

October 25, 2017

#1)  $S = \{(4,4), (2,-7), (-3,5), (4,6), (-2,-7), (7,3)\}$   
 Domain:  $\{6, 2, -3, 4, -2, 7\}$   
 Range:  $\{4, -7, 5, 6, 3\}$

#2)  $T = \{(-6,-4), (-4,-4), (-1,-4), (3,5)\}$   
 Yes! no repeated elements in the Domain

D	R
-6	-4
-4	-4
-1	-4
3	5

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D	R
7	8
-2	8
5	9
-2	9

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#3)  $f: x \rightarrow 3x - 5$

$f$  takes the input  $x$  into the rule  $3x - 5$  to produce an output.

0	$3(0) - 5$	-5
3	$3(3) - 5$	4
-1	$3(-1) - 5$	-8

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#4)  $f(x) = 4 - 5x - x^2$  (Rule)

$f(-3) = 4 - 5(-3) - (-3)^2$   
 $= 4 + 15 - 9$   
 $= 19 - 9$   
 $= 10$

$(-3, 10)$

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### 5.5 Laws of Exponents

meaning of Exponents:  $a^n = \underbrace{a \cdot a \cdot a \cdot \dots \cdot a}_n$   
 (Base)  $a$  (Exponent)  $n$  factors of  $a$

$x^3 = \underbrace{x \cdot x \cdot x}_{\text{meaning of } x^3}$   
 (Base)  $x$

$a^1 b^2 = a \cdot \underbrace{b \cdot b}_{\text{Base}}$

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### ① Product Rule

$x^3 \cdot x^2 = \underbrace{x \cdot x \cdot x \cdot x \cdot x}_{\text{Same Base "x"}} = x^5$

\* Same base, add exponents  
 $x^3 \cdot x^2 = x^{3+2} = x^5$

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## ② Power Rule

$$\begin{aligned} (\underbrace{x^3}_{\text{Base}})^2 &= x^3 \cdot x^3 \\ &= x \cdot x \cdot x \cdot x \cdot x \cdot x \\ &= x^6 \end{aligned}$$

\* if a base raised to a power is then raised to a power, multiply exponents.

$$(x^3)^2 = x^{3 \cdot 2} = x^6$$

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## ③ Quotient Rule

same base  $\left\langle \frac{x^3}{x^2} = \frac{\boxed{x} \cdot \boxed{x} \cdot x}{\boxed{x} \cdot \boxed{x} \cdot 1} \right.$

$$= \frac{1 \cdot 1 \cdot x}{1 \cdot 1}$$

$$= x$$

\* with a fraction, subtract the denominator's exponent from the numerator's exponent.

$$\frac{x^3}{x^2} = x^{3-2} = x^1 = x$$

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