QUESTIONS

CHOOSING OPERATIONS TO SOLVE PROBLEMS WITH LARGE NUMBERS

Knowledgehook

NAME: DATE:

1 Write a number sentence to show how you would solve each problem.
Show or explain why your number sentence solves the problem.

a) Ivey has $18 and Fiona has $6.
How much more does Ivey have than Fiona?

6 + 12 = 18: You add up 12 from 6 to 18:

18 X X X X X X X X X X X X X X X X X X

6 X X X X X X 1 2 3 4 5 6 7 8 9 10 11 12

OR

How much more ← Subtract

$18 − $6 = $12

b) Hamid spent $160 buying gifts for family and $125 buying gifts for friends.
How much more did he spend on family gifts than gifts for friends?

Subtract

$$\begin{array}{r} {}^{5}\cancel{1}{}^{1}\cancel{6}0 \\ -\ 1\,2\,5 \\ \hline 3\,5 \end{array}$$

125 + ☐ = $160

Hamid spent $35 more on family gifts.

c) Juli has $124 in bills and $36 in coins. How much money does she have altogether?

add

$$\begin{array}{r} {}^{\dot{1}}\dot{2}\dot{4} \\ +\ 3\,6 \\ \hline 1\,6\,0 \end{array}$$

Juli has $160 total.

d) Katy has some fish in her tank. She added 22 new ones, and now she has 45.
How many fish did she have to start with?

☐ + 22 = 45 or $\begin{array}{r} 45 \\ -22 \\ \hline 23 \end{array}$

Katy had 23 fish to start with.

e) Lucas spent $98 altogether on new shoes and socks. The socks cost $18.
How much were the shoes?

$$\begin{array}{r} 98 \\ -\ 18 \\ \hline 80 \end{array}$$

Shoes cost $80

Shoes + socks = $98

Shoes + $18 = $98

QUESTIONS CHOOSING OPERATIONS TO SOLVE PROBLEMS WITH LARGE NUMBERS

NAME: DATE:

2 Write a number sentence to show how you would solve each problem. Show or explain why your number sentence solves the problem.

a) The teacher arranged the class into 4 groups with 12 children in each. How many students are in the class?

4 × 12 = 48: It's 4 equal groups of 12, which is 4 × 12.

XXXXXX XXXXXX XXXXXX XXXXXX
XXXXXX XXXXXX XXXXXX XXXXXX
G1 G2 G3 G4

b) Farah had 60 scissors to give out to 5 groups of students. How many scissors will each group get?

60 ÷ 5 = 12 Each group gets 12 pairs of scissors

c) Oli displayed his card collection in 3 rows of 21. How many cards did he have?

3 x 21 = 63
Oli has 63 cards

21 21 21

d) Peta gave out 60 candies to her friends. Each friend got 6 candies. How many friends did Peta give candies to?

60 ÷ 6 = 10 friends

e) 300 desks in Ivan's gymnasium were set up in rows of 10. How many desks were there in each row?

300 ÷ 10 = 30

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NAME: DATE:

2 f) Oli earned $12 a day doing chores after school for his grandmother. How much did he earn altogether after 14 days?

d1 $12 d2 $12 d3 $12 d4 $12 d5 $12 d6 $12 d7 $12

d8 $12 d9 $12 d10 $12 d11 $12 d12 $12 d13 $12 d14 $12

$$\begin{array}{r} {}^{1}14 \\ \times\ 12 \\ \hline 28 \\ 140 \\ \hline 168 \end{array}$$

Oli gets $168 altogether.

g) Pierre has 9 pairs of pants and 6 times as many shirts. How many shirts does he have?

Shirt = 6 x Pants
= 6 x 9
= 54

h) Jonathon lives 18 blocks away from school, which is 9 times farther than Carver. How many blocks away from school does Carver live?

Jonathan — — — — — — — — — — — — — — — — — — —

most

Carver — —

9 x 2 = 18

INTERVENTION QUESTIONS

CHOOSING OPERATIONS TO SOLVE PROBLEMS WITH LARGE NUMBERS

GUIDE

To identify specific issues that students might have, select and assign questions based on the curriculum you have covered at the time of this formative assessment.

Please Note: These questions could span multiple grades in your curriculum, so carefully select only those questions that are appropriate to the grade(s) you are teaching.

Provide students with square and/or round counters in two colours. Observe students while they answer questions in order to identify specific learning gaps, errors, and/or misconceptions. You can use the strategies described in the *Math Background* and/or the *Misconception Chart* to facilitate intervention.

Q	Focus	Observations and Look Fors	Notes
1	Identifying and solving addition and subtraction problems	• Do students subtract or add to solve **a)**, **b)**, **d)**, and **e)**? • Do they model their answer for **b)** on the sample answer for **a)**? • Do they use models to help them calculate or do they use mental math? • Do they explain their thinking with words and/or show with a model?	• The problems have been designed with these meanings of the operations in mind: ◦ **c)** is an addition situation. ◦ **a)** and **b)** are comparison subtraction situations, and **d)** and **e)** are missing-part subtraction situations.
2	Identifying and solving multiplication and division problems	• Do students find multiplication problems easier than division ones? • Do they model their answer for **f)** on the sample answer for **a)**? • Do they mention or show equal groups in their explanations? • Do they use models to help them calculate or do they know their multiplication / division facts? • Do they explain their thinking with words and/or show with a model?	• The problems have been designed with these meanings of the operations in mind: ◦ **a)** and **f)** are equal-groups multiplication situations, **c)** is an array multiplication situation, and **g)** is a comparison-rate multiplication situation. ◦ **b)** is a division situation with a given number of groups (i.e., sharing), **d)** is a division situation with a given number in each group (i.e., grouping), **e)** is a division array situation, and **h)** is a comparison division situation.

CHOOSING OPERATIONS TO SOLVE PROBLEMS WITH LARGE NUMBERS

ANSWERS

1 Write a number sentence to show how you would solve each problem.
Show or explain why your number sentence solves the problem.

Explanations will vary

a) Ivey has $18 and Fiona has $6.
How much more does Ivey have than Fiona?

6 + 12 = 18: To figure out how much more 18 is than 6, you can add up from 6 to 18:

18 X X X X X X X X X X X X X X X X X X

6 X X X X X X 1 2 3 4 5 6 7 8 9 10 11 12

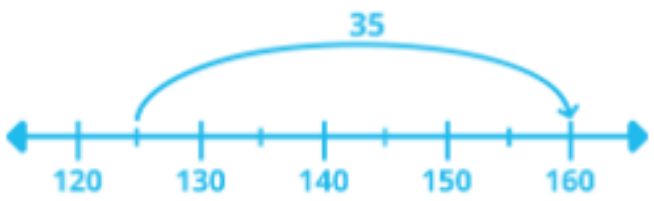
Or, 18 − 6 = 12: To figure out how much more 18 is than 6, you can take away 6 from 18:

18 ~~X X X X X X~~ X X X X X X X X X X X X

6 ~~X X X X X X~~ There are 12 left.

b) Hamid spent $160 buying gifts for family and $125 buying gifts for friends.
How much more did he spend on family gifts than gifts for friends?

125 + 35 = 160 To figure out how much more 160 is than 125, I added up 35 from 125 to 160:



Or, 160 − 125 = 35: To figure out how much more 160 is than 125, I took away 125 from 160.

c) Juli has $124 in bills and $36 in coins.
How much money does she have altogether?

124 + 36 = 160: You have to add 124 and 36 together to find out what they are altogether.

d) Katy has some fish in her tank. She added 22 new ones, and now she has 45.
How many fish did she have to start with?

45 − 22 = 23: To figure out the missing amount, I took 22 away from 45:

? fish	22 fish
45 fish	

Or, 22 + 23 = 45: To figure out the missing amount, I added up from 22 to 45:

? fish	22 fish
45 fish	

e) Lucas spent $98 altogether on new shoes and socks. The socks cost $18.
How much were the shoes?

98 − 18 = 80: To figure out the missing amount, I took away 18 from 98:

?$ for shoes	$18 for socks
$98 altogether	

Or, 18 + 80 = 98: To figure out the missing amount, I added up from 18 to 98:

?$ for shoes	$18 for socks
$98 altogether	

ANSWERS (CONTINUED)

2 Write a number sentence to show how you would solve each problem.
Show or explain why your number sentence solves the problem.

Explanations will vary

a) The teacher arranged the class into 4 groups with 12 children in each.
How many students are in the class?

$4 \times 12 = 48$: It's 4 equal groups of 12, which is 4×12.

XXXXXX XXXXXX XXXXXX XXXXXX
XXXXXX XXXXXX XXXXXX XXXXXX

b) Farah had 60 scissors to give out to 5 groups of students.
How many scissors will each group get?

$60 \div 5 = 12$: It's sharing 60 things equally in 5 groups, and that's dividing $60 \div 5$.

XXXXX XXXXX XXXXX XXXXX XXXXX
XXXXX XXXXX XXXXX XXXXX XXXXX

c) Oli displayed his card collection in 3 rows of 21.
How many cards did he have?

$3 \times 21 = 63$: XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX

It's 3 equal groups of 21, which is multiplying 3×21.

d) Peta gave out 60 candies to her friends. Each friend got 6 candies.
How many friends did Peta give candies to?

$60 \div 6 = 10$: It's sharing 60 things equally in groups of 6, which is dividing $60 \div 6$.

XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX

e) 300 desks in Ivan's gymnasium were set up in rows of 10.
How many desks were there in each row?

$300 \div 10 = 30$: It's taking 300 things and dividing them into equal rows of 10. You end up with 30 in each row.

2 f) Oli earned $12 a day doing chores after school for his grandmother.
How much did he earn altogether after 14 days?

12 × 14 = 168: It's like adding twelve 14 times, which is multiplying 14 × 12.

$12	$12	$12	$12	$12	$12	$12
$12	$12	$12	$12	$12	$12	$12

g) Pierre has 9 pairs of pants and 6 times as many shirts.
How many shirts does he have?

6 × 9 = 54 Pants: xxxxxxxxx
Shirts: xxxxxxxxx xxxxxxxxx xxxxxxxxx xxxxxxxxx xxxxxxxxx xxxxxxxxx
6 times as many as 9 is 6 × 9 = 54.

h) Jonathon lives 18 blocks away from school, which is 9 times farther than Carver.
How many blocks away from school does Carver live?

18 ÷ 9 = 2 XXXXXXXXXXXXXXXXXX → XX XX XX XX XX XX XX XX XX

The model shows that 18 is 9 times as many as 2.