

All work must be shown (legibly) and done in pencil for full credit.

1. (4 points) Simplify the following sums

(a)  $-2 + 9 = 7$

(b)  $3 + (-7) = -4$

3. (4 points) Simplify the following sums

(a)  $-15 + 39 = 24$

(b)  $23 + (-44) = -21$

2. (4 points) Simplify the following differences

(a)  $-8 - (-3) = -8 + 3 = -5$

(b)  $4 - (-5) = 4 + 5 = 9$

4. (4 points) Simplify the following differences

(a)  $-24 - (-27) = -24 + 27 = 3$

(b)  $18 - (-25) = 18 + 25 = 43$

5. (4 points) Simplify the following products

(a)  $-8(15) = -120$

(b)  $-19(-12) = 228$

$$\begin{array}{r} 19 \\ \times 12 \\ \hline 38 \\ 19\phantom{0} \\ \hline 228 \end{array}$$

6. (4 points) Simplify the following expressions

(a)  $20 - 4(15) + 6^2 = -4$

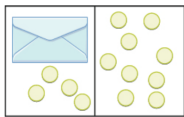
$$\begin{aligned} 20 - 4(15) + 36 \\ 20 - 60 + 36 \\ 20 + -60 + 36 \\ -40 + 36 \\ -4 \end{aligned}$$

(b)  $(-3)^2 - 2^2 = 5$

$$\begin{aligned} 9 - 4 \\ = 5 \end{aligned}$$

7. (4 points)  
Write and solve the equation demonstrated by the following diagram.

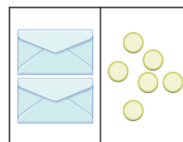
Write your answer as  $x =$



$$\begin{aligned} x + 4 &= 9 \\ -4 \quad -4 \\ \hline x &= 5 \end{aligned}$$

8. (4 points)  
Write and solve the equation demonstrated by the following diagram.

Write your answer as  $x =$



$$\begin{aligned} 2x &= 6 \\ \frac{2x}{2} &= \frac{6}{2} \\ x &= 3 \end{aligned}$$

**9.** (4 points)

Solve each equation given.

Write your answer as  $m =$ 

$$\begin{aligned} (a) \quad m + 18 &= 34 \\ &\quad -18 \quad -18 \\ m &= 16 \end{aligned}$$

$$\begin{aligned} (b) \quad -5 + m &= -26 \\ +5 \quad \quad +5 \\ m &= -21 \end{aligned}$$

**11.** (4 points)

Reduce each fraction to its lowest terms.

$$(a) \quad \frac{4}{10} = \frac{4}{10} = \frac{2 \cdot 2}{2 \cdot 5} = \frac{2}{5}$$

$$(b) \quad \frac{36}{60} = \frac{36}{60} = \frac{2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{3}{5}$$

**10.** (4 points)

Solve each equation given.

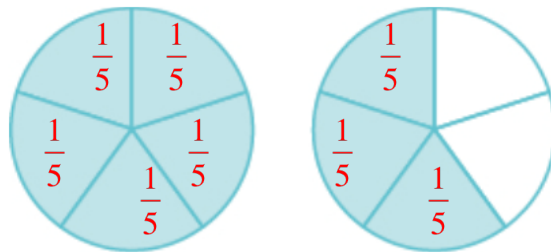
Write your answer as  $x =$ 

$$\begin{aligned} (a) \quad 3x &= 42 \\ 3x &= 42 \\ \frac{3x}{3} &= \frac{42}{3} \\ x &= 14 \end{aligned}$$

$$\begin{aligned} (b) \quad -9x &= -54 \\ -9x &= -54 \\ \frac{-9x}{-9} &= \frac{-54}{-9} \\ x &= 6 \end{aligned}$$

**12.** (4 points)

Write the improper fraction and mixed number for the following diagram



$$(a) \quad \text{Mixed number: } 1\frac{3}{5}$$

$$(b) \quad \text{Improper fraction: } \frac{8}{5}$$

13. (4 points) Write each mixed number as an improper fraction.

$$(a) \quad 3\frac{2}{7} = \frac{3 \cdot 7 + 2}{7} = \frac{23}{7}$$

$$(b) \quad 6\frac{7}{10} = \frac{6 \cdot 10 + 7}{10} = \frac{67}{10}$$

14. (4 points) Simplify each expression.

(a)

$$\frac{1}{11} + \frac{3}{11} = \frac{4}{11}$$

(b)

$$\frac{5}{7} - \frac{2}{7} = \frac{3}{7}$$

15. (4 points) Simplify each expression.

(a)

$$\frac{2}{15} + \frac{3}{15} = \frac{5}{15} = \frac{1 \cdot 5}{3 \cdot 5} = \frac{1}{3}$$

(b)

$$\frac{18}{20} - \frac{3}{20} = \frac{15}{20} = \frac{3 \cdot 5}{4 \cdot 5} = \frac{3}{4}$$

16. (4 points) Simplify the expression. The work has been started for you.

$$\frac{5}{8} + \frac{1}{12} = \frac{17}{24}$$

$$\frac{5 \cdot 3}{8 \cdot 3} = \frac{15}{24}$$

$$+ \frac{1 \cdot 2}{12 \cdot 2} = \frac{2}{24}$$

$$\frac{17}{24}$$

17. (4 points) Simplify the expression.

$$\frac{19}{24} - \frac{1}{6} = \frac{5}{8}$$

$$\frac{19}{24} = \frac{19}{24}$$

$$\frac{1 \cdot 4}{6 \cdot 4} = \frac{4}{24}$$


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$$\frac{15}{24} = \frac{5}{8}$$

18. (4 points) Simplify the expression.

$$8\frac{5}{7} + 3\frac{1}{7} = 11\frac{6}{7}$$

$$8\frac{5}{7}$$

$$+ 3\frac{1}{7}$$


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$$11\frac{6}{7}$$

19. (4 points) Simplify the expression.

$$4\frac{5}{6} + 11\frac{2}{3} = 16\frac{1}{2}$$

$$4\frac{5}{6} = 4\frac{5}{6}$$

$$+ 11\frac{2 \cdot 2}{3 \cdot 2} = 11\frac{4}{6}$$


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$$15\frac{9}{6} = 15 + 1\frac{3}{6} = 16\frac{1}{2}$$

20. (4 points) Simplify the expression.

$$9\frac{1}{6} - 5\frac{3}{4} = 3\frac{5}{12}$$

$$9\frac{1 \cdot 2}{6 \cdot 2} = 9\frac{2}{12} = 8\frac{14}{12}$$

$$- 5\frac{3 \cdot 3}{4 \cdot 3} = 5\frac{9}{12} = 5\frac{9}{12}$$


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$$3\frac{5}{12}$$

Addition Table

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

Multiplication Table

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Rules for Signed Numbers

Addition				Subtraction			
Positive	+	Positive	= Positive	$A - B = A + (-B)$			
<b>POSITIVE</b>	+	Negative	= Positive				
Positive	+	<b>NEGATIVE</b>	= Negative				
Negative	+	Negative	= Negative				
Numbers in bold, capital letters have a greater magnitude than nonbold, lower case partner number.							
Multiplication				Division			
Positive	×	Positive	= Positive	Positive	÷	Positive	= Positive
Positive	×	Negative	= Negative	Positive	÷	Negative	= Negative
Negative	×	Positive	= Negative	Negative	÷	Positive	= Negative
Negative	×	Negative	= Positive	Negative	÷	Negative	= Positive

Rules for Fractions

For any real numbers,  $a, b, c,$  and  $d, b \neq 0, c \neq 0,$  and  $d \neq 0$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$$

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$