§4.2 41, 43

28, 29, 30

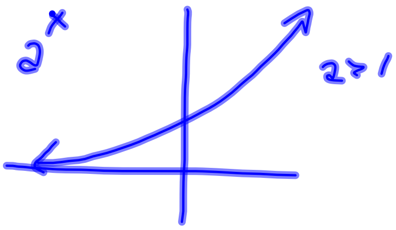
$\log_a(x)$

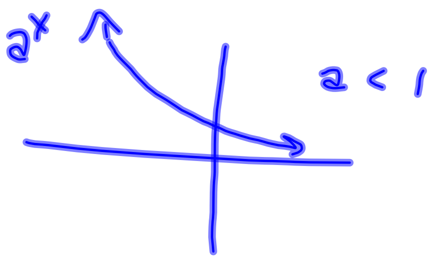
$a > 0, \ a \neq 1$

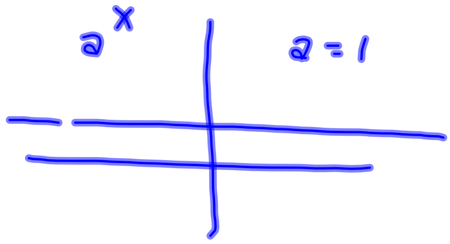
$0^x = 0$

$a^x > 0$, right?

$\log_a(a^x) > \log_a(0)$!?







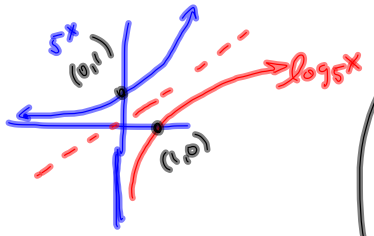
28 $\log 10 = \log_{10} 10 = 1$

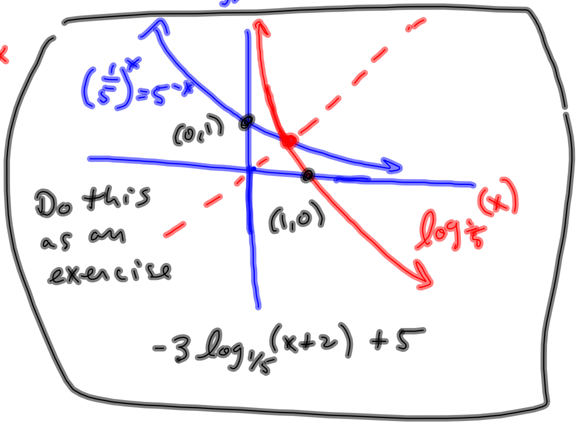
$\ln e = 1$

$= \log_e e = 1$

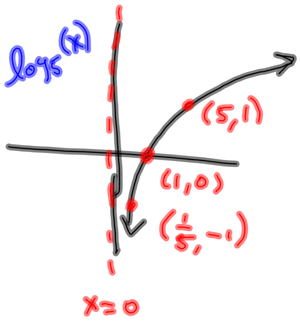
29 $\log_{10}(10^6) = 6$

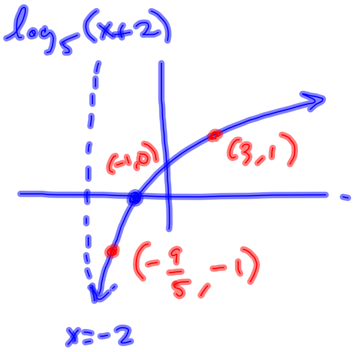
Inverse func: If $f(x)$ is increasing, so is $f^{-1}(x)$





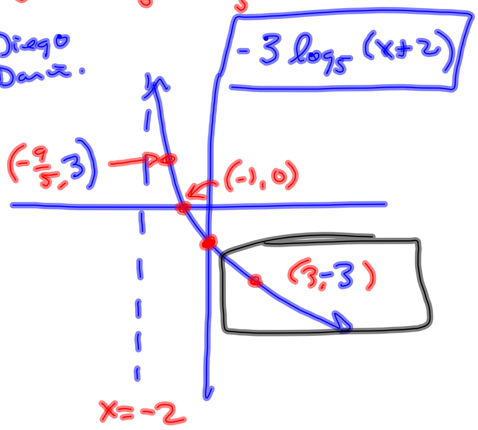
$-3\log_5(x+2)+5$

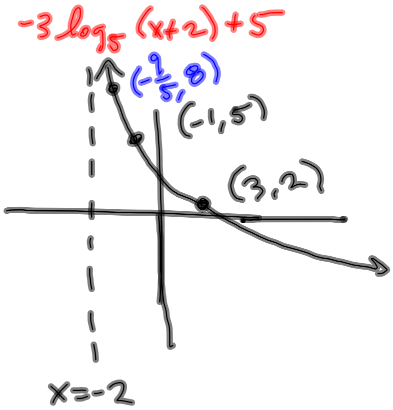




$\frac{1}{5}-2=\frac{1-10}{5}=-\frac{9}{5}$

Diego Dance.





$3^{5x+2} = 7$ Solve for x

$$\log_3(3^{5x+2}) = \log_3(7)$$
$$(5x+2)\log_3(3) = \log_3(7)$$
$$5x+2 = \log_3(7)$$
$$5x = \log_3(7) - 2$$
$$x = \frac{\log_3(7)-2}{5}$$
$$\frac{\frac{\ln(7)}{\ln(3)} - 2}{5}$$
$$= \frac{\frac{\ln(7)-2\ln(3)}{\ln(3)}}{\frac{5}{1}} = \frac{\ln(7)-2\ln(3)}{\ln(3)} \cdot \frac{1}{5} =$$

$$3^{5x+2} = 7$$
$$\ln(3^{5x+2}) = \ln(7)$$
$$(5x+2)\ln(3) = \ln(7)$$
$$5\ln(3)x + 2\ln(3) = \ln(7)$$
$$5\ln(3)x = \ln(7) - 2\ln(3)$$
$$x = \frac{\ln(7)-2\ln(3)}{5\ln(3)}$$

Oct 30-8:21 AM

$$3^{5x+2} = 7$$

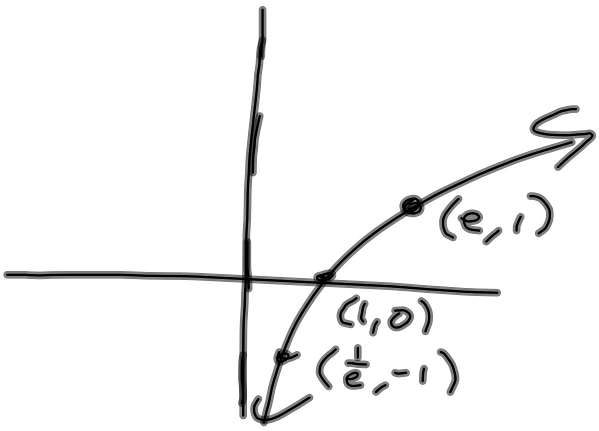
$$\ln(3^{5x+2}) = \ln(7)$$

$$(5x+2)\ln(3) = \ln(7)$$

$$5x+2 = \frac{\ln(7)}{\ln(3)}$$

$$5x = \frac{\ln(7)}{\ln(3)} - 2$$

$$x = \frac{\frac{\ln(7)}{\ln(3)} - 2}{5}$$



$x=0$

Function Gallery
Pp 365-6

§ 4.3

$$3^2 \cdot 3^5 = 3^{2+5} = 3^7$$

Logs turn multiplication into addition.

$$\log_4(2 \cdot 5) = \log_4(2) + \log_4(5)$$

Consider: $(1257)(3275)$

$$\log(1257) \approx 3.099335278$$
$$\log(3275) \approx 3.515211304$$

$$10^{3.099335278} \cdot 10^{3.515211304}$$
$$= 10^{3.099335278 + 3.515211304}$$

multiplication

Take logs by Computer.
Add 'em
take inverse log

```
log(1257)+log(32
75)
     6.614546582
10^Ans
         4116675
1257*3275
         4116675
```

$(3^2)^5 = 3^{2\cdot 5} = 3^{10}$ $\log(2^5) = 5\log 2$

$(xy^3)^{\frac{1}{2}} = x^{\frac{1}{2}}y^{\frac{3}{2}}$

$\log\left(\frac{\sqrt{xy^3}}{\sqrt[4]{z}}\right) = \frac{1}{2}\log(x) + \frac{3}{2}\log(y) - \frac{1}{4}\log(z)$

$\log(\sqrt{xy^3}) - \log(\sqrt[4]{z})$

$= \log((xy^3)^{\frac{1}{2}}) - \log(z^{\frac{1}{4}}) = \log(x^{\frac{1}{2}}y^{\frac{3}{2}}) - \frac{1}{4}\log(z)$

$= \log(x^{\frac{1}{2}}) + \log(y^{\frac{3}{2}}) - \frac{1}{4}\log(z)$

$= \frac{1}{2}\log(x) + \frac{3}{2}\log(y) - \frac{1}{4}\log(z)$

Keli

$\log\left(\frac{A}{B}\right) = \log(AB^{-1}) = \log(A) + \log(B^{-1})$

$= \log(A) - 1\log(B)$

§4.3 #66

$.23^x = 8.4$

$\ln(.23^x) = \ln(8.4)$

$\ln(.23) \cdot x = \ln(8.4)$

$x = \frac{\ln(8.4)}{\ln(.23)}$

$\log_{.23}(.23^x) = \log_{.23}(8.4)$

$x = \log_{.23}(8.4)$

$= \frac{\ln(8.4)}{\ln(.23)}$

$3^{2.7x-5} = 4^{-3x+2}$

§4.3 #s 1-10 ALL, 17, 45, 47, 49, 51, 53, 61
71, 75, 79, 81, 98
1, 2, 3, 4, 5, 6, 7