# 14. [Exploring Numbers]

## Skill 14.1 Expressing word numbers in numerals.

MM3.2 1 1 2 2 3 3 4 4
MM4.1 1 1 2 2 3 3 4 4

Rule 1: Leave a space, or put a comma, between the thousands and the hundreds.
2: Write a zero in any place that is left empty between other digits.

**Q.** Express in numerals:
Eighteen thousand, seven hundred and two.

**A.** ***18 702***

| Places | | | | |
|---|---|---|---|---|
| Tens of thousands | Thousands | Hundreds | Tens | Units |
| *1* | *8* | *7* | *0* | *2* |

The digits 1 and 8, 7 and 2 will be in the number.
Numbers read from left to right so start with 18 thousand. The last digit of this number goes in the thousands position. The seven goes in the hundreds position. There is no ten, so put a 0. Write 2 as the unit.

**a)** Express in numerals:
Six thousand, three hundred and fifty-four.
6354

**b)** Express in numerals:
Two hundred and eighteen.

**c)** Express in numerals:
Nine hundred and twenty-seven.

**d)** Express in numerals:
Eight thousand, four hundred and six.

**e)** Express in numerals:
Three thousand and thirteen.

**f)** Express in numerals:
Seven thousand and eight.

**g)** Express in numerals:
Eighty thousand.

**h)** Express in numerals:
Seventy thousand, nine hundred.

**i)** Express in numerals:
Sixteen thousand, two hundred and three.

**j)** Express in numerals:
Ninety-six thousand.

**k)** Express in numerals:
Four hundred thousand.

**l)** Express in numerals:
Five hundred thousand and one.

## Skill 14.2 Writing 2-digit numbers in words.

General Rules for writing a number in words

Rule 1: Consider one digit at a time starting from the left.

2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.

Exceptions for 2-digit numbers

Multiples of 10 have their own words:

| | | | | |
|---|---|---|---|---|
| 10 ten | 20 twenty | 30 thirty | 40 forty | 50 fifty |
| 60 sixty | 70 seventy | 80 eighty | 90 ninety | |

For the numbers 11 to 19 use:

| | | | | |
|---|---|---|---|---|
| 11 eleven | 12 twelve | 13 thirteen | 14 fourteen | 15 fifteen |
| 16 sixteen | 17 seventeen | 18 eighteen | 19 nineteen | |

For all numbers 21 to 99 use a hyphen (-) to separate the word for the tens from the word for the units.

**Q.** Write the number 27 in words.

**A.** ***twenty-seven***

| Places | | | | |
|---|---|---|---|---|
| Tens of thousands | Thousands | Hundreds | Tens | Units |
| | | | *2* | *7* |

Starting from the left the 2 is in the tens position. As a multiple of 10 it has its own word and is written as 'twenty'.
The next digit 7 is written as 'seven'.
27 is between 21 and 99, so it has a hyphen '-' when written in words.

**a)** Write the number 35 in words.

thirty-five

**b)** Write the number 82 in words.

**c)** Write the number 69 in words.

**d)** Write the number 16 in words.

**e)** Write the number 23 in words.

**f)** Write the number 74 in words.

**g)** Write the number 11 in words.

**h)** Write the number 48 in words.

## Skill 14.3 Writing 3-digit numbers in words.



Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always write 'hundred' not 'hundreds'.
4: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

**Q.** Write the number 943 in words.

**A.** ***nine hundred and forty-three***

| Places | | | | |
|---|---|---|---|---|
| Tens of thousands | Thousands | Hundreds | Tens | Units |
| | | *9* | *4* | *3* |

Start from the left. The 9 is in the hundreds position so write 'nine hundred'. Include 'and' as other values follow.
The next digit is 4. It is in the tens position so it is written as 'forty'.
The 3 is a unit and written as 'three'.
43 is between 21 and 99, so it has a hyphen '-' when written in words.

**a)** Write the number 610 in words.

six hundred and ten

**b)** Write the number 800 in words.

**c)** Write the number 400 in words.

**d)** Write the number 160 in words.

**e)** Write the number 290 in words.

**f)** Write the number 738 in words.

**g)** Write the number 657 in words.

**h)** Write the number 901 in words.

**i)** Write the number 306 in words.

**j)** Write the number 582 in words.

## Skill 14.4 Writing 4-digit numbers in words.



Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
4: Place the word 'and' after the word 'thousand' if there are no hundreds.
5: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

**Q.** Write the number 2610 in words.

**A.** ***two thousand, six hundred and ten***

| Places | | | | |
|---|---|---|---|---|
| Tens of thousands | Thousands | Hundreds | Tens | Units |
| | ***2*** | ***6*** | ***1*** | ***0*** |

Start from the left. The 2 is in the thousands position so write 'two thousand'.
The 6 is in the hundreds position so write 'six hundred'. Include 'and' as other values follow.
The next two digits are 1 and 0 in the tens and units places. They are written as 'ten'.

**a)** Write the number 3018 in words.

three thousand and eighteen

**b)** Write the number 6000 in words.

**c)** Write the number 4300 in words.

**d)** Write the number 7500 in words.

**e)** Write the number 8070 in words.

**f)** Write the number 9090 in words.

**g)** Write the number 5002 in words.

**h)** Write the number 4006 in words.

**i)** Write the number 2059 in words.

**j)** Write the number 3021 in words.

## Skill 14.5 Finding and ordering odd and even numbers.

**Q.** Write the largest odd, 4 digit number that includes the digits 2, 3, 5 and 6.

**A.** ***6523***

Consider the requirements one by one.
Use all 4 digits.
The largest number requires that the largest digits go first ⇒ 6532
An odd number means the last digit must not be divisible by 2.
Swap the order of the last two digits
⇒ 6523

**a)** What is the largest odd number less than 16?

15

**b)** What is the largest odd number less than 8?

**c)** What is the smallest even number greater than 13?

**d)** Write the smallest even, 3 digit number that includes the digits 2, 5 and 8.

**e)** Write the largest odd, 3 digit number that includes the digits 1, 2 and 9.

**f)** Write the smallest odd, 3 digit number that includes the digits 3, 5 and 9.

**g)** Write in order from largest to smallest the odd numbers between 10 and 16.

**h)** Write in order from smallest to largest the odd numbers between 4 and 10.

**i)** Write in order from largest to smallest the even numbers between 7 and 15.

**j)** Write the smallest even, 4 digit number that includes the digits 1, 3, 4 and 6.

**k)** Write the largest odd, 4 digit number that includes the digits 2, 3, 8 and 9.

**l)** Write the smallest odd, 4 digit number that includes the digits 5, 6, 7 and 8.

**m)** Using the digits 1, 5, 6 and 9 write an even number between 9150 and 9200.

**n)** Using the digits 1, 3, 4 and 5 write an odd number between 5300 and 5350.

**o)** Using the digits 2, 3, 7 and 8 write an even number between 8700 and 8750.

## Skill 14.6 Finding the multiples of a number.



- Count by the number, i.e. add the number to itself continuously.

OR

- Multiply the number by 1, then 2, 3, 4, 5, etc. to get the multiples in order.

**Q.** Complete the next two multiples of 7.

7, 14, 21, _ , _

**A.** *7, 14, 21,* ***28,*** ***35***

Add 7 to the previous number.
$21 + 7 = 28$
$28 + 7 = 35$

**a)** Complete the next two multiples of 2.

2, 4, 6, 8, 10, 12 , 14

**b)** Complete the next two multiples of 3.

3, 6, 9, 12, _ , _

**c)** Complete the next two multiples of 11.

11, 22, 33, _ , _

**d)** Complete the next two multiples of 8.

8, 16, 24, _ , _

**e)** Complete the next two multiples of 4.

12, 16, 20, _ , _

**f)** Complete the next two multiples of 7.

21, 28, 35, _ , _

**g)** Complete the next two multiples of 5.

65, 70, 75, _ , _

**h)** Complete the next two multiples of 3.

18, 21, 24, _ , _

**i)** Complete the next two multiples of 10.

80, 90, 100, _ , _

**j)** Complete the next two multiples of 9.

27, 36, 45, _ , _

**k)** Complete the next two multiples of 6.

36, 42, 48, _ , _

**l)** Complete the next two multiples of 12.

36, 48, 60, _ , _

## Skill 14.7 Finding the factors of a number.



- To decide if a number is a factor of another number the first number must divide evenly into the second number, with no remainder.
  *Hint: A number always has at least 2 factors, 1 and the number itself.*
- Use trial and error. Be systematic.
  Divide 2 into the number. If 2 divides evenly then 2 and the result are factors of the number.
  Divide 3 into the number. If 3 divides evenly then 3 and the result are factors of the number.
  Divide 4 into the number. If 4 divides evenly then 4 and the result are factors of the number.
- Continue until all possibilities are exhausted.

**Q.** Which number is **not** a factor of 42?
3, 4 or 6

**A.** ***4***

Divide each number into 42.
$42 \div 3 = 14$
$42 \div 4 = 10$ remainder 2
$42 \div 6 = 7$
4 does not divide evenly into 42
so 4 is not a factor of 42.

**a)** Which number is a factor of 15?
3, 4 or 7

*15 ÷ 3 =* ..... *15 ÷ 4 =* .....

*15 ÷ 7 =* .....

**b)** Which number is **not** a factor of 14?
2, 6 or 7

..... .....

.....

**c)** Which number is **not** a factor of 18?
3, 4 or 6

..... .....

.....

**d)** Which number is a factor of 25?
5, 6 or 7

..... .....

.....

**e)** Which list has only factors of 35?
A) 1, 3, 5, 35
B) 1, 5, 7, 35 .....

**f)** Which list has only factors of 22?
A) 1, 2, 4, 12,
B) 1, 2, 11, 22 .....

**g)** Which list has only factors of 30?
A) 1, 3, 5, 15
B) 1, 10, 20, 30 .....

**h)** Which list has only factors of 28?
A) 1, 4, 7, 14, 28
B) 1, 2, 3, 8, 28 .....

**i)** Which of the numbers 2, 3, 4, 5 and 10 are factors of 2016?

**j)** Which of the numbers 3, 4, 5, 7 and 9 are factors of 2025?

## Skill 14.8 Finding prime and composite numbers.

**Q.** Which number is **not** a prime number?
2, 3, 4 or 5

**A.** ***4*** List the factors of each number.
2: 1, 2
3: 1, 3
4: 1, 2, 4
5: 1, 5
Only 4 has more factors than 1 and the number.

**Q.** List the composite numbers between 11 and 17.

**A.** ***12, 14, 15, 16***
Consider each number one at a time. The only prime number is 13 so all others are composite.

**a)** Which of the following is **not** a composite number?
4, 5 or 6
[ 5 ]

**b)** Which of the following is a composite number?
2, 8 or 11
[ ]

**c)** Which of the following is a prime number?
12, 15, 16 or 19
[ ]

**d)** Which of the following is a composite number?
11, 12 or 13
[ ]

**e)** Which of the following is a prime number?
6, 7, 8 or 9
[ ]

**f)** Which of the following is **not** a prime number?
23, 27 or 29
[ ]

**g)** List the composite numbers between 2 and 7.
.....
[ ]

**h)** List the prime numbers between 8 and 15.
.....
[ ]

**i)** List the composite numbers between 13 and 23.
.....
[ ]

**j)** List the prime numbers between 18 and 26.
.....
[ ]

## Skill 14.9 Writing 5-digit numbers in words.



Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always group the tens of thousands digit to the thousands digit using the 2-digit rules.
4: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
5: Place the word 'and' after the word 'thousand' if there are no hundreds.
6: Place the word 'and' after the word 'hundred' if other values follow.

AND Consider the rules for 2-digit numbers on page 108.

**Q.** Write the number 15 078 in words.

**A.** ***fifteen thousand and seventy-eight***

| Places | | | | |
|---|---|---|---|---|
| Tens of thousands | Thousands | Hundreds | Tens | Units |
| *1* | *5* | *0* | *7* | *8* |

Start from the left. The 1 is in the tens of thousands position and the 5 is in the thousands position so consider them together. Write 'fifteen thousand'. Include 'and' as there are no hundreds. The next digit is 7. It is in the tens position so it is written as 'seventy'. The 8 is a unit and written as 'eight'. 78 is between 21 and 99, so it has a hyphen '-' when written in words.

**a)** Write the number 27 006 in words.

twenty-seven thousand and six

**b)** Write the number 13 000 in words.

**c)** Write the number 60 000 in words.

**d)** Write the number 79 000 in words.

**e)** Write the number 45 000 in words.

**f)** Write the number 21 001 in words.

**g)** Write the number 18 004 in words.

**h)** Write the number 10 016 in words.

## Skill 14.10 Writing 6-digit numbers in words.



Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always group the hundreds of thousands digit and the tens of thousands digit to the thousands digit using the 2-digit and 3-digit rules.
4: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
5: Place the word 'and' after the word 'thousand' if there are no hundreds.
6: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

**Q.** Write the number 950 073 in words.

**A.** ***nine hundred and fifty thousand and seventy-three***

| Places | | | | | |
|---|---|---|---|---|---|
| Hundreds of thousands | Tens of thousands | Thousands | Hundreds | Tens | Units |
| ***9*** | ***5*** | ***0*** | ***0*** | ***7*** | ***3*** |

Start from the left. The 9 is in the hundreds of thousands position, the 5 is in the tens of thousands position and the 0 in the thousands position so consider them together. Write 'nine hundred and fifty thousand'.
Include 'and' as there are no hundreds.
The next digit is 7. It is in the tens position so it is written as 'seventy'.
The 3 is a unit and written as 'three'.
73 is between 21 and 99, so it has a hyphen '-' when written in words.

**a)** Write the number 100 030 in words.

one hundred thousand and thirty

**b)** Write the number 400 000 in words.

**c)** Write the number 600 000 in words.

**d)** Write the number 800 050 in words.

**e)** Write the number 200 080 in words.

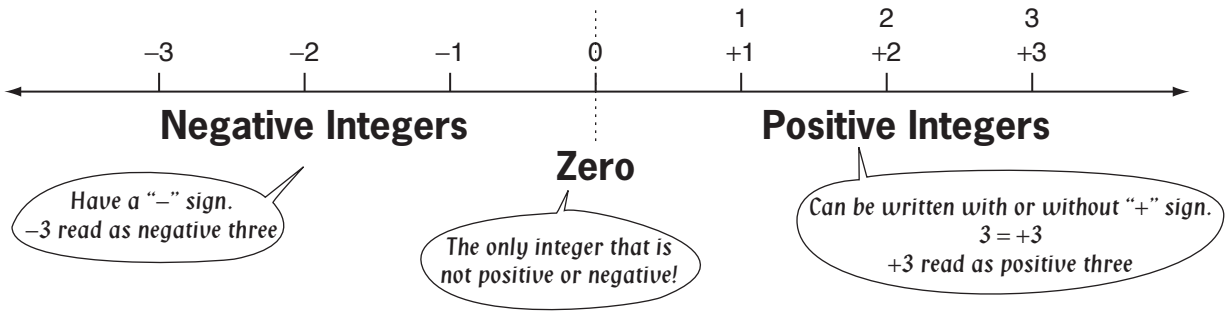
**f)** Write the number 530 014 in words.

**g)** Write the number 730 004 in words.

**h)** Write the number 200 001 in words.

## Skill 14.11 Comparing integers.

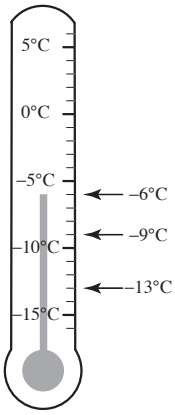





**Q.** Which temperature is higher?

A) 9°F below zero
B) 6°F below zero
C) 13°F below zero

**A.** ***B***




Consider each temperature as they would appear on a thermometer.
+ means above zero
– means below zero
Hotter temperatures are higher so –6°C or 6°C below zero is the highest of the three shown.

**a)** Which golf score is closest to par for the round?

A) 4 under par
B) 8 under par

A

**b)** Which scuba diver is closest to the ocean floor?

A) 13 feet below sea level
B) 16 feet below sea level

**c)** Which time period is the most recent?

A) 135 - 195 million years ago (Jurassic)
B) 195 - 225 million years ago (Triassic)

**d)** Which elevation is higher?

A) 52 ft below sea level (Lake Eyre - Australia)
B) 282 ft below sea level (DeathValley - USA)

**e)** Which temperature is colder?

A) 4°F above zero
B) 5°F below zero

**f)** Which year is most recent?

A) 20 B.C. (before Christ)
B) 8 A.D. (year of the Lord)

**g)** Who won the 2013 US Open?
[Hint: The lowest score wins in golf.]

A) J. Day with –7
B) A. Scott with –9
C) T. Woods with –5

**h)** In which month does the firm perform best?

A) April: –$200,000
B) May: –$220,000
C) June: –$202,000

## Skill 14.12 Recognising positive and negative integers.



- Consider the words used with the numbers.
  Positive integers would be associated with words like: above, after, deposit, over, gain, A.D.
  Negative integers would be associated with words like: below, before, withdraw, under, loss, B.C.
  *Hint: Consider zero to be ground level. Above ground is positive. Below ground is negative.*

**Q.** Write as a positive or negative number:
three hundred metres below sea level

**A.** $-300$ Write the number in digits. Considering the preposition 'below' use a negative sign.

**a)** Write as a positive or negative number:
a deposit of twenty dollars [+20]

**b)** Write as a positive or negative number:
on the seventh floor [ ]

**c)** Write as a positive or negative number:
sixteen degrees below zero [ ]

**d)** Write as a positive or negative number:
ten seconds after take-off [ ]

**e)** Write as a positive or negative number:
forty-two years B.C.
(before Christ) [ ]

**f)** Write as a positive or negative number:
eight hundred metres above sea level [ ]

**g)** Write as a positive or negative number:
a score of eleven over par in golf [ ]

**h)** Write as a positive or negative number:
a gridiron player gaining four yards [ ]

**i)** Write as a positive or negative number:
a withdrawal of six dollars [ ]

**j)** Write as a positive or negative number:
second floor underground [ ]

**k)** Write as a positive or negative number:
a deposit of twenty-five dollars [ ]

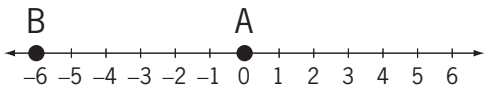
**l)** Write as a positive or negative number:
a score of four under par in golf [ ]

## Skill 14.13 Reading integers on a number line.



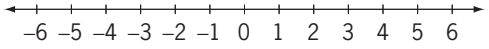
- Locate zero on the scale.
- Indentify negative integers (–) or less than (<) zero and positive integers (+) or greater than (>) zero.

**Q.** What numbers are shown at points A and B?

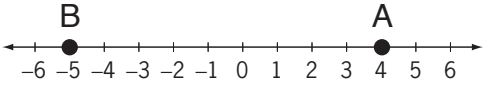



**A.** $A = \mathbf{0}$
$B = \mathbf{-6}$

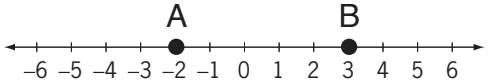
**Q.** Mark the following points on the number line:
A at +4 and B at –5.




**A.**

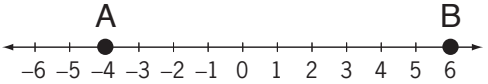



**a)** What numbers are shown at points A and B?



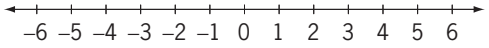

A = –2 B = 3

**b)** What numbers are shown at points A and B?

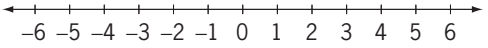



A = B =

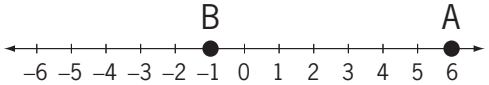
**c)** Mark the following points on the number line:
A at 0 and B at –5.




**d)** Mark the following points on the number line:
A at –1 and B at 5.




**e)** What numbers are shown at points A and B?

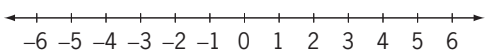



A = B =

**f)** What numbers are shown at points A and B?


A = B =

**g)** Mark the following points on the number line:
A at +2 and B at –4.




**h)** Mark the following points on the number line:
A at –3 and B at +3.