OPERATIONS WITH WHOLE NUMBERS

A ADDITION

A.1 SOLVING REAL-WORLD PROBLEMS

Ex 1: Emma collected 3 112 postcards, and her sister gave her 2 458 more.
How many postcards does Emma have in total?

$\boxed{5570}$ postcards

Answer:

- To find the total number of postcards, add the postcards Emma collected and those her sister gave her.
- The column addition is:

$$\begin{array}{r} {\scriptstyle 1} \\ 3\,1\,1\,2 \\ +\,2\,4\,5\,8 \\ \hline 5\,5\,7\,0 \end{array}$$

- The total number of postcards Emma has is $3112 + 2458 = 5570$.

Ex 2: In a car race, Car A traveled 18 432 kilometers, and Car B traveled 22 516 kilometers.
How many kilometers did they travel in total?

$\boxed{40948}$ kilometers

Answer:

- To find the total distance traveled, add the kilometers traveled by Car A and Car B.
- The column addition is:

$$\begin{array}{r} {\scriptstyle 1} \\ 1\,8\,4\,3\,2 \\ +\,2\,2\,5\,1\,6 \\ \hline 4\,0\,9\,4\,8 \end{array}$$

- The total distance traveled is $18432 + 22516 = 40948$.

Ex 3: A charity event collected 25 670 dollars on the first day and 34 859 dollars on the second day.
How much money was collected in total?

$\boxed{60529}$ dollars

Answer:

- To find the total amount collected, add the amounts from the first and second days.
- The column addition is:

$$\begin{array}{r} {\scriptstyle 1\;1\;1} \\ 2\,5\,6\,7\,0 \\ +\,3\,4\,8\,5\,9 \\ \hline 6\,0\,5\,2\,9 \end{array}$$

- The total amount collected is $25670 + 34859 = 60529$ dollars.

Ex 4: An orchard produced 43 215 apples and 21 638 pears this season.
How many fruits were harvested in total?

$\boxed{64853}$ fruits

Answer:

- To find the total number of fruits harvested, add the apples and pears produced.
- The column addition is:

$$\begin{array}{r} {\scriptstyle 1} \\ 4\,3\,2\,1\,5 \\ +\,2\,1\,6\,3\,8 \\ \hline 6\,4\,8\,5\,3 \end{array}$$

- The total number of fruits harvested is $43215 + 21638 = 64853$ fruits.

B SUBTRACTION

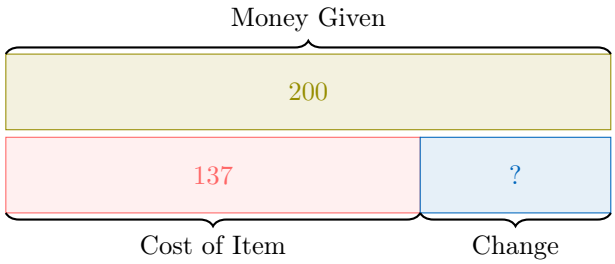
B.1 SOLVING REAL-WORLD PROBLEMS

Ex 5: You buy an article for 137 dollars. You give the seller a 200 dollar bill.
How much change will you get back?

$\boxed{63}$ dollars

Answer:

- To find out how much change you'll get back, start with the amount you gave the seller and subtract the cost of the item.



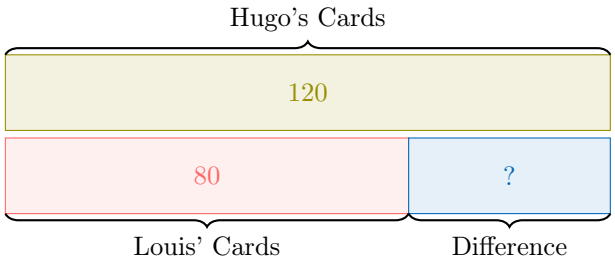
- $$\begin{array}{r} 2\,{}^{1}\!\not{0}\,{}^{1}\!\not{0} \\ -\,{}^{1}\!\not{1}\,{}^{1}\!\not{3}\;7 \\ \hline 6\;3 \end{array}$$
- So, the change you'll get back is $200 - 137 = 63$ dollars.

Ex 6: Hugo has 120 Pokémon cards, and Louis has 80 Pokémon cards.
What is the difference in the number of cards they have?

$\boxed{40}$ cards

Answer:

- To find the difference, subtract the number of cards Louis has from the number of cards Hugo has.



- $$\begin{array}{r} {}^{1}\cancel{1}{}^{1}\cancel{2}\,0 \\ -\,1\;\;8\;0 \\ \hline 4\;0 \end{array}$$

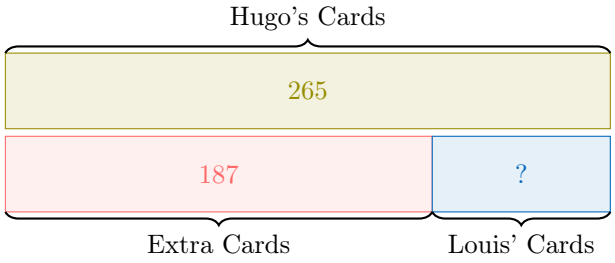
- The difference in the number of cards is $120 - 80 = 40$ cards.

Ex 7: Hugo has 265 Pokémon cards. He has 187 more cards than Louis.
How many cards does Louis have?

$$\boxed{78} \text{ cards}$$

Answer:

- To find the number of cards Louis has, subtract the extra cards Hugo has from his total.



- $$\begin{array}{r} 2\,{}^{1}\cancel{6}{}^{1}\cancel{5} \\ -\,1\,1\,8\;\;7 \\ \hline 7\;8 \end{array}$$

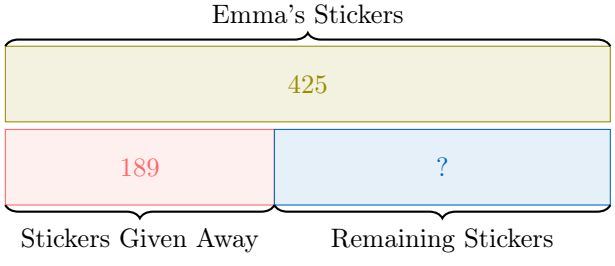
- Louis has $265 - 187 = 78$ cards.

Ex 8: Emma has 425 stickers. She gives 189 stickers to her friend.
How many stickers does Emma have left?

$$\boxed{236} \text{ stickers}$$

Answer:

- To find out how many stickers Emma has left, subtract the number of stickers she gave away from her initial total.



- $$\begin{array}{r} 4\,{}^{1}\cancel{2}{}^{1}\cancel{5} \\ -\,1\,1\,8\;\;9 \\ \hline 2\;3\;6 \end{array}$$

- So, Emma has $425 - 189 = 236$ stickers left.

C MULTIPLICATION

C.1 SOLVING REAL-WORLD PROBLEMS

Ex 9: Each day, my meal costs \$5. What is the total cost in a year (365 days)?

$$\text{Total cost} = \boxed{1825} \text{ dollars}$$

Answer:

- To solve this exercise, multiply the daily cost by the number of days in a year:

$$\text{Total cost} = 5 \times 365$$

- $$\begin{array}{r} 3\;6\;5 \\ \times \quad 5 \\ \hline 1\;8\;2\;5 \end{array}$$

- Therefore, the total cost is $5 \times 365 = 1825$ dollars.

Ex 10: In a school, there are 240 students. Each student needs 12 books. How many books are needed in total?

$$\text{Total books} = \boxed{2880}$$

Answer:

- To find the total number of books, multiply the number of students by the number of books per student:

$$\text{Total books} = 240 \times 12$$

- $$\begin{array}{r} 2\;4\;0 \\ \times \quad 1\;2 \\ \hline 4\;8\;0 \\ 2\;4\;0 \\ \hline 2\;8\;8\;0 \end{array}$$

- Therefore, the total number of books is $240 \times 12 = 2880$.

Ex 11: A library has 245 books on each shelf. If the library has 25 shelves, how many books does it have in total?

$$\text{Total books} = \boxed{6125}$$

Answer:

- To solve this exercise, multiply the number of books per shelf by the number of shelves:

$$\text{Total books} = 245 \times 25$$

- $$\begin{array}{r} 2\;4\;5 \\ \times \quad 2\;5 \\ \hline 1\;2\;2\;5 \\ 4\;9\;0 \\ \hline 6\;1\;2\;5 \end{array}$$

- Therefore, the total number of books is $245 \times 25 = 6125$.

Ex 12: I do 20 Maths exercises per week. How many exercises do I do in a year (52 weeks)?

$$\text{Total exercises} = \boxed{1040}$$

Answer:

- To solve this exercise, multiply the number of exercises per week by the number of weeks in a year:

$$\text{Total exercises} = 20 \times 52$$

$$\begin{array}{r} 2\,0 \\ \times\, 5\,2 \\ \hline 4\,0 \\ 1\,0\,0 \\ \hline 1\,0\,4\,0 \end{array}$$

-
- Therefore, the total number of exercises is $20 \times 52 = 1040$.

D DIVISION

D.1 SOLVING REAL-WORLD PROBLEMS

Ex 13: A baker packs 42 cookies into boxes. Each box holds 3 cookies.How many full boxes does the baker have?

$$\boxed{14} \text{ boxes}$$

How many cookies will be left over?

$$\boxed{0} \text{ cookies}$$

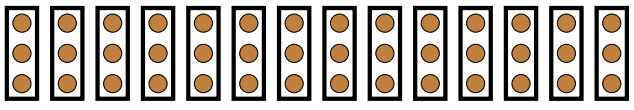
Answer:

- We can divide the cookies like this:

$$\begin{array}{r} 14 \\ 3\overline{)42} \\ \underline{3} \\ 12 \\ \underline{12} \\ 0 \end{array}$$

So, $42 \div 3 = 14\text{R}0$.

- This means we can pack 42 cookies into boxes that hold 3 cookies each.



- The baker has 14 full boxes.
- There will be 0 cookies left over.

Ex 14: 6 pirates share equally a treasure of 200 golden coins. How many coins does each pirate receive? How many coins remain?

$$\text{Coins per pirate} = \boxed{33} \text{ coins}$$
$$\text{Leftover coins} = \boxed{2} \text{ coins}$$

Answer:

- To solve this exercise, divide 200 by 6. Using long division:

$$\begin{array}{r} 33 \\ 6\overline{)200} \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

- The division gives a quotient of 33 with a remainder of 2. This means each pirate receives 33 coins and 2 coins remain.
- Pour résoudre cet exercice, divise 200 par 6. En utilisant la division posée française :

$$\begin{array}{r|l} 2\,0\,0 & 6 \\ \cline{2-2} -\,1\,8 & 3\,3 \\ \cline{1-1} 2\,0 & \\ -\,1\,8 & \\ \cline{1-1} 2 & \end{array}$$

- Le calcul donne un quotient de 33 et un reste de 2. Cela signifie que chaque pirate reçoit 33 pièces et qu'il reste 2 pièces.

Ex 15: A teacher distributes 250 candies equally among 12 children. How many candies does each child receive? How many candies remain?

$$\text{Candies per child} = \boxed{20} \text{ candies}$$
$$\text{Leftover candies} = \boxed{10} \text{ candies}$$

Answer:

- To solve this exercise, divide 250 by 12. Using long division:

$$\begin{array}{r} 20 \\ 12\overline{)250} \\ \underline{24} \\ 10 \end{array}$$

- The division gives a quotient of 20 with a remainder of 10. This means each child receives 20 candies and 10 candies remain.
- Pour résoudre cet exercice, divise 250 par 12 en utilisant la division posée française :

$$\begin{array}{r|l} 2\,5\,0 & 1\,2 \\ \cline{2-2} -\,2\,4 & 2\,0 \\ \cline{1-1} 1\,0 & \\ -\quad 0 & \\ \cline{1-1} 1\,0 & \end{array}$$

- Le calcul donne un quotient de 20 et un reste de 10. Cela signifie que chaque élève reçoit 20 bonbons et qu'il reste 10 bonbons.

Ex 16: An art supply store has 456 pencils. They want to pack these pencils equally into boxes containing 20 pencils each. How many full boxes can be filled? How many pencils remain?

$$\text{Full boxes} = \boxed{22} \text{ boxes}$$

$$\text{Leftover pencils} = \boxed{16} \text{ pencils}$$

Answer:

- **English:** To solve this exercise, divide 456 by 20. Using long division:

$$\begin{array}{r} 22 \\ 20\overline{)456} \\ \underline{40} \\ 56 \\ \underline{40} \\ 16 \end{array}$$

The division gives a quotient of 22 with a remainder of 16. This means 22 full boxes can be filled, and 16 pencils remain.

- **Français :** Pour résoudre cet exercice, divise 456 par 20. En utilisant la division posée française :

$$\begin{array}{r|l} 4\,5\,6 & 2\,0 \\ \cline{2-2} -\,4\,0 & 2\,2 \\ \cline{1-1} 5\,6 & \\ -\,4\,0 & \\ \cline{1-1} 1\,6 & \end{array}$$

Le calcul donne un quotient de 22 et un reste de 16. Cela signifie que l'on peut remplir 22 boîtes pleines et qu'il restera 16 crayons.

E ORDER OF OPERATIONS

E.1 PERFORMING MULTI-OPERATIONS

Ex 17:

$$4 + 2 \times (2 + 3) = \boxed{14}$$

Answer:

- $4 + 2 \times (2+3) = 4 + 2 \times 5$ (parentheses: $2 + 3 = 5$)
- $4 + 2 \times (2 + 3) = 4 + 2 \times 5$
  $= 4 + 10$ (multiplication: $2 \times 5 = 10$)
- $4 + 2 \times (2 + 3) = 4 + 2 \times 5$
  $= 4 + 10$
  $= 14$ (addition: $4 + 10 = 14$)

Ex 18:

$$10 - 2 \times (5 - 3) = \boxed{6}$$

Answer:

- $10 - 2 \times (5-3) = 10 - 2 \times 2$ (parentheses: $5 - 3 = 2$)
- $10 - 2 \times (5 - 3) = 10 - 2 \times 2$
  $= 10 - 4$ (multiplication: $2 \times 2 = 4$)
- $10 - 2 \times (5 - 3) = 10 - 2 \times 2$
  $= 10 - 4$
  $= 6$ (subtraction: $10 - 4 = 6$)

Ex 19:

$$3 \times (7 - 2) + 1 = \boxed{16}$$

Answer:

- $3 \times (7-2) + 1 = 3 \times 5 + 1$ (parentheses: $7 - 2 = 5$)
- $3 \times (7 - 2) + 1 = 3 \times 5 + 1$
  $= 15 + 1$ (multiplication: $3 \times 5 = 15$)
- $3 \times (7 - 2) + 1 = 3 \times 5 + 1$
  $= 15 + 1$
  $= 16$ (addition: $15 + 1 = 16$)

Ex 20:

$$12 \div (6 - 2) + 3 = \boxed{6}$$

Answer:

- $12 \div (6-2) + 3 = 12 \div 4 + 3$ (parentheses: $6 - 2 = 4$)
- $12 \div (6 - 2) + 3 = 12 \div 4 + 3$
  $= 3 + 3$ (division: $12 \div 4 = 3$)
- $12 \div (6 - 2) + 3 = 12 \div 4 + 3$
  $= 3 + 3$
  $= 6$ (addition: $3 + 3 = 6$)

Ex 21:

$$(2 + 8) \div 5 - 2 = \boxed{0}$$

Answer:

- $(2+8) \div 5 - 2 = 10 \div 5 - 2$ (parentheses: $2 + 8 = 10$)
- $(2 + 8) \div 5 - 2 = 10 \div 5 - 2$
  $= 2 - 2$ (division: $10 \div 5 = 2$)
- $(2 + 8) \div 5 - 2 = 10 \div 5 - 2$
  $= 2 - 2$
  $= 0$ (subtraction: $2 - 2 = 0$)

F SOLVING PROBLEMS

F.1 BUILDING THE EXPRESSION

MCQ 22: A farmer has 3 fields, and each field contains 10 apple trees. If each tree produces 8 apples, what is the total number of apples?
Choose the correct expression

☐ $3 + 10 \times 8$

☒ $3 \times 10 \times 8$

☐ $(10 \times 8) \div 3$

Answer:

- **Read**: "each field contains" and "each tree produces" both imply multiplication.
- **Identify the steps**:
  1. Find the total number of trees by multiplying fields by trees per field.
  2. Multiply the total number of trees by the apples per tree.
- **Write the expression**: $3 \times 10 \times 8$ or $(3 \times 10) \times 8$

MCQ 23: A library has 50 books. 14 books are loaned out. The remaining books are then placed equally on 4 shelves. How many books are on each shelf?
Choose the correct expression

☐ $50 - (14 \div 4)$

☐ $50 + 14 \div 4$

☒ $(50 - 14) \div 4$

Answer:

- **Read**: "loaned out" means subtract; "placed equally" means divide.
- **Identify the steps**:
  1. Start with 50.
  2. Subtract 14 to find the remaining books.
  3. Divide the result by 4.
- **Write the expression**: $(50 - 14) \div 4$

MCQ 24: A baker makes 5 trays of cookies, with 12 cookies on each tray. He sells 40 cookies. How many cookies are left?
Choose the correct expression

☒ $(5 \times 12) - 40$

☐ $5 \times (12 - 40)$

☐ $5 + 12 - 40$

Answer:

- **Read**: "trays of cookies" implies multiplication; "sells" implies subtraction.
- **Identify the steps**:
  1. Calculate the total number of cookies made (5×12).
  2. Subtract the number of cookies sold.
- **Write the expression**: $(5 \times 12) - 40$

MCQ 25: Sam has 20 dollars. He buys 3 notebooks that cost 4 dollars each. He then finds 5 dollars. How much money does he have now?
Choose the correct expression

☐ $20 - 3 + 4 + 5$

☒ $20 - (3 \times 4) + 5$

☐ $(20 - 3) \times 4 + 5$

Answer:

- **Read**: "buys 3...that cost 4 each" means multiply then subtract; "finds" means add.
- **Identify the steps**:
  1. Start with 20.
  2. Subtract the total cost of the notebooks (3×4).
  3. Add the money he found.
- **Write the expression**: $20 - (3 \times 4) + 5$

MCQ 26: There are 30 students in a class. Today, 2 students are absent. The teacher divides the remaining students into 4 equal teams for a game. Which expression shows the number of students on each team?
Choose the correct expression

☐ $30 - 2 \div 4$

☒ $(30 - 2) \div 4$

☐ $30 \div 4 - 2$

Answer:

- **Read**: "absent" implies subtraction; "divides...into equal teams" implies division. The subtraction must be done first to find the total number of students present.
- **Identify the steps**:
  1. Start with 30 students.
  2. Subtract the 2 absent students.
  3. Divide the result by 4.
- **Write the expression**: $(30 - 2) \div 4$

MCQ 27: For a school bake sale, Maria bakes 4 batches of 12 cookies. At the same time, John bakes 3 batches of 10 cookies. Which expression represents the total number of cookies they baked together?
Choose the correct expression

☐ $4 + 12 \times 3 + 10$

☐ $(4 + 3) \times (12 + 10)$

☒ $(4 \times 12) + (3 \times 10)$

Answer:

- **Read**: "batches of" implies multiplication. "together" implies addition of the two totals.
- **Identify the steps**:
  1. Calculate the total cookies Maria baked (4×12).
  2. Calculate the total cookies John baked (3×10).
  3. Add the two results together.
- **Write the expression**: $(4 \times 12) + (3 \times 10)$

MCQ 28: Leo starts with 5 bags of marbles, and each bag contains 10 marbles. He loses 8 marbles during a game. Which expression shows how many marbles Leo has left?
Choose the correct expression

☐ $5 \times (10 + 8)$

☒ $(5 \times 10) - 8$

☐ $5 + 10 - 8$

Answer:

- **Read**: "bags of marbles" implies multiplication to find the total; "loses" implies subtraction.
- **Identify the steps**:
  1. Calculate the total number of marbles Leo started with (5×10).
  2. Subtract the number of marbles he lost.
- **Write the expression**: $(5 \times 10) - 8$

F.2 SOLVING REAL-WORLD PROBLEMS

Ex 29: Hugo is 5 years old. Louis is twice as old as Hugo, plus 3 years. What is the age of Louis?

Louis is $\boxed{13}$ years old.

Answer: Applying the five-step procedure:

- **1. Understand**: We must find Louis's age based on Hugo's age. "Twice as old" indicates multiplication by 2, and "plus" indicates addition.
- **2. Plan**: First, multiply Hugo's age by 2. Second, add 3 to the result.
- **3. Write Expression**: $(5 \times 2) + 3$
- **4. Calculate**: $(5 \times 2) + 3 = 10 + 3$
  $= 13$
- **5. Conclude**: Therefore, Louis is 13 years old.

Ex 30: A zoo houses 15 animals in the morning. Throughout the day, 5 new animals are admitted. In the evening, the zookeeper divides the total number of animals into 5 equal groups. How many animals are in each group?

There are $\boxed{4}$ animals in each group.

Answer: Applying the five-step procedure:

- **1. Understand**: We need to find the total number of animals first, and then divide that total into 5 equal groups.
- **2. Plan**: First, add the new animals to the initial count. Second, divide the sum by 5.
- **3. Write Expression**: $(15 + 5) \div 5$
- **4. Calculate**: $(15 + 5) \div 5 = 20 \div 5$
  $= 4$
- **5. Conclude**: Therefore, there are 4 animals in each group.

Ex 31: Hugo has 12 pencils. He gives 3 pencils to each of his 2 friends and then purchases 5 more. What is the final number of pencils Hugo possesses?

Hugo possesses $\boxed{11}$ pencils.

Answer: Applying the five-step procedure:

- **1. Understand**: We start with 12, subtract the total number of pencils given away, and then add the number of pencils purchased.
- **2. Plan**: First, calculate the total pencils given away (3×2). Second, subtract this total from the initial 12. Third, add 5 to that result.
- **3. Write Expression**: $(12 - (3 \times 2)) + 5$
- **4. Calculate**: $(12 - (3 \times 2)) + 5 = (12 - 6) + 5$
  $= 6 + 5$
  $= 11$
- **5. Conclude**: Therefore, Hugo possesses 11 pencils.

Ex 32: You have 3 apples, you purchase 5 more, and then you share the total quantity equally with a friend. How many apples are left?

You retain $\boxed{4}$ apples.

Answer: Applying the five-step procedure:

- **1. Understand**: We must first find the total number of apples. "Share equally with a friend" implies dividing the total between two people. The question asks how many you have left, which is your own share.
- **2. Plan**: First, add 3 and 5. Second, divide the sum by 2.
- **3. Write Expression**: $(3 + 5) \div 2$
- **4. Calculate**: $(3 + 5) \div 2 = 8 \div 2$
  $= 4$
- **5. Conclude**: Therefore, you retain 4 apples.