

BE-Geometry 11 TUESDAY 3-29-11

① Name the 5 PLATONIC SOLIDS,
the number of sides, and the
type of regular polygon that
makes up each of these polyhedrons

• Hexagons.

Geo 1 Hw Review

#1-8

① $(7m)^{\frac{3}{2}}$

② $r^{\frac{6}{5}}$

③ $(6x)^{\frac{3}{2}}$

④ $(5n)^{\frac{1}{2}}$

⑤ $(5\sqrt{x})^3$

⑥ $\sqrt[3]{(5n)^4}$

⑦ $5\sqrt{a^8}$

⑧ $\sqrt[3]{V^3}$ or $(\sqrt{V})^3$ WHY? LOOK
↓
 $\sqrt[3]{V \cdot V \cdot V} = \sqrt{V} \cdot \sqrt{V} \cdot \sqrt{V} = (\sqrt{V})^3$

Exponential Functions

EXPONENTIAL
Function

A function where the independent variable (x) is an exponent.

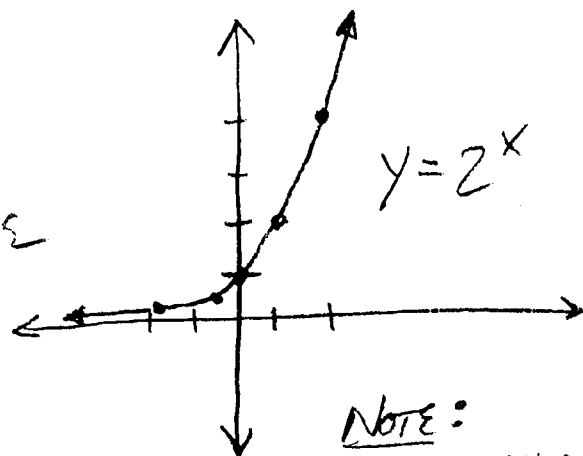
EX $y = ab^x$

b = base
 a = constant, often called the "initial value" since when $x=0$, $y = ab^0 = a(1)$
 $y = a$

EX

$y = 2^x$
 $\Rightarrow a=1$
 $b=2$
 (base is 2)

x	$y = 2^x$
-2	$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$
-1	$2^{-1} = \frac{1}{2}$
0	$2^0 = 1$ ← KEY POINT
1	$2^1 = 2$
2	$2^2 = 4$
$-\infty$	Approaches asymptotically - never crosses 0
$+\infty$	keeps getting bigger, passes to right of any x eventually



NOTE:
 Domain: All reals
 Range: $y > 0$

$$\textcircled{EX} \quad y = \left(\frac{1}{2}\right)^x$$

$$a = 1$$

$$b = \frac{1}{2}$$

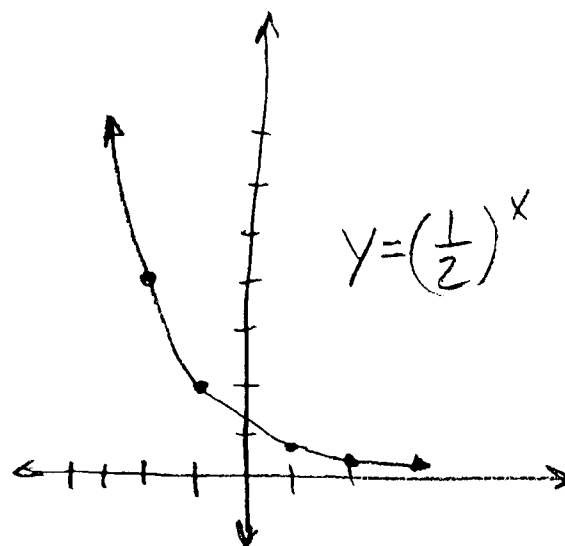
x	$\left(\frac{1}{2}\right)^x$
-2	$\left(\frac{1}{2}\right)^{-2} = \frac{1}{\left(\frac{1}{2}\right)^2} = \frac{1}{\frac{1}{4}} = 4$

-1	$\left(\frac{1}{2}\right)^{-1} = \frac{1}{\left(\frac{1}{2}\right)^1} = 2$
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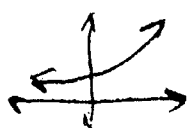
Key point ↓ y-intercept ↓ "initial" value	0	$\left(\frac{1}{2}\right)^0 = 1$
	1	$\left(\frac{1}{2}\right)^1 = \frac{1}{2}$
	2	$\left(\frac{1}{2}\right)^2 = \frac{1}{4}$

+∞ Approaches 0
Asymptotically

-∞ Keep ↑, NOT Asymptote

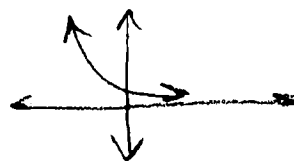


EXPONENTIAL FUNCTIONS:



EXPONENTIAL
GROWTH

$$\text{BASE} > 1$$



EXPONENTIAL
DECAY

$$0 < \text{BASE} < 1$$

• Base $\neq 1$, why? $y = 1^x = 1$ NOT EXPONENTIAL, just horizontal line

• Base $\neq$ Negative, why?

$(-b)^x$ even $\Rightarrow$ positive

$(-b)^x$ odd $\Rightarrow$ negative

Graph is "crazy" ↑ ↓

Domain of $y = 2^x$ is "All reals"

$\therefore y = 2^{\sqrt{5}}$ MUST EXIST $\Rightarrow$ Need calculator to approximate

$$y = 2^{\sqrt{5}} \approx 2^{(2.2361)} \approx 4.7112$$

NOTE: $2^2 = 4$ $2^3 = 8$

$\therefore 2^{\sqrt{5}} \approx 4.7$ is reasonable

Do not mix up $y = x^2$ with $y = 2^x$

$\uparrow$
 Quadratic function
 (parabola)

$\uparrow$
 Exponential
 function

Domain: All reals	Domain: All reals
Range: All reals	Range: $y > 0$

EX Identify: Exponential Growth or Decay?

(A) $y = (\frac{1}{5})^x$ $a = 1$ $b = \frac{1}{5}$

(B) $y = 3(4)^x$ $a = 3$ $b = 4$

(C) $y = 7(1.2)^x$ $a = 7$ $b = 1.2$

A "trick" for solving
exponential equations:

Get the bases equal, the exponents
have to be equal. If bases are equal,

(Ex) If $2^x = 2^5$ $x = 5$

(Ex) $2^{3x} = 2^{12}$ $3x = 12$
 $x = 4$

(Ex) $3^{5x} = 9^{x+1}$

$$3^{5x} = (3^2)^{x+1}$$

$$3^{5x} = 3^{2x+2}$$

$$5x = 2x + 2$$

$$3x = 2$$

$x = \frac{2}{3}$

$$\textcircled{\text{Ex}} \quad 3^{x-2} = 27$$

$$3^{x-2} = 3^3$$

$$x-2 = 3 \quad \therefore \boxed{x=5}$$

$$\textcircled{\text{Ex}} \quad 3^{2n+1} = 81$$

$$3^{2n+1} = 3^4$$

$$2n+1 = 4$$

$$2n = 3 \quad \therefore \boxed{n = \frac{3}{2}}$$

$$\textcircled{\text{Ex}} \quad 4^{2x} = 8^{x-1}$$

$$(2^2)^{2x} = (2^3)^{x-1}$$

$$\begin{array}{ccc} 2^{4x} & = & 2^{3x-3} \\ \downarrow & & \downarrow \end{array}$$

$$4x = 3x - 3$$

$$\boxed{x = -3}$$

Homework: • Practice Worksheet # 9-27 odd
• Graph $y = 3^x$ • Graph $y = \left(\frac{1}{3}\right)^x$