)=\frac{a}{b}$$

* The quotient of two numbers with opposite signs is negative.

$$a÷\left(-b\right)=-\frac{a}{b}$$

**Sample Problem 6**: Simplify each expression.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$\frac{24-8x}{4}$$ |  | $$\frac{32x-8}{4}$$ |  | $$\frac{45+10x}{5}$$ |
|  | $$=\frac{24}{4}-\frac{8x}{4}$$ |  | $$=\frac{32x}{4}-\frac{8}{4}$$ |  | $$=\frac{45}{5}+\frac{10x}{5}$$ |
|  | $$=6-2x$$ |  | $$=8x-2$$ |  | $$=9+2x$$ |

**Sample Problem 7**: Evaluate each expression if $a=-3$ and $b=-2$.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | $$\frac{2a}{a-b}$$ |  | $$\frac{4-b}{a^{2}}$$ |  | $$\frac{a}{3-b}$$ |
|  | $$=\frac{2\left(-3\right)}{-3-\left(-2\right)}$$ |  | $$=\frac{4-\left(-2\right)}{\left(-3\right)^{2}}$$ |  | $$=\frac{-3}{3-\left(-2\right)}$$ |
|  | $$=\frac{-6}{-3+2}$$ |  | $$=\frac{4+2}{9}$$ |  | $$=\frac{-3}{3+2}$$ |
|  | $$=\frac{-6}{-1}$$ |  | $$=\frac{6}{9}$$ |  | $$=-\frac{3}{5}$$ |
|  | $$=6$$ |  | $$=\frac{2}{3}$$ |  |  |

**Sample Problem 8**: Russia has a land area of $17,098,242 km^{2}$ Russia is approximately seven times bigger than Algeria in terms of land area. What is the land area of Algeria?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $$\frac{R}{A}=7$$ | $$\rightarrow $$ | $$7=\frac{17 098 242}{A}$$ | $$\rightarrow $$ | $$A=\frac{17 098 242}{7}$$ | $$\rightarrow $$ | $$A=2 442 606 km^{2}$$ |