3.9 Evaluate Division Expressions

Follow these steps to evaluate an algebraic expression:

1. Substitute the given number for the variable.

2. Simplify to find the value of the expression.

Example: Evaluate the expression.

1.) $345 \div f$ when $f = 15$

$345 \div 15$

$$\begin{array}{r} 23 \\ 15\overline{)345} \\ -30\downarrow \\ \hline 45 \\ -45 \\ \hline 0 \end{array}$$

23

2.) $n \div 160$ when 2992

$2992 \div 160$

$$\begin{array}{r} 18.7 \\ 160\overline{)2992.0} \\ -160\downarrow \\ \hline 1392 \\ -1280\downarrow \\ \hline 1120 \\ -1120 \\ \hline 0 \end{array}$$

$160 \times 7 = 1120$

$160 \times 8 = 1280$

Example: Evaluate the expression.

3.) 101.6 divided by x when x = 4

$101.6 \div 4$

$$\begin{array}{r} 25.4 \\ 4\overline{)101.6} \\ -8\downarrow \\ \hline 21 \\ -20\downarrow \\ \hline 1\,6 \\ -1\,6 \\ \hline 0 \end{array}$$

25.4

4.) the quotient of 12.2 and x when x = 2

$12.2 \div 2$

$$\begin{array}{r} 6.1 \\ 2\overline{)12.2} \\ -12\downarrow \\ \hline 0\,2 \\ -2 \\ \hline 0 \end{array}$$

6.1

Example: Evaluate each algebraic expression for p = 1.2 and q = 225. (Remember to work from left to right!)

5.) $q \div 5 \times 30$

$$\begin{array}{r} 45 \\ 5\overline{)225} \\ -20\downarrow \\ \hline 25 \\ -25 \\ \hline 0 \end{array}$$

$225 \div 5 \times 30$

45×30

1350

$$\begin{array}{r} {\scriptstyle 1}45 \\ \times\ 30 \\ \hline 00 \\ +1350 \\ \hline 1350 \end{array}$$

6.) $36 \div p \times q$

$36 \div 1.2 \times 225$

30×225

6750

$$1.2\overline{)36.0}$$

$$\begin{array}{r} 30 \\ 12\overline{)360.} \\ -36\downarrow \\ \hline 00 \\ -0 \\ \hline 0 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1}225 \\ \times\ 30 \\ \hline 000 \\ +6750 \\ \hline 6750 \end{array}$$

Example: Evaluate each algebraic expression for p = 1.2 and q = 225. (Remember to work from left to right!)

7.) $54 \div p$

$54 \div 1.2$

$12\overline{)540}$

$45.$
$12\overline{)540}$
$-48\downarrow$
60
-60
0

45

8.) $q \div 20 \times p$

$225 \div 20 \times 1.2 \Rightarrow 11.25 \times 1.2$

11.25
$20\overline{)225.00}$
$-20\downarrow$
25
-20
50
-40
100
-100
0

11.25
$\times \quad 12$
2250
$+ 11250$
135.00

13.5

Example: Ellie meets her friends for lunch. The bill is $40.24 plus an $8 tip.

$40.24 + 8 = 48.24$

40.24
$+ 8.00$
48.24

a.) Write an expression to show how much each person pays if f people share the amount equally.

$48.24 \div f$

b.) Use the expression to evaluate the expression if a total of 8 people share the amount equally.

$f = 8$

$48.24 \div 8$

6.03
$8\overline{)48.24}$
$-48\downarrow\downarrow$
$0\ 24$
-24
0

$6.03