

DO NOW

pg 27; 1 & 2

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1.3 Functions and Their Graphs

Relation - between 2 sets X and Y is a set of ordered pairs (x, y) where $x \in X$ and $y \in Y$

Function - is a relation where for every x -value there is only one y -value

Vertical Line Test - helps determine if a graph is a function

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$x \rightarrow$ independent variable

$y \rightarrow$ dependent variable

" y depends upon x " or " y is a function of x "
therefore we can write " y " as: $f(x)$

Other symbols can be used:

$s(t), g(s), f(t)$

Note: Implicit form: Not " $y =$ " form

Ex: $3x^2 + 2y = 1$

Explicit form: in " $y =$ " form

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

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Evaluating a Function

**See page 27; 5, 12

12. $f(x) = x^3 - x$

Find: $\frac{f(x) - f(1)}{x - 1}$

$$\frac{x^3 - x - (1^3 - 1)}{x - 1}$$

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

$$\frac{x(x^2 - 1)}{x - 1}$$

$$\frac{x(x - 1)(x + 1)}{x - 1} = \boxed{x(x + 1)}$$

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Domain - possible values for x
(where function is defined)

Range - possible values for y

** no zero in denom.

negatives

Piece-wise function - function defined by more than one equation

Ex: $f(x) = \begin{cases} 1 - x & x < 1 \\ \sqrt{x - 1} & x \geq 1 \end{cases}$

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Ex: pg 27; 18 (Find the domain and range of the function.)

$g(x) = \frac{2}{x - 1}$

domain $(-\infty, 1) \cup (1, \infty)$

$x - 1 \neq 0$
 $x \neq 1$

range $(-\infty, 0) \cup (0, \infty)$

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HOMEWORK

pg 27 - 28; 4, 7, 9, 10, 13, 17, 19,
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