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$(2+4)\times 7$

$= 6 \times 7 = 42$

Section 3.6 Order of Operations with Rational Numbers

B Do the operations in brackets first

E Next, evaluate any Exponents

Ex) $4^2 = 4\times 4 = 16$

Ex) $2^3 = 2\times 2\times 2 = 8$

D / M Then, Divide and Multiply in order from left to right

A / S Finally, Add and Subtract in order from left to right

Order of Operations

Example # 1 $(-8) \div 2 - 7 \times 3$

$= -4 - 21$

$4+21$

$= -25$

Divide First
Then, multiply
To subtract, add the opposite

Example # 2 $(-4 + 5) + 4^2 \times 2$

4×4

$= 1 + 16 \times 2$

$= 1 + 32$

$= 33$

Brackets First
Then evaluate the power
Then multiply

Order of Operations with Fractions

Example # 1 $\left(\frac{3}{4}-\frac{7}{8}\right)\div\left(-\frac{5}{16}\right)$

$=\left(\frac{6}{8}-\frac{7}{8}\right)\div\left(-\frac{5}{16}\right)$

$=\frac{-1}{8}\times\frac{-16}{5}$

$=\frac{2}{5}$

subtract in the brackets first Use a common denominator of 8

To divide, multiply by the reciprocal

$\div\frac{a}{b}\rightarrow\times\frac{b}{a}$

Look for common factors

Both factors are negative, so the product is positive.

Example #2 $\left(-\frac{2}{3}\right)\times\frac{1}{6}+\frac{1}{2}$

$=-\frac{1}{9}+\frac{1}{2}$

$=\frac{-2}{18}+\frac{9}{18}$ $\quad -2+9$, $9-2=7$

$=\frac{7}{18}$

Multiply First

Look for common factors

Add.

Use a common denominator of 18.

Example # 3 $\left(2\frac{1}{3}\right)+\left(1\frac{1}{4}\right)\times\left(-\frac{2}{3}\right)$

Convert mixed numbers to Improper fractions

$= \frac{7}{3} + \frac{5}{4_2} \times \left(-\frac{2}{3}\right)^1$

Multply first

$= \frac{7}{3_{\times 4}}^{\times 4} - \frac{5}{6_{\times 2}}^{\times 2}$

+/− Use a common denominator of 12

$= \frac{28}{12} - \frac{10}{12} = \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$

Always Reduce

Error Questions

1. A student's solution to a problem, to the nearest hundredth, is shown below. The solution is incorrect. Identify the errors. Provide a correct solution.

Q $(-8)^2 \div (-2) - 3 \times (-6)$ (-8)×(-8) = +64

Ans
$= 64 \div (-2) - 3 \times (-6)$
$= 64 \div (-2) + 18$
$= 64 \div (-20)$

7×2+5 = 14+5 = 19

Answer: $64 \div (-2) - 3 \times (-6)$

$= -32 + 18$

$= -14$

$\begin{array}{r} {}^{2}\cancel{3}\,{}^{12}\cancel{2} \\ -18 \\ \hline 14 \end{array}$

$\begin{aligned} 7\times2+5 \\ &= 14+5 \\ &= 19 \end{aligned}$

2. Two students were asked to evaluate:

$(-8) - 2(24 \div (-8))^2$

Here are their calculations.

Student 1	Student 2
$(-8) - 2(24 \div (-8))^2$	$(-8) - 2(24 \div (-8))^2$
$= (-10)(24 \div (-8))^2$	$= (-8) - 2(-3)^2$
$= (-10)(-3)^2$	$= (-8) - (-6)^2$
$= (-10)(9)$	$= -8 - 36$
$= -90$	$= -44$

Why did both these students get incorrect answers? What is the correct answer?

Answer:

Student 1	Student 2
$(-8) - 2(24 \div (-8))^2$	$(-8) - 2(24 \div (-8))^2$
$= (-10)(24 \div (-8))^2$	$= (-8) - 2(-3)^2$
$= (-10)(-3)^2$	$= (-8) - (-6)^2$
$= (-10)(9)$	$= -8 - 36$
$= -90$	$= -44$

Correct Answer:

$-8 - 2\times[24 \div (-8)]^2$

$= -8 - 2\times[-3]^2$ $(-3)\times(-3)$

$= -8 - 2 \times 9$

$= -8 - 18$

$= -26$ //

① Quiz 3.4 Tomorrow (×/÷ BEDMAS)

② P.116 Q7

③ Ch.3 Test on Wednesday next week