A symbolic statement in *x* with an equals sign is called an *equation* in *x*. The equal sign divides the equation into two parts, the left side and the right side. The two sides are called *expressions*.

Example: (2x+5)=(3x+1)

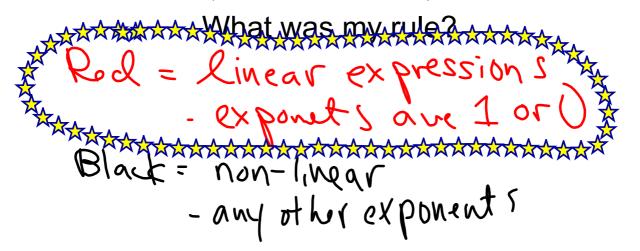
Expression Expression

The following chart contains both linear and nonlinear expressions in x. Sort them into two groups and be prepared to explain what is different about the two groups.

5x + 3	$-8x + \frac{7}{9} - 3$	$9 - x^2$
$4x^2 - 9$	0.31x + 7 - 4.2x	$\left(\frac{x}{2}\right)^3 + 1$
11(x+2)	-(6-x)+15-9x	$7 + x^{-4} + 3x$

## This is how I sorted mine.

5x + 3	$-8x + \frac{7}{9} - 3$	$9 - x^2$
$4x^2 - 9$	0.31x + 7 - 4.2x	$\left(\frac{x}{2}\right)^3 + 1$
11(x+2)	-(6-x)+15-9x	$7 + x^{-4} + 3x$



Is 2x2+3x-9 linear or non-linear? Why?

Non-linear > # bigger than 1

Is 3x+4+5x-9 linear or non-linear? Why?

How many terms does it have?

Is 3+4x+5x<sup>2</sup> linear or non-linear? Why?

Non-linear

## Classwork

Exercises

Write each of the following statements in Exercises 1–12 as a mathematical expression. State whether or not the expression is linear or nonlinear. If it is nonlinear, then explain why.

1. The sum of a number and four times the number

Let n=a number

n+4n This is a linear expression.

2. The product of five and a number

let n= a number 5.n

This is linear.

3. Multiply six and the eciprocal of the quotient of a number and seven.

Let n = a number answer to division problem

(by 7 / X

Non-Linear, h/c exponent = b.7.X

is negative

4. Twice a number subtracted from four times a number, added to 15

Let n= a number

4x'-2x'+15 Linear

The square of the sum of six and a number

Let n= a number

(6+x) or (6+x)(6+x)
Non-Linear b/c exponent greater Than 1

The cube of a positive number divided by the square of the same positive number

Led n = a positive number

$$N^3 \div N^2 = \frac{N^3}{N^2} = \frac{MN}{M} = N$$
Linear (i)

7. The sum of four consecutive numbers

Let x = an odd number

X+ x+2 + x+4 + x+6

Linear

8. Four subtracted from the reciprocal of a number

9. Half of the product of a number multiplied by itself three times

10. The sum that shows how many pages Maria read if she read 45 pages of a book yesterday and  $\frac{2}{3}$  of the remaining pages today

11. An admission fee of \$10 plus an additional \$2 per game

Let n= number of games

10+2n

12. Five more than four times a number and then twice that sum