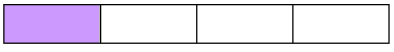
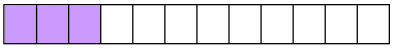
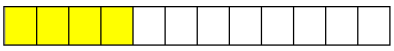
4.5 Addition and Subtraction of Fractions with Different Denominators

Models of Addition of Fractions with Different Denominators

Coins	Sum (different denominators)	Equivalent Sum (common denominators)	Dollar Value Sum
	$\frac{1}{4}$	$\frac{25}{100}$	\$0.25
+	$+\frac{1}{10}$	$+\frac{10}{100}$	+ \$0.10
	?	$\frac{35}{100}$	\$0.35

Sum (different denominators)		Equivalent Sum (common denominators)	
	$\frac{1}{4}$		$\frac{3}{12}$
+	$+\frac{1}{3}$	+ 	$+\frac{4}{12}$
	?		$\frac{7}{12}$

Recall from section 2.5, that the Least Common Multiple of 3 and 4 is 12, denoted

$$\text{LCM}(3, 4) = 12$$

And recall from section 4.1, by the Equivalent Fractions Property

$$\frac{1}{4} = \frac{1 \bullet 3}{4 \bullet 3} = \frac{3}{12} \text{ and } \frac{1}{3} = \frac{1 \bullet 4}{3 \bullet 4} = \frac{4}{12}$$

Demonstration Problems	*Practice Problems*
Add and simplify, if possible. **1. (a)** $\frac{1}{2}+\frac{1}{5}=$	Add and simplify, if possible. **1. (b)** $\frac{1}{2}+\frac{1}{3}=$
2. (a) $\frac{1}{2}-\left(-\frac{1}{8}\right)=$	**2. (b)** $\frac{1}{2}-\left(-\frac{1}{4}\right)=$
	Answers: **1. (b)** $\frac{5}{6}$; **2. (b)** $\frac{3}{4}$

Demonstration Problems	*Practice Problems*
Add and simplify, if possible. **3. (a)** $\frac{7}{12}+\frac{11}{15}=$	Add and simplify, if possible. **3. (b)** $\frac{7}{12}+\frac{5}{18}=$
Subtract and simplify, if possible. **4. (a)** $\frac{13}{24}-\frac{17}{32}=$	Subtract and simplify, if possible. **4. (b)** $\frac{7}{15}-\frac{19}{24}=$
	Answers: **3. (b)** $\frac{31}{36}$; **4. (b)** $-\frac{13}{40}$

Demonstration Problems	*Practice Problems*
Simplify. **5. (a)** $\frac{y}{6}+\frac{7}{9}=$	Simplify. **5. (b)** $\frac{3}{5}+\frac{x}{8}=$
6. (a) For $y=-\frac{3}{4}$, evaluate $y+\frac{1}{2}$	**6. (b)** For $x=-\frac{3}{4}$, evaluate $x+\frac{1}{3}$
	Answers: **5. (b)** $\frac{24+5x}{40}$; **6. (b)** $-\frac{5}{12}$