

Lecture 08/23/23 HW

Alg. Exp. p. 13

Deletions, Tables, Graphs pg 17
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Algebraic Expressions

Def's:

- A variable is an unknown quantity usually represented by a letter. Eg. x, y, z, \dots

- An algebraic expression is a combination of variables and numbers along with $+, -, \div, \times$.

$$2x^2 + 7x + 1$$

- The terms in an algebraic expression are separated by $+$.

$2x^2, 7x, 1$ are the terms of the above expression.

- A term with no variable is called a constant term.

1 is the constant term of the above expression.

Coefficient

- The number attached to a variable is called a coefficient.

2 is the coefficient of $2x^2$.

Ex: List all coefficients and variable parts of each term of

$$-13xyz^2 + 7$$

Term	variable part	coefficient part
$-13xyz^2$	xyz^2	-13
x	x	1

A variable part can contain more than one variable!

Combining Like Terms :

Defn Terms whose variable parts are exactly the same are called like terms.

We can combine like terms by adding the coefficients. ~~It~~ Cannot combine unlike terms !!

Ex: Simplify $-yx + xy^3 - 2x^2y^2 + 3xy + 15x^2$

Identify like terms:

$$(-1+3)yx + xy^3 - 2x^2y^2 + 15x^2$$

$$\boxed{2yx + xy^3 - 2x^2y^2 + 15x^2}$$

Evaluation :

Defn: Evaluation is the process of substituting values for unknown variables and performing all operations.

Ex: Evaluate ~~know~~ $t^3 + t^2 + t + 1$ where $t = -1$

$$(-1)^3 + (-1)^2 + (-1) + 1 = (-1) + 1 + (-1) + 1 = \boxed{0}$$

Distributive Property

Thm: The D.P states given any ~~4~~ numbers $a, b,$ and c

$$\begin{aligned} a(b+c) &= ab + ac \\ (b+c)a &= ba + ca \end{aligned}$$

Ex: Simplify the expression:

$$6(x-y) - 9(y-x)$$

$$\begin{aligned} 6(x-y) - 9(y-x) &= 6x - 6y - 9y + 9x \\ &= \boxed{15x - 15y} \end{aligned}$$

Ex: Does $\frac{a+b}{a} = b$ for all $\neq 0$ a and b ? No take $a=1, b=1$
 $\frac{1+1}{1} \neq 1$

Relations, Tables, and Graphs

Def: A relation is a collection of pairs of numbers (a, b) . We call a the x -coord. and b the y -coord. We say a is related to b .

Ex: Consider the relation $\{(1,2), (2,4), (3,6)\}$

1 is related to 2.

We usually represent relations in a few ways:
Tables, Diagrams and Graphs.

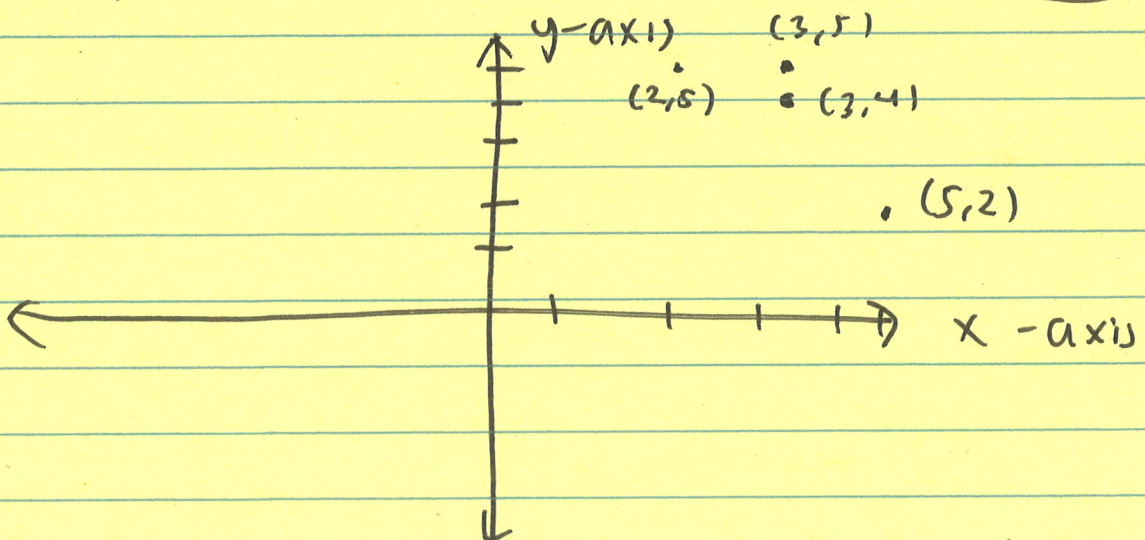
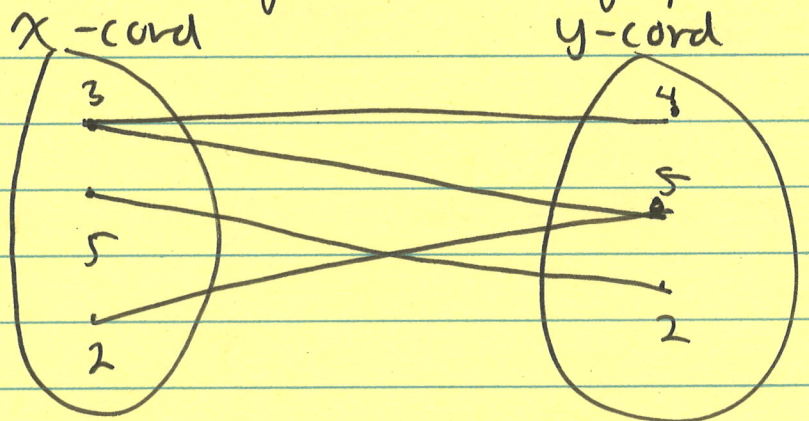
~~Table~~

Ex: ~~Given a relation~~ Represent the relation

$$\{(3,4), (3,5), (5,2), (2,5)\}$$

~~Example~~ using a table, diagram and graph

x	y
3	4
3	5
5	2
2	5



Defn The domain of a relation are the possible x-values

coord in our relation and the range is the possible y-coord in our relation

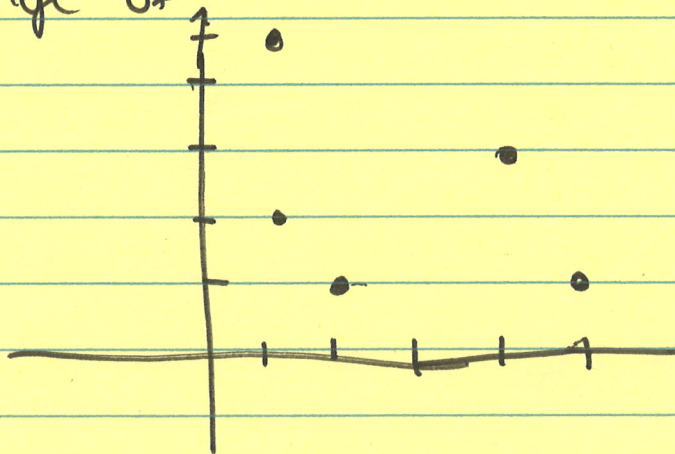
Ex: ~~What is the~~ What is the domain and range of the relation?

x	y
1	2
1	3
2	7

$$D: \{1, 2\}$$

$$R: \{2, 3, 7\}$$

Ex: 3d) p. 19 What is the domain and range of



$$D = \{1, 2, 4, 5\}$$

$$R = \{1, 2, 3, 5\}$$