AP Calculus

Chapter 1

Section 1-2

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Functions

A **function** from a set D to a set R is a rule that assigns a unique element in R to each element in D.

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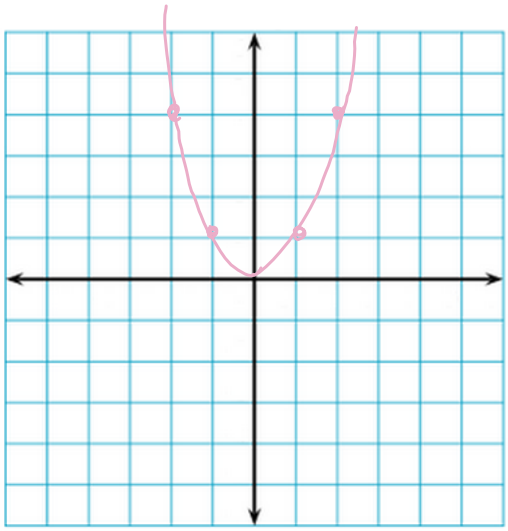
Functions

$f(x) = x^2$

$y = x^2$



x	y
-2	4
-1	1
0	0
1	1
2	4

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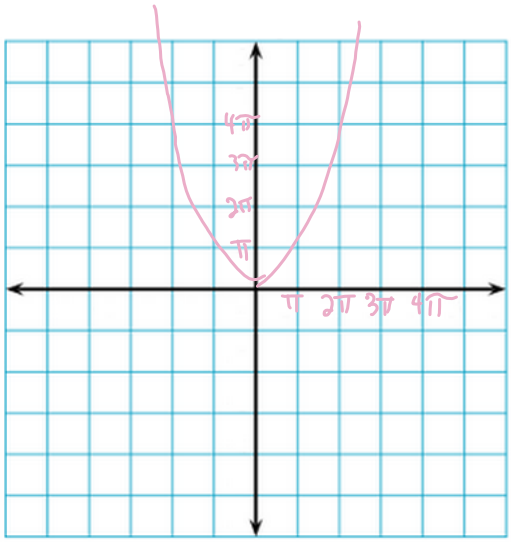
Functions

$A = \pi r^2$



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Function Domain

$$f(x) = \frac{x^2 + 4x - 32}{x - 4}$$

$\rightarrow \frac{(x+8)(x-4)}{x-4}$

$x - 4 \neq 0 \rightarrow x \neq 4$

$x < 4 \cup x > 4$

$(-\infty, 4) \cup (4, \infty)$

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Function Domain

$$f(x) = \frac{x + 3}{\sqrt{4 - x^2}}$$

$4 - x^2 \geq 0$ $\quad$ $4 - x^2 \neq 0$

$4 - x^2 > 0$

$4 > x^2$ $\quad$ $-2 < x < 2$

$(-2, 2)$

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Even and Odd Functions

A function $y = f(x)$ is an

even function of x if $f(-x) = f(x)$,

odd function of x if $f(-x) = -f(x)$,

for every x in the function's domain.

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Even, Odd, or Neither

$f(x) = x^4$

$f(-x) = (-x)^4 = x^4$

even

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Even, Odd, or Neither

$f(x) = x^4 + 1$

$f(-x) = (-x)^4 + 1$

$x^4 + 1$

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Even, Odd, or Neither

$f(x) = (x + 1)^4$

$f(-x) = (-x+1)^4$

neither

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Even, Odd, or Neither

$f(x) = x^3 + 1$

$f(-x) = -x^3 + 1$

neither

$f(x) = (x - 2)^3$

$f(-x) = (-x - 2)^3$

neither

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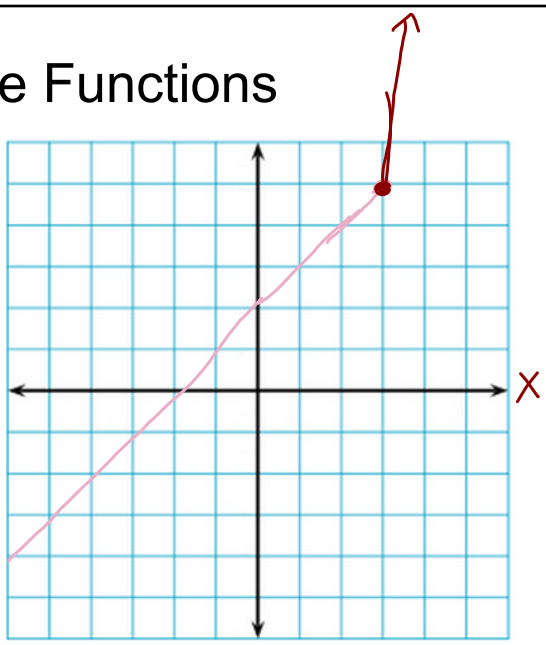
Piecewise Functions

$$f(x) = \begin{cases} x + 2, & x < 3 \\ x^2 - 4, & x \geq 3 \end{cases}$$



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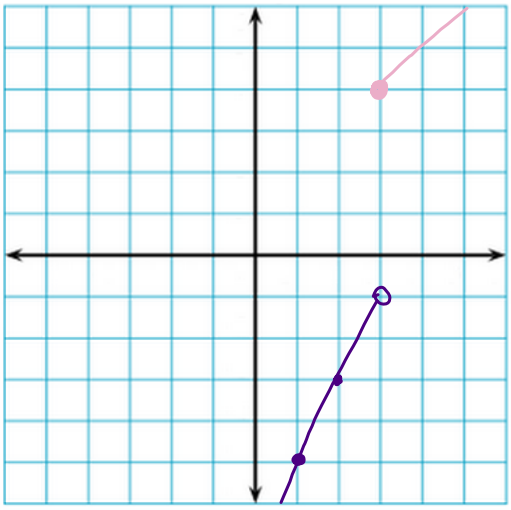
Piecewise Functions

$$f(x) = \begin{cases} 2x - 7 & , x < 3 \\ x + 1 , & x \geq 3 \end{cases}$$



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Composition of Functions

$f(x) = 7x^3 - x$ $\qquad$ $g(x) = x^{-1}$

$f \circ g(x) =$ $7(x^{-1})^3 - (x^{-1}) = 7x^{-3} - x^{-1}$

$f(g(x))$

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Composition of Functions

$f(x) = 7x^3 - x$ $g(x) = x^{-1}$

$g \circ f(x) =$ $(7x^3 - x)^{-1}$

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The radius of the great circle of a spherical balloon is growing at a constant rate of 1.5 feet per minute for $0 \leq t \leq 18$. Write a function, r(t), to describe the growth of the radius. Then write a function A(t) to describe the growth of the area of the great circle.

$r(t) = 1.5t$ $A(r) = \pi r^2$

$A(r(t)) = \pi(1.5t)^2$ ft^2

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Homework

Pages 19 - 20

Do odd #s: 1 - 11, 21 - 33, 41 - 47, 51 - 55

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