$\boxed{\log}$

$\ln(x)$

$\boxed{e^x}$

10^x

$\boxed{\ln}$

x^y or ^

Ch 14

exponentials

&

logarithms

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$2^{\sqrt{3}} \approx 3.322$$

$$2^{-5} = \frac{1}{2^5}$$

$$2^{\pi} \approx 8.825$$

$$\frac{2^{12}}{2^{12}} = 2^0 = 1$$

$$\frac{0^{12}}{0^{12}} = 0^0 = \text{undefined}$$

$$2^{\frac{2}{3}} = \sqrt[3]{2^2}$$

$y = 2^{x}$ exponential vs $y = x^2$

Polynomial

Domain

$(-\infty, \infty)$

$\boxed{y = a^x}$

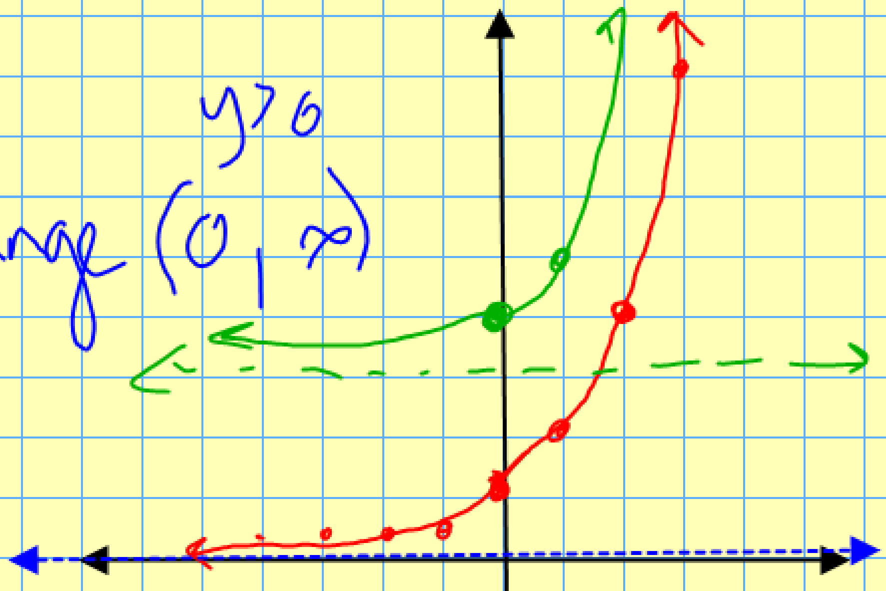
$\left.\begin{array}{l} a \neq 0 \\ a \neq 1 \\ a > 0 \end{array}\right\}$

$y = (-4)^{\frac{1}{2}} = 2i$

$\boxed{y = 2^x}$

① Domain $(-\infty, \infty)$

② Range $(0, \infty)$ $y > 0$



④

x	y
0	1
1	2
2	4
3	8
	↓
	∞

x	y	
0	1	
−1	$\frac{1}{2}$	2^{-1}
−2	$\frac{1}{4}$	2^{-2}
−3	$\frac{1}{8}$	2^{-3}
	↓	
	0	

$y = 2^x + 3$

x	y
0	4
1	5
2	

x	y
−1	$3\frac{1}{2}$
−2	$3\frac{1}{4}$
	$3\frac{1}{8}$
	$3\frac{1}{16}$

③ horizontal asymptote

$y = 0$

Compound Interest

\$1000 Compound yearly at 5%

interest annually.

end of 1st year

Principle + Interest

$$1000 + .05(1000) = \boxed{1000(1+.05)^1}$$

end of 2nd year

$$1000(1+.05) + .05 * 1000(1+.05) = 1000(1+.05)(1+.05)$$

$$= \boxed{1000(1+.05)^2}$$

$$= 1000(1+.05)^3$$

Accumulated \$

$$A = P(1+r)^t$$ Compounded yearly

n = # times you compound per year

$$\boxed{A = P\left(1+\frac{r}{n}\right)^{n \cdot t}}$$

n = # times you compd

$$\boxed{A = P\left(1+\frac{r}{n}\right)^{n \cdot t}}$$

Precal

College Alg + Trig → Calc

you deposit $10,000 for 15 years at 6.5% annual interest compounded Quarterly. What is Accum. amt?

$$A = 10{,}000(1+.065/4)\wedge(4 * 15) = \$26{,}304.71$$

$$A = 10{,}000(1+.065/12)\wedge(12 \cdot 15) = \$26{,}442.01$$

Monthly

Continuously $A = Pe^{rt} = 10000\,e\wedge(.065 * 15) = 26{,}511.67$

\$3500 @ 10.5% compounded
weekly for 25 years

$$A = 3500(1 + .105/52)\wedge(52 \cdot 25) \approx 48{,}188.30$$

compound continuously

$$A = 3500\, e \wedge (.105 * 25) \approx \$48{,}316.01$$

e^1 ≈ 2.72

$\pi \approx 3.14$

$$\left(1+\frac{1}{n}\right)^n = e$$

as $n \to \infty$

the natural number

$$\frac{C}{d} = \pi$$

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$

$$\boxed{A = Pe^{rt}}$$

Compounding Continuosly