

Module 2: Addition and Subtraction - Practice Questions

1. Determine the minimum number of long-flats, flats, longs, and units for the bases below if the pieces in set A are combined with the pieces in set B. Then write numerals in positional numeration for sets A and B and the numerals for their sum in the given base.

a. Base five

A: 2 flats, 3 longs, 2 units

B: 1 flat, 2 longs, 3 units

b. Base twelve

A: 8 flats, 5 longs, 2 units

B: 2 flats, 9 longs, 5 units

2. Determine the minimum number of pieces below that need to be combined with set B to obtain set A for the given base. Then write numerals in positional numeration for sets A and B and the numerals for their difference in the given base.

a. Base eight

A: 5 flats, 2 longs, 3 units

B: 2 flats, 6 longs, 5 units

b. Base five

A: 3 flats, 4 longs, 2 units

B: 1 flat, 3 longs, 4 units

3. Sketch base pieces for the exercises below to illustrate each computation. Show regrouping.

a. $106 + 38$

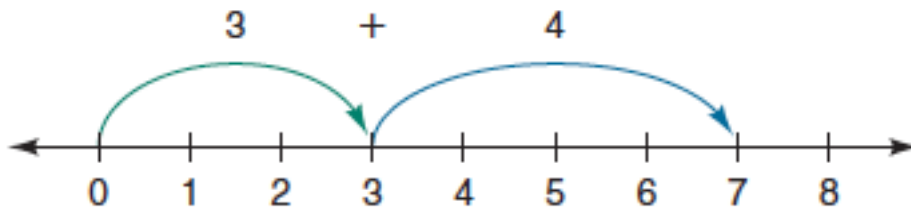
b. $41_{\text{five}} - 23_{\text{five}}$, using the take-away concept

c. $161 - 127$, using the comparison concept

d. $142_{\text{five}} + 34_{\text{five}}$

e. $157 - 123$, using the missing addend concept

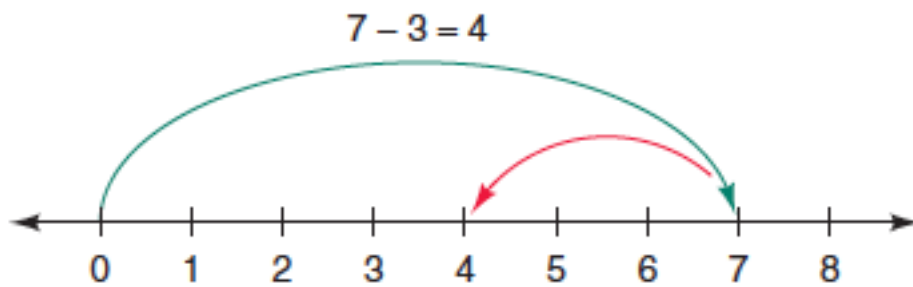
4. Addition is illustrated on a number line by a series of arrows as shown here. Use a number line to illustrate the equalities below.



a. $2 + 5 = 5 + 2$

b. $(2 + 4) + 1 = 1 + (2 + 4)$

5. Subtraction is illustrated on a number line by arrows that represent numbers. The number being subtracted is represented by an arrow from right to left, as shown below. Use a number line to illustrate the equations below.



a. $(6 - 3) - 2 = 1$

b. $6 - 6 = 0$

6. Compute the sums below using the given method. Describe an advantage of each method.

a. Left-to-right addition

$$\begin{array}{r} 726 \\ +508 \\ \hline \end{array}$$

b. Partial sums

$$\begin{array}{r} 974 \\ +382 \\ \hline \end{array}$$

7. Which number property shows that the two sides are equal in each question below?

a. $(38 + 13) + 17 = 38 + (13 + 17)$

b. $(47 + 62) + 12 = (62 + 47) + 12$

8. Compute exact answering using the mental math method listed for each problem below. Explain your process.

a. Compatible numbers: $128 - 15 + 27 - 50$

b. Substitutions: $23 + 25 + 28$

c. Equal-differences: $894 - 199$

d. Add-up: $135 - 47$

9. In the problems below, estimate each sum or difference by replacing one or both numbers by *compatible numbers*. Show your replacements.

a. $359 - 192 \approx$

b. $712 + 293 \approx$

c. $882 + 245 \approx$

d. $1522 - 486 \approx$

10. In the problems below, use front-end estimation to estimate each sum.

a. $362 + 408 + 978$

b. $16 + 49 + 87 + 33$

c. $7215 + 5102 + 8736$

Module 2: Addition and Subtraction - Practice Questions Answers

a. $232_{\text{five}} + 123_{\text{five}} = 410_{\text{five}}$

b. $852_{\text{twelve}} + 295_{\text{twelve}} = E27_{\text{twelve}}$, where E represents eleven

1.

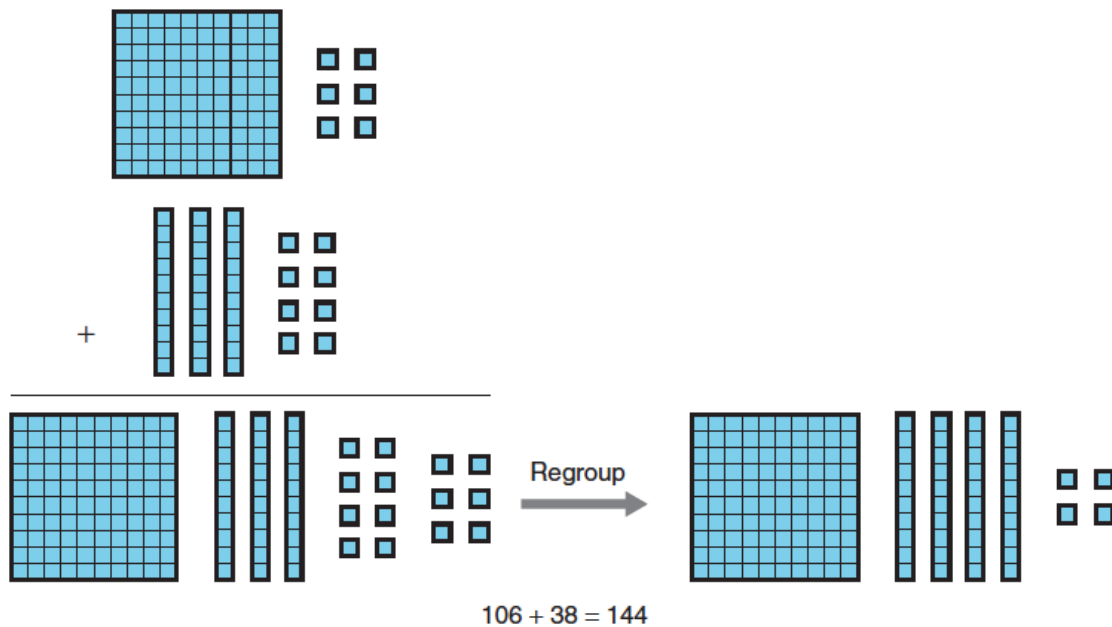
2.

a. 2 flats, 3 longs, 6 units; $523_{\text{eight}} - 265_{\text{eight}} = 236_{\text{eight}}$

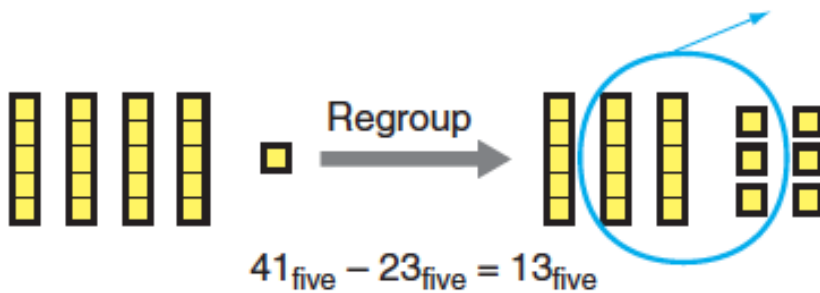
b. 2 flats, 0 longs, 3 units; $342_{\text{five}} - 134_{\text{five}} = 203_{\text{five}}$

3.

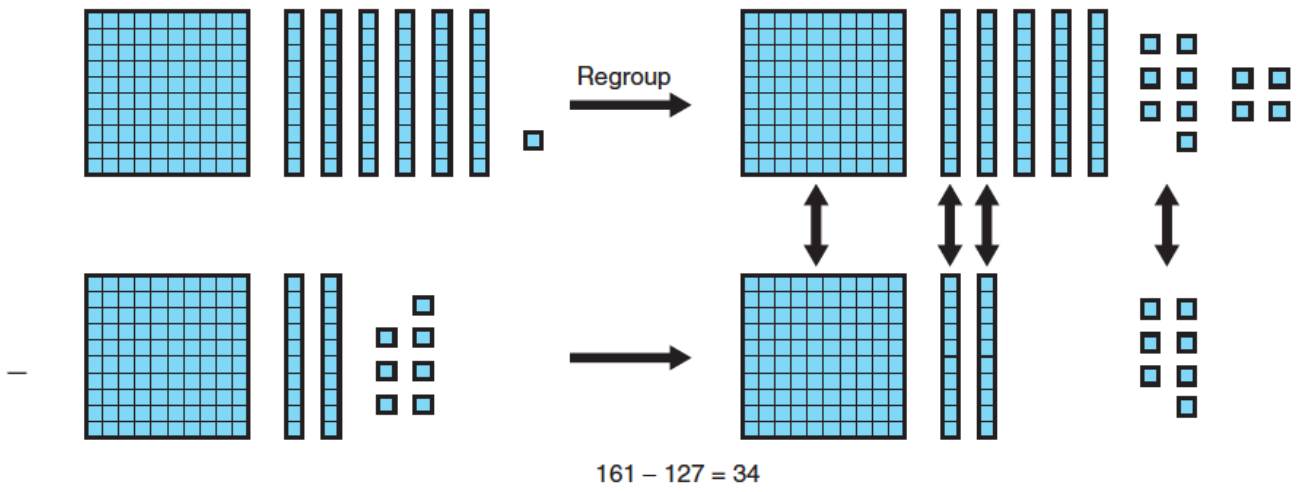
7. a. $106 + 38 = 144$



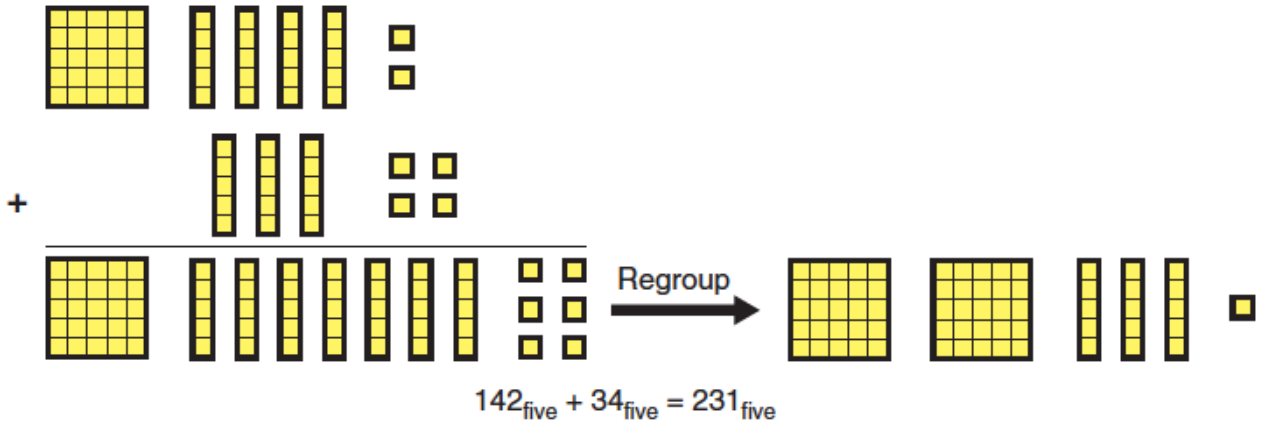
b. $41_{\text{five}} - 23_{\text{five}} = 13_{\text{five}}$



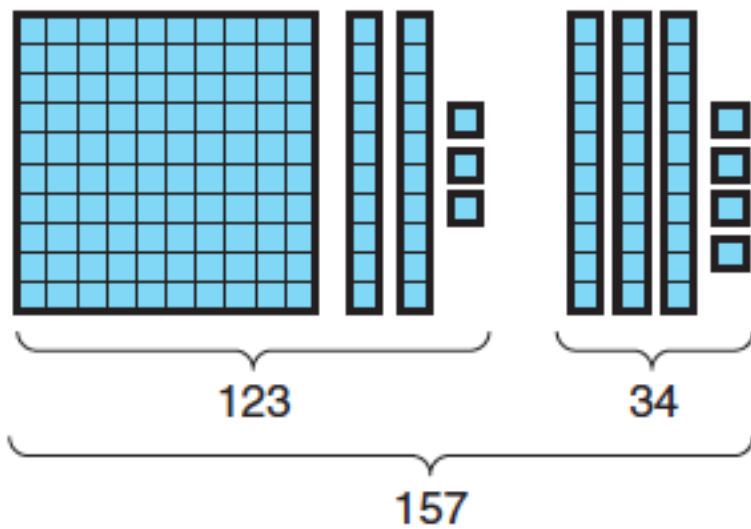
c. $161 - 127 = 34$



d. $142_{\text{five}} + 34_{\text{five}} = 231_{\text{five}}$

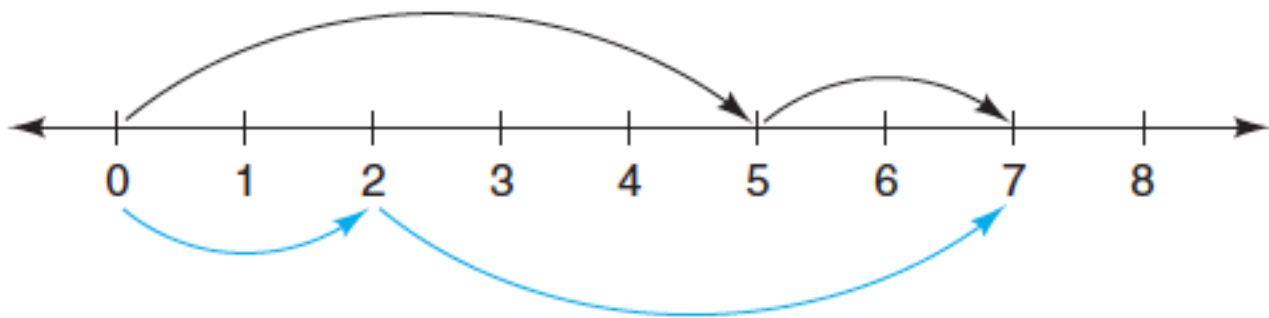


e. $157 - 123 = 34$

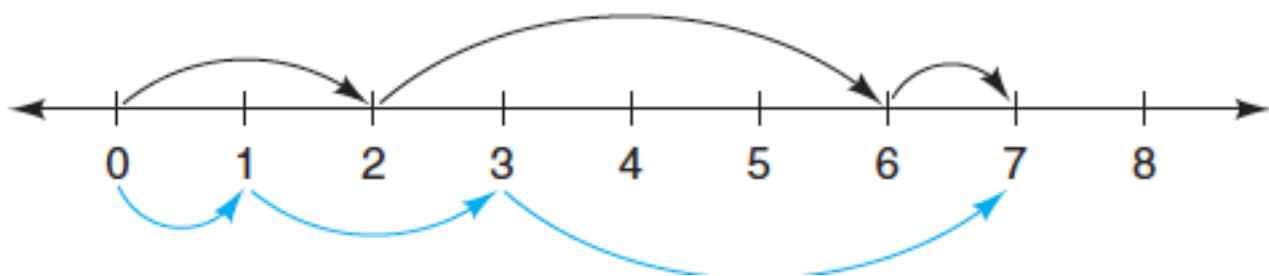


4.

9. a.

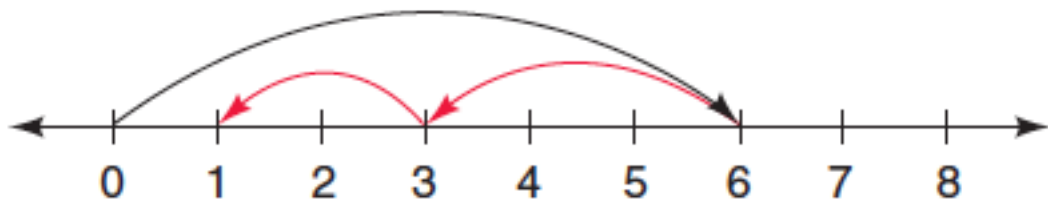


b.

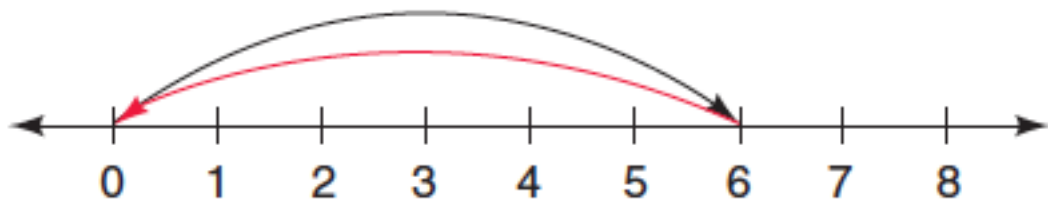


5.

a.



b.



6.

- a.** An advantage of this method is that when the digits of highest place value are added first, a subsequent error will affect only the digits of lower place value.

$$\begin{array}{r} 726 \\ + 508 \\ \hline 12\cancel{2}4 \\ 3 \end{array}$$

- b.** An advantage of this method is that all digits of column sums are recorded before regrouping. This eliminates the need to add and regroup in the same step.

$$\begin{array}{r} 974 \\ + 382 \\ \hline 6 \\ 15 \\ \hline 12 \\ \hline 1356 \end{array}$$

7.

- a.** Associative property for addition
b. Commutative property for addition

8. a.

$$\begin{aligned} 128 - 15 + 27 - 50 &= 128 + 12 - 50 \\ &= 140 - 50 \\ &= 90 \end{aligned}$$

b.

$$\begin{aligned}23 + 25 + 28 &= 25 + 23 + (2 + 26) \\ &= 25 + 25 + 26 \\ &= 50 + 26 \\ &= 76\end{aligned}$$

c.

$$894 - 199 = 895 - 200 = 695$$

d.

$$\begin{aligned}47 + 53 &= 100 \\ 100 + 35 &= 135 \\ \text{So } 47 + 88 &= 135\end{aligned}$$

9.

. Other compatible numbers are possible.

a. $359 - 192 \approx 360 - 200$
 $= 160$

b. $712 + 293 \approx 700 + 300$
 $= 1000$

c. $882 + 245 \approx 900 + 245$
 $= 1145$

d. $1522 - 486 \approx 1500 - 500$
 $= 1000$

10.

a. 1600, since $3 + 4 + 9 = 16$

b. 160, since $1 + 4 + 8 + 3 = 16$

c. 20,000, since $7 + 5 + 8 = 20$