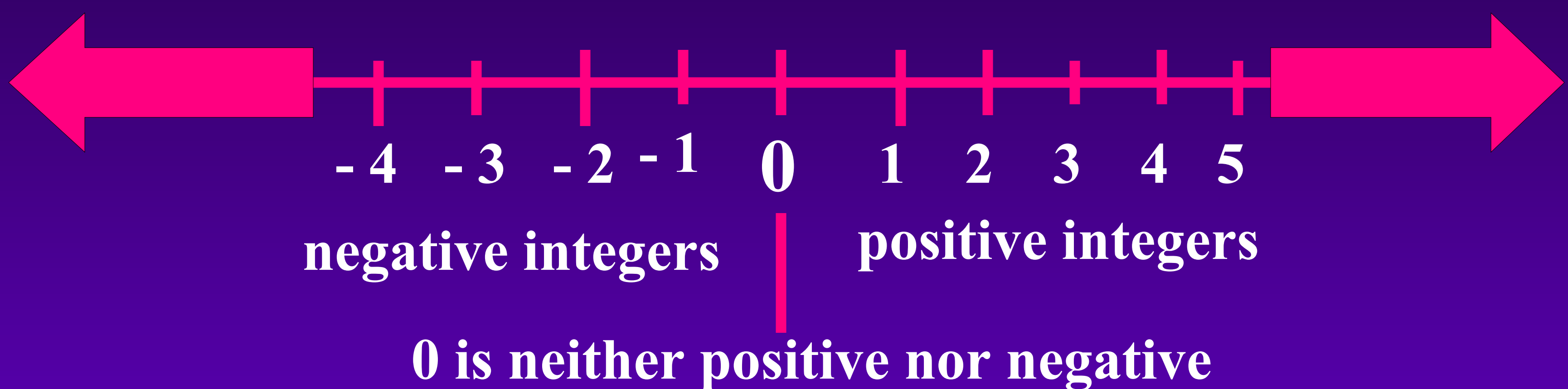
INTEGERS

INTEGERS INCLUDE POSITIVE WHOLE NUMBERS, NEGATIVE WHOLE NUMBERS, AND ZERO



A number line can be used to illustrate integers

Integers

Integers are used in many everyday applications

NEGATIVES		POSITIVES
below zero	Weather	above zero
below par	golf	above par
below	sea level	above
debts	business	earnings
loss	body mass	gain
withdrawal	bank account	deposit
net loss	stock market	net gain

Positive integers reflect a step forward while negative integers reflect a step backward.

Each integer has an opposite.

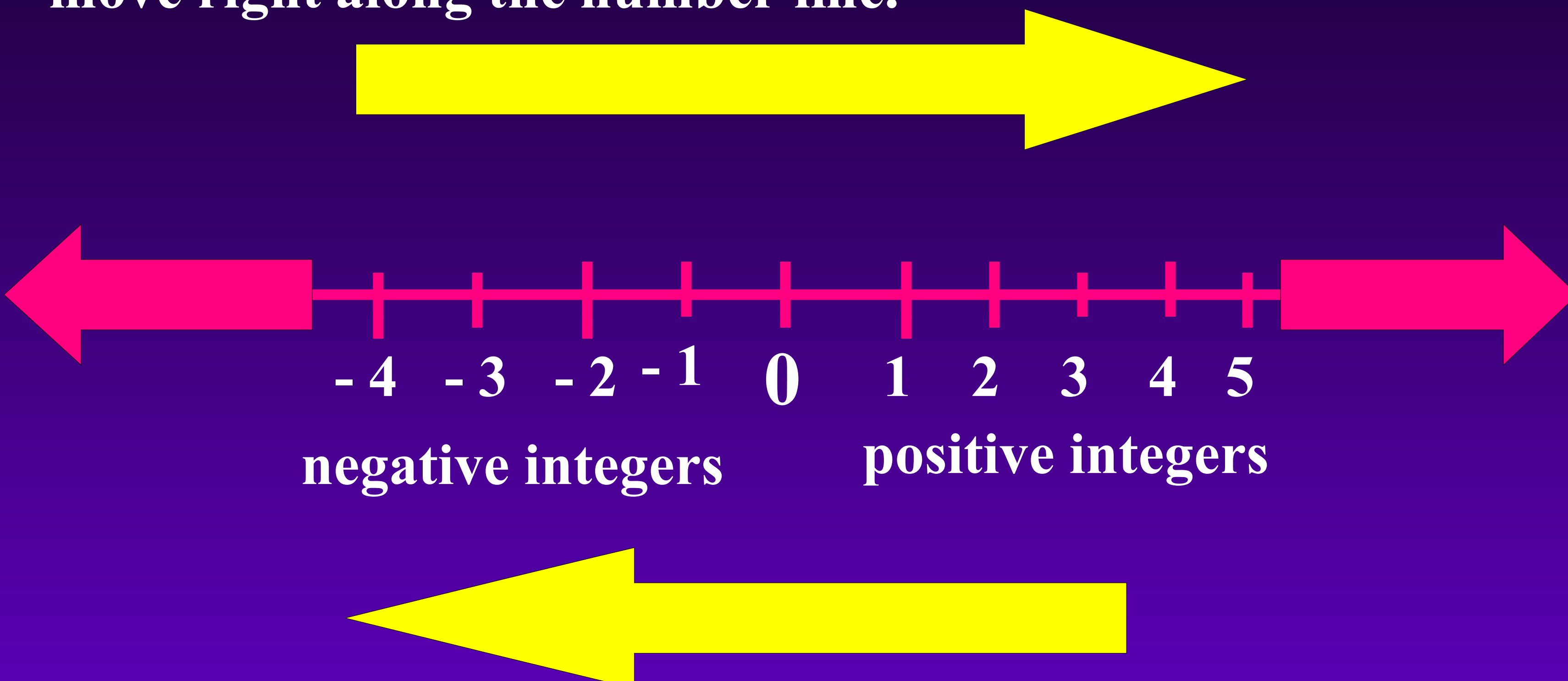
Positive four and negative four are opposite
+ 4 and - 4 are opposite

Ten degrees below zero is - 10
Ten degrees above zero is + 10

A profit of $100 is + 100
A loss of $100 is - 100

INTEGERS

Integers increase in value as you move right along the number line.



Integers decrease in value as you move left along the number line

ADDING INTEGERS

So as not to confuse *integer indicator symbols* with *operation signs*, place a set of brackets around each integer.

Positive 6 would look like (+6)
Negative 6 would look like (-6)

(+7) + (+4) = (+11) **A gain of 7 added to a gain of 4 results in a gain of 11**

(+5) + (-2) = (+3) **A gain of 5 added to a loss of two results in a gain of 3**

(-8) + (+4) = (-4) **A loss of 8 added to a gain of 4 results in a loss of 4**

(-6) + (-3) = (-9) **A loss of six added to a loss of 3 results in a loss of 9**

SUBTRACTING INTEGERS

ADDING THE OPPOSITE

$$(+7) - (-3)$$

to add the opposite, change the second integer to its opposite and change the operation sign to addition.

$$(+7) + (+3) = (+10)$$

Examples

$(-8) - (+6) = (-14)$ A gain of 6 subtracted from a loss of 8 results in a loss of 14

$(-5) - (-4) = (-1)$ A loss of 4 subtracted from a loss of 5 results in a loss of 1

$(-12) - (-15) = (+3)$ A loss of 15 subtracted from a loss of 12 results in a gain of 3

MULTIPLYING INTEGERS

FAST AND EASY RULES FOR MULTIPLYING INTEGERS

Multiply the numbers like you would whole numbers

positive* x *positive* results in *positive

positive* x *negative* results in *negative

negative* x *positive* results in *negative

negative* x *negative* results in *positive

How to determine what sign your answer will have

Examples

(+8) x (+5) = (+40)

(+3) x (-4) = (-12)

(-6) x (+6) = (-36)

(-5) x (-4) = (+20)

DIVIDING INTEGERS

FAST AND EASY RULES FOR DIVIDING INTEGERS

Divide the numbers like you would whole numbers

positive **÷ *positive* results in *positive***

positive **÷ *negative* results in *negative***

negative **÷ *positive* results in *negative***

negative **÷ *negative* results in *positive***

How to determine what sign your answer will have

Examples

$$(+20) \div (+5) = (+4)$$
$$(+30) \div (-3) = (-10)$$
$$(-24) \div (+6) = (-4)$$
$$(-56) \div (-4) = (+16)$$

INTEGERS IN STANDARD FORM

Integers have two signs, a sign of *quality* telling us whether the integer is positive or negative, and a sign of *operation*, telling us how to combine the integers

sign of operation

$$(-8) - (+6) = (-14)$$

sign of quality

Any integer not having a quality sign attached to it is considered to be positive.

$$4 + (-6) = (-2)$$

$$-4 - 6 = -10$$

$$-6 \times 4 = -24$$

$$24 \div (-6) = -4$$

SCIENTIFIC NOTATION

LARGE NUMBERS

***Scientific notation* is a short way that scientists use to write down very large or very small numbers. It involves the use of decimals and powers of ten.**

For a very large number, place a decimal point between the first and second digits. Multiply your new number by the power of ten that moves the decimal the correct number of places to make your number a whole number again.

Example

Write 150,000 in scientific notation

It becomes 1.5×10^5

Write 8,700 in scientific notation

It becomes 8.7×10^3

SCIENTIFIC NOTATION

SMALL NUMBERS

The procedure is similar for very small numbers. Place a decimal point between the *first two non-zero* digits and multiply by the power of ten that moves the decimal the correct number of spaces to the *left*.

0.0037 becomes 3.7×10^{-3}

0.000 000 12 becomes 1.2×10^{-7}