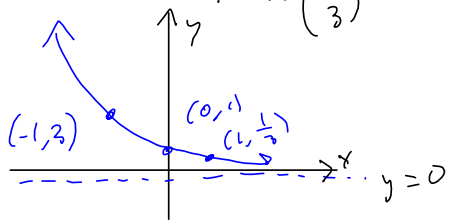
$f(x) = \left(\frac{1}{3}\right)^x = (3^{-1})^x = 3^{-x}$ is horizontal flip of

$h(x) = 3^x$



x	y
-1	3
0	1
1	$\frac{1}{3}$

$\left(\frac{1}{3}\right)^{-1} = 3$ $\left(\frac{1}{3}\right)^0 = 1$

$\left(\frac{1}{3}\right)^1 = \frac{1}{3}$

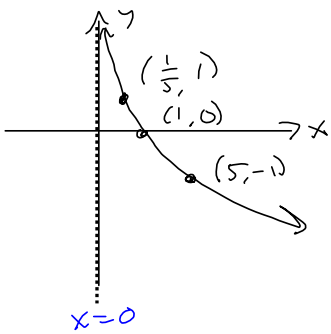
y becomes x!

logs & exponentials are INVERSES, so no surprise

x becomes y

that $\log_{\frac{1}{5}}(x)$ is a VERTICAL flip of $\log_5(x)$

$f(x) = \log_{\frac{1}{5}}(x)$



x	y
$\frac{1}{5}$	1
1	0
5	-1

$\log_{\frac{1}{5}}\left(\frac{1}{5}\right) = 1$

$\log_{\frac{1}{5}}(1) = 0$; $\left(\left(\frac{1}{5}\right)^0 = 1\right)$

$\log_{\frac{1}{5}}(5) = \log_{\frac{1}{5}}\left(\left(\frac{1}{5}\right)^{-1}\right) = -1$

with the basic graphs nailed down, the rest is Chapter 2 graphing skills (transformations).

$g(x) = -7\log_2(5x-20)+3$

Find g^{-1}:

$-7\log_2(5y-20)+3 = x$

$-7\log_2(5y-20) = x-3$

$\log_2(5y-20) = \frac{x-3}{-7}$

$2^{\log_2(5y-20)} = 2^{\frac{x-3}{-7}}$

$5y-20 = 2^{-\frac{x-3}{7}}$

$5y = 2^{-\frac{x-3}{7}}+20$

$y = \frac{2^{-\frac{x-3}{7}}+20}{5} = g^{-1}(x)$

$= \frac{1}{5}\cdot 2^{-\frac{x-3}{7}} + 4$

```
(3^(11/2)-7)/5
        82.77766925
-2log(7)/log(3)+
11
        7.457512502
(2^(3/7)+20)/5
        4.269180039
```

y-int: $g(0) = -7\log_2(-20)+3$

?! No y-int.

Find x-intercept

$-7\log_2(5x-20)+3 = 0$

$-7\log_2(5x-20) = -3$

$\log_2(5x-20) = \frac{-3}{-7} = \frac{3}{7}$

$2^{\log_2(5x-20)} = 2^{\frac{3}{7}}$

$5x-20 = 2^{\frac{3}{7}}$

$5x = 2^{\frac{3}{7}}+20$

$x = \frac{2^{\frac{3}{7}}+20}{5}$

$\boxed{\left(\frac{2^{\frac{3}{7}}+20}{5}, 0\right)}$

Perfect

(4.2692, 0) only if I asked for 4-decimal (imperfection) approximation.

A lot of button-pushing & time for one measly, cotton-pickin' point.

$-7\log_2(5x-20)+3$

$g(x) = -7\cdot 3^{5x-20}+3$

g^{-1}:

$-7\cdot 3^{5y-20}+3 = x$

$-7\cdot 3^{5y-20} = x-3$

$3^{5y-20} = \frac{x-3}{-7} = -\frac{x-3}{7}$

$\log_3\left(3^{5y-20}\right) = \log_3\left(-\frac{x-3}{7}\right)$

$5y-20 = \log_3\left(-\frac{x-3}{7}\right)$

$5y = \log_3\left(-\frac{x-3}{7}\right)+20$

$y = \boxed{\frac{\log_3\left(-\frac{x-3}{7}\right)+20}{5} = g^{-1}(x)}$

$f(x) = \sqrt{x+16}$, $g(x) = x^2-5x-66$

(a) $\mathcal{D}(f) = [-16, \infty)$ (Need $x+16 \geq 0$)

(b) $\mathcal{D}(g) = (-\infty, \infty)$

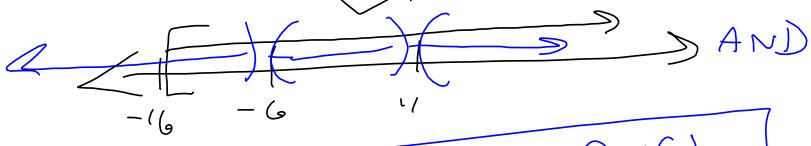
(c) $\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x+16}}{x^2-5x-66}$

(d) $\mathcal{D}\left(\frac{f}{g}\right)$: Need $x+16 \geq 0$ & $x^2-5x-66 \neq 0$

$(x-11)(x+6) \neq 0$

$x \neq -6, 11$

AND $x \geq -16$

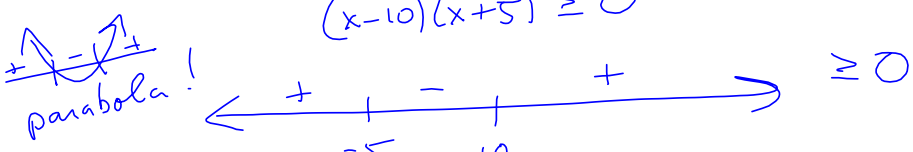


$= \boxed{[-16,-6) \cup (-6, 4) \cup (4, \infty) = \mathcal{D}\left(\frac{f}{g}\right)}$

(e) $(f \circ g)(x) = \sqrt{x^2-5x-66+16}$

(f) Need $x^2-5x-50 \geq 0$

$(x-10)(x+5) \geq 0$



$= \boxed{(-\infty, -5] \cup [10, \infty)} = \mathcal{D}(f \circ g)$