1. $(2x-8y)^3$

1	3	3	1
$(7x)^3$	$(7x)^2$	$(7x)^1$	$(7x)^0$
$(-8y)^0$	$(-8y)^1$	$(-8y)^2$	$(-8y)^3$

$3\cdot 7^2\cdot(-8)^1\cdot x^2\cdot y^1$

$-1176x^2y^1$

1st 2nd term 3rd 4th also.

#3 look in book long division

#4. $(x-6)\rightarrow$ 6 |

#5 $a^3+b^3=(a+b)(a^2-ab+b^2)$

#6. get all on one side.
synthetic divide by root.
don't change sign.

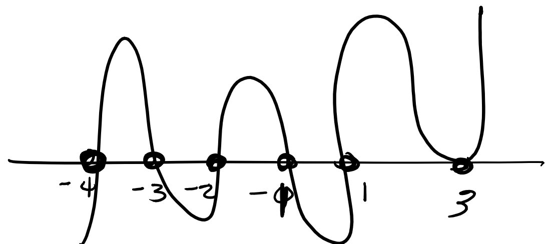
Key

7. Roots 1 + $1-2i$

1+2i Manufacture also a root

factor $(x-1)(x-(1-2i))(1-(1+2i))$ $1+2i$

10.



$$P(x) = (x+4)^1(x+3)^1(x+2)^1(x+1)^1(x-1)^1(x-3)^2$$

#6 $x^3 - x^2 = 9 - 9x$

Root 1

$$x^3 - x^2 + 9x - 9 = 0$$

1	1	-1	9	-9
		1	0	9
	1	0	9	0
	x^2	x	c	R

$$x^2 + 9 = 0$$

$\sqrt{-16} = \pm 4i$

$$x^2 = -9$$

$\sqrt{-9}$
$= \pm 3i$

$x = \pm 3i$

Roots $1, 3i, -3i$

$2^0 = 1$
$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
⋮
$2^7 =$
$2^8 = 256$

$3^0 = 1$
$3^1 = 3$
$3^2 =$
⋮
$3^6 = 729$

$4^0 = 1$
$4^1 = 4$
$4^2 = 16$
$4^3 = 64$
$4^4 = 256$
$4^5 = 1024$

$5^4 \quad 6^4 \quad 7^4 \quad 8^4$

Check For understanding

$\log_3 81$ is a question.

? What is the exponent on 3 to equal 81?

Answer $\boxed{4}$

$$\log_3 81 = 4$$

$$Y = \log_3 X$$

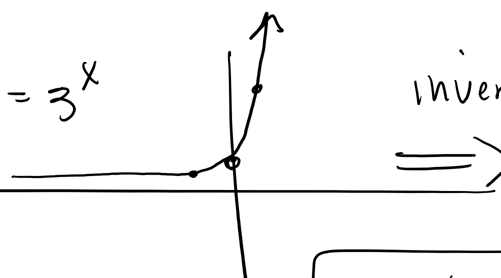
First think

$$Y = 3^X$$

then graph inverse

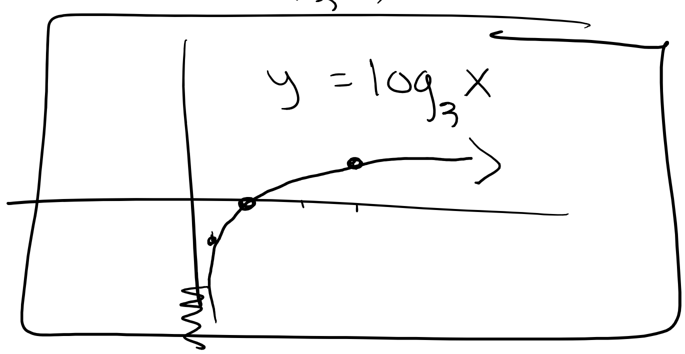
(0,1)
(1,3)
(−1, 1/3)

$Y = 3^X$



inverse ⟹

(1,0)
(3,1)
(1/3, −1)



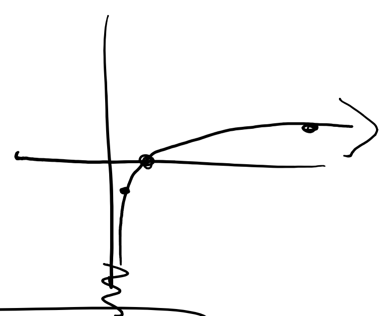
$$Y = \log_5 X$$

Think
$Y = 5^X$

(0,1)
(1,5)
−1, 1/5

⟹ switch

(1,0)
(5,1)
(1/5, −1)



exp (0,1) ~ log

exp $(0,1)$ → log

$(1, \text{base})$

$(-1, \frac{1}{\text{base}})$

log: switch the ordered pair

7.4 Properties of logarithms

① $\log A \cdot B = \log A + \log B$.

$\log 35 = \log 7 + \log 5$

Recall: $7^2 \cdot 7^4 = 7^6$

Because add exponents when mult. w/ same base.

$\log_{10} 100 = \log 10 + \log 10$

$= 1 + 1$

$= 2$

$\log_{10} 100 = \log 50 + \log 2$

garbage

---

② $\log \frac{A}{B} = \log A - \log B$

$\log 20 = \log 100 - \log 5$ *

OR $\log 40 - \log 2$

Because $\frac{10^{10}}{10^4} = 10^6$

(3.) $\log A^{m} = m \cdot \log A$

why?

$\log 3^2 = \log 3 \cdot 3 = \log 3 + \log 3$

$= 2 \cdot \log 3$

---

(4) $\log 1 = 0$

because $\square^0 = 1$.

---

(5) $\log_b b = 1$ because $b^1 = b$

---

6. Inverse:

$\log_b b^x = x \cdot \log_b b$

$= x$

$\log_2 2^7 = 7$

Application

new: $\log_3$ both sides

$3^x = 11$

$\log_3 3^x = \log_3 11$

$x \cdot \log_3 3 = \log_3 11$

$x = \log_3 11$

(7)

Change of Base:

$$\log_3 11 = \frac{\log 11}{\log 3}$$

$\log(11) \div \log(3)$

2.1827

$3^x = 11$

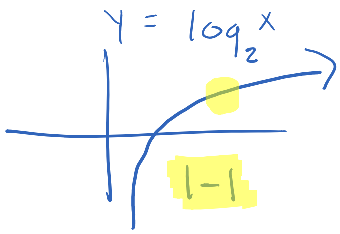
	11	
9	3^x	27
3^2	x=2ish.	3^3

$$\frac{\log 11}{\log 3} = 2.1827$$

4 digits

Solve log Equations.

$$\log_2(x+7) = \log_2 11$$



$$x+7 = 11$$

$$x = 4$$

When bases are same. The argument (inside) must be =.

$$\log_3 51 = \log_3 17 + x$$

$$51 = 17 + x$$

$$34 = x$$

$$\log_3 7 = \underline{\underline{\log_3 10 + \log_3 4x}}$$

single log

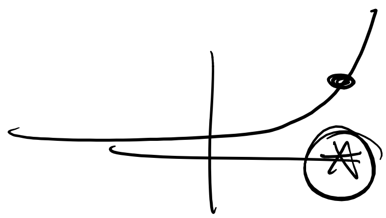
$$\log AB = \log A + \log B$$

$$\log_3 7 = \log_3 40x$$

$$7 = 40x$$

$$\frac{7}{40} = x$$

$$3^{x+11} = 3^4$$



$x + 11 = 4$

$x = -7$

$3^{x+7} = 9^4$

$3^{x+7} = (3^2)^4$

$3^{x+7} = 3^8$

$x + 7 = 8$

$x = 1$

Assignment 4 Worksheet

And 7.5 1-33 odd; 48-50