

Southern Illinois University
Math 107: Intermediate Algebra
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Sections 7 and 17
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Homework 1

1.2.28

$$\frac{3}{14} - \left(-\frac{1}{4}\right)$$

$$\frac{3}{14} + \frac{1}{4} \quad \text{minus a negative is a positive}$$

$$\left(\frac{2}{2}\right)\frac{3}{14} + \left(\frac{7}{7}\right)\frac{1}{4} \quad \text{find a common denominator}$$

$$\frac{6}{28} + \frac{7}{28}$$

$$\frac{13}{28}$$

13 and 28 do not have any common factors, so we cannot reduce $\frac{13}{28}$ and we are done.

1.2.42

$$\frac{-2}{11} \left(-\frac{99}{4}\right)$$

$$\frac{2}{11} \cdot \frac{99}{4} \quad \text{negative times negative is positive}$$

$$\frac{2 \cdot 99}{11 \cdot 4}$$

$$\frac{2 \cdot 11 \cdot 9}{11 \cdot 2 \cdot 2} \quad \text{break numbers into factors we can cancel}$$

$$\frac{9}{2} \quad \text{the 11 and one of the 2's cancel}$$

9 and 2 do not have any common factors, so we cannot reduce $\frac{9}{2}$ and we are done.

1.2.68

$$\frac{12}{0}$$

Division by zero is undefined, so $\frac{12}{0}$ is undefined.

1.2.70

$$\frac{-22}{23} \div \left(-\frac{33}{4}\right)$$

$$\frac{-22}{23} \cdot \left(-\frac{4}{33}\right) \quad \text{invert and multiply}$$

$$\frac{22}{23} \cdot \frac{4}{33} \quad \text{negative times a negative is positive}$$

$$\frac{22 \cdot 4}{23 \cdot 33}$$

$$\frac{11 \cdot 2 \cdot 4}{23 \cdot 11 \cdot 3} \quad \text{break numbers into factors we can cancel}$$

$$\frac{2 \cdot 4}{23 \cdot 3} \quad \text{the 11's cancel}$$

$$\frac{8}{69}$$

8 and 69 do not have any common factors, so we cannot reduce $\frac{8}{69}$ and we are done.

1.3.79

When working problems like this, remember the order of operations:

1. Work separately above and below any fraction bar.
2. If grouping symbols such as parentheses (), square brackets [], or absolute value bars || are present, start with the innermost set and work outward.

3. Evaluate all powers, roots, and absolute values.
4. Do any multiplications or divisions in order, working from left to right.
5. Do any additions or subtractions in order, working from left to right.

$$\frac{2(-5)+(-3)(-2)}{-8+3^2-1}$$

$$\frac{2(-5)+(-3)(-2)}{-8+9-1} \quad \text{evaluate squares}$$

$$\frac{-10+6}{-8+9-1} \quad \text{evaluate multiplications from left to right}$$

$$\frac{-4}{0} \quad \text{evaluate additions and subtractions from left to right}$$

Division by zero is undefined, so $\frac{-4}{0}$ is undefined.

1.3.88

Evaluate $\frac{3c+a^2}{2b-6c}$ when $a = -3, b = 64, c = 6$

$$\frac{3 \cdot 6 + (-3)^2}{2 \cdot 64 - 6 \cdot 6} \quad \text{replace variables with their given values}$$

$$\frac{3 \cdot 6 + 9}{2 \cdot 64 - 6 \cdot 6} \quad \text{evaluate powers}$$

$$\frac{18 + 9}{128 - 36} \quad \text{evaluate multiplications from left to right}$$

$$\frac{27}{92} \quad \text{evaluate additions and subtractions from left to right}$$

27 and 92 do not have any common factors, so we cannot reduce $\frac{27}{92}$ and we are done.

1.4.26

Recall the distributive property of multiplication:

For any real numbers $a, b,$ and $c,$

$$a(b + c) = ab + ac \quad \text{and} \quad (b + c)a = ba + ca$$

$$\frac{8}{5} \cdot 17 + \frac{8}{5} \cdot 13$$

$$\frac{8}{5}(17 + 13) \quad \text{use distributivity "in reverse"}$$

$$\frac{8}{5}(30) \quad \text{evaluate inside parentheses first}$$

$$\frac{8 \cdot 30}{5}$$

$$\frac{8 \cdot 5 \cdot 6}{5} \quad \text{break into factors we can cancel}$$

$$8 \cdot 6 \quad \text{the 5's cancel}$$

$$48$$

1.4.40

Recall the commutative properties:

For any real numbers $a, b,$ and $c,$

$$a + b = b + a \quad \text{and} \quad ab = ba$$

Simplify: $-(7m - 12) - 2(4m + 7) - 8m$

$$-7m + 12 - 8m - 14 - 8m \quad \text{apply distributive property twice}$$

$$-7m - 8m - 8m + 12 - 14 \quad \text{use commutativity to reorder terms}$$

$$-23m - 2$$