14.4) Logarithms

Worked example	Your turn
Write each statement as a logarithm: $$2^3 = 8$$	Write each statement as a logarithm: $$3^2 = 9$$ $$\log_3 9 = 2$$
$$7^2 = 49$$	$$2^7 = 128$$ $$\log_2 128 = 7$$
$$64^{\frac{1}{3}} = 4$$	$$64^{\frac{1}{2}} = 8$$ $$\log_{64} 8 = \frac{1}{2}$$

Worked example	Your turn
Write each statement using a power: $$\log_4 64 = 3$$	Write each statement using a power: $$\log_3 81 = 4$$ $$3^4 = 81$$
$$\log_3 \frac{1}{9} = -2$$	$$\log_2 \frac{1}{8} = -3$$ $$2^{-3} = \frac{1}{8}$$

Worked example	Your turn
Without a calculator, find the value of:	Without a calculator, find the value of:
$\log_5 125$	$\log_4 16$
	2
$\log_5 5$	$\log_4 1$
	0
$\log_5\left(\dfrac{1}{625}\right)$	$\log_4 4$
	1
$\log_5 1$	$\log_4\left(\dfrac{1}{64}\right)$
	-3

Worked example	Your turn
Without a calculator, find the value of:	Without a calculator, find the value of:
$\log_5 125$	$\log_4 16$
	2
$\log_5 5$	$\log_4 1$
	0
$\log_5\left(\dfrac{1}{625}\right)$	$\log_4 4$
	1
$\log_5 1$	$\log_4\left(\dfrac{1}{64}\right)$
	-3
$\log_5(-2)$	$\log_4(-3)$
	No value

Worked example	Your turn
Without a calculator, find the value of:	Without a calculator, find the value of:
$\log_5 5$	$\log_3 3$
	1
$\ln e^2$	$\ln e$
	1
$\log 1000$	$\log 100$
	2

Worked example	Your turn
Use your calculator to find the value of:	Use your calculator to find the value of:
$\log_5 40$	$\log_3 40$
	3.358 (3 dp)
$\ln 16$	$\ln 8$
	2.079 (3 dp)
$\log 25$	$\log 75$
	1.875 (3 dp)

Worked example

Using a table of values sketch the graph of
$y = \log_4 x$
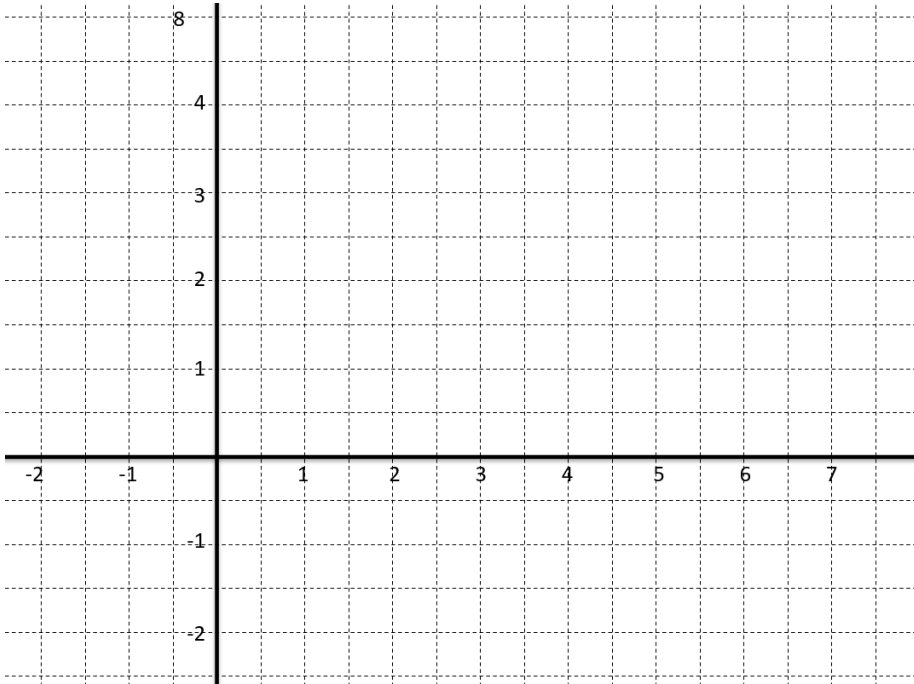
Your turn

Using a table of values sketch the graph of
$y = \log_2 x$

x	0.25	0.5	1	2	4	8
y	-2	-1	0	1	2	3

$y = \log_2 x$