Answers

**Number**

**Unit 2 Line Master 1f**

Use mental math to explore multiplying and dividing by powers of 10.
Verify your thinking with a calculator.

1. Complete each chart. In part a), the first row is done for you.

 a)

|  |  |  |
| --- | --- | --- |
| **Number** | **Operation** | **Answer** |
| 34.912 | × 10 | 349.12 |
| 34.912 | × 100 | 3491.2 |
| 34.912 | ÷ 10 | 3.4912 |
| 34.912 | ÷ 100 | 0.349 12 |
| 34.912 | ÷ 1000 | 0.034 912 |

 What do you notice?
 The digits are the same. They change their place value
 depending on the power of 10 and whether I am multiplying
 or dividing.

 b)

|  |  |  |
| --- | --- | --- |
| **Number** | **Operation** | **Answer** |
| 0.8531 | × 10 | 8.531 |
| 0.8531 | × 100 | 85.31 |
| 0.8531 | ÷ 10 | 0.085 31 |
| 0.8531 | ÷ 100 | 0.008 531 |
| 0.8531 | ÷ 1000 | 0.000 853 1 |

 What do you notice?
 Even though this number was less than 1, the same patterns
 happened. Dividing made the number smaller and multiplying
 made the number greater but the digits didn’t change.

Answers (cont’d)

**Number**

**Unit 2 Line Master 1g**

 c)

|  |  |  |
| --- | --- | --- |
| **Number** | **Operation** | **Answer** |
| 90.47 | × 10 | 904.7 |
| 90.47 | × 100 | 9047 |
| 90.47 | ÷ 10 | 9.047 |
| 90.47 | ÷ 100 | 0.9047 |
| 90.47 | ÷ 1000 | 0.090 47 |

 What do you notice?
 Again, the digits stayed the same. I am scaling the original
 number.

2. Pat wants to convert 453 m to kilometres.
Sam says to divide by 1000 while Chris says to multiply by .

a) Explain why they are both correct.

 The fraction means 1 ÷ 1000.
 So, the strategies are the same.

 Sam is saying: 453 ÷ 1000

 Chris is saying: 453 × which can also be thought of as
 453 × 1 ÷ 1000 or 453 ÷ 1000

Answers (cont’d)

**Number**

**Unit 2 Line Master 1h**

 b) How many kilometres is 453 m?

 To convert metres to kilometres, I’ll divide by 1000.
 453 ÷ 1000 = 0.453
 453 m is equal to 0.453 km.

 c) To convert a distance measured in kilometres to metres,
 would you multiply or divide?
 By what number? Explain your thinking.

 I know 1 km = 1000 m.
 So, I would multiply the distance by 1000 to convert it to metres.
 Because I know multiplying by 1000 is the same as dividing

 by , I could also convert by dividing the distance by .

Answers (cont’d)

**Number**

**Unit 2 Line Master 1i**

3. Complete the following charts.

 a)

|  |  |  |
| --- | --- | --- |
| **Number Sentence** | **Expanded Form** | **Value** |
| 89 × 103 | 89 × 1000 | 89 000 |
| 89 × 102 | 89 × 100 | 8900 |
| 89 × 101 | 89 × 10 | 890 |
| 89 × 100 | 89 × 1 | 89 |
| 89 × 10-1 | 89 ×  | 8.9 |
| 89 × 10-2 | 89 ×  | 0.89 |
| 89 × 10-3 | 89 ×  | 0.089 |

 What do you notice?

 The value gets smaller as the exponent decreases.
 Multiplying by a power of 10 with a negative exponent
 has the same effect as dividing by a power of 10
 with a positive exponent.

Answers (cont’d)

**Number**

**Unit 2 Line Master 1j**

 b)

|  |  |  |
| --- | --- | --- |
| **Number Sentence** | **Expanded Form** | **Value** |
| 89 ÷ 103 | 89 ÷ 1000 | 0.089 |
| 89 ÷ 102 | 89 ÷ 100 | 0.89 |
| 89 ÷ 101 | 89 ÷ 10 | 8.9 |
| 89 ÷ 100 | 89 ÷ 1 | 89 |
| 89 ÷ 10-1 | 89 ÷  | 890 |
| 89 ÷ 10-2 | 89 ÷  | 8900 |
| 89 ÷ 10-3 | 89 ÷  | 89 000 |

 What do you notice?

 The number gets larger as the exponent decreases.
 Dividing by a power of 10 with a negative exponent
 has the same effect as multiplying by a power of 10
 with a positive exponent.