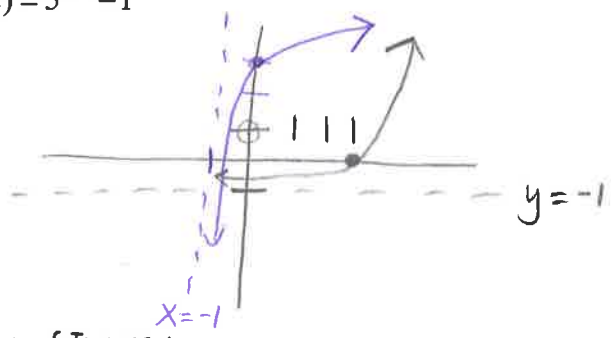
Int 3 MA C5 DDAY Name Key Per ____ Group ____

NO CALCULATOR

1. Sketch. Label asymptotes and the locator point. Find the inverse and then sketch on the same axis.

a. $f(x)=5^{x-3}-1$



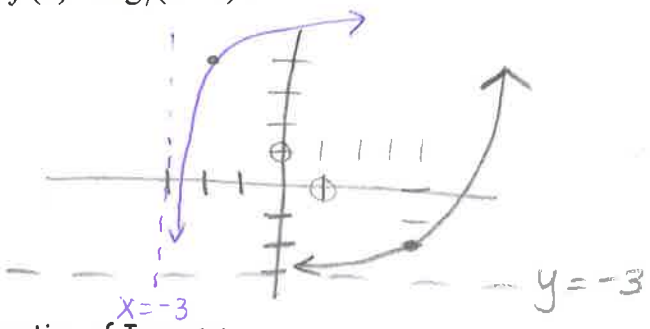
Equation of Inverse:

$x=5^{y-3}-1$

$x+1=5^{y-3}$

$y-3=\log_5(x+1) \rightarrow$ $y=\log_5(x+1)+3$

b. $f(x)=\log_7(x+3)+4$



Equation of Inverse:

$x=\log_7(y+3)+4$

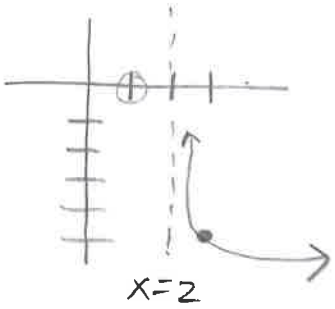
$x-4=\log_7(y+3)$

$7^{x-4}=y+3$

$y=7^{x-4}-3$

2. Sketch. Find the asymptote, x-intercept and domain.

a. $f(x)=-\log_4(x-2)-5$



Domain:	$x>2$
x-intercept:	$(2+\frac{1}{4^5},0)$
Vertical asymptote:	$x=2$

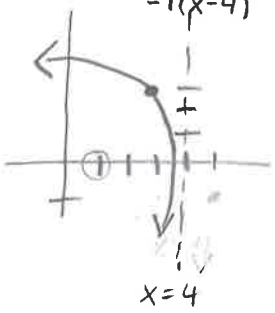
$0=-\log_4(x-2)-5$

$5=-\log_4(x-2)$

$-5=\log_4(x-2)$

$4^{-5}=x-2 \rightarrow x=2+4^{-5}$

b. $f(x)=\log_5(4-x)+3$



Domain:	$x<4$
x-intercept:	$4-\frac{1}{125} = 3\frac{124}{125}, 0$
Vertical asymptote:	$x=4$

$0=\log_5(4-x)+3$

$-3=\log_5(4-x)$

$5^{-3}=4-x$ $\rightarrow$ $x+5^{-3}=4$, $x=4-5^{-3}$

3. Solve for x:

a. $\log_4 x=-2$

$4^{-2}=x$

$x=\frac{1}{16}$

b. $\log_8 \frac{1}{32}=x$

$8^x=\frac{1}{32}$

$2^{3x}=2^{-5}$ $\rightarrow$ $3x=-5$

$x=-\frac{5}{3}$

c. $\log_x 5=-\frac{1}{2}$

$\left(x^{-\frac{1}{2}}\right)^{-2}=(5)^{-2}$

$x=\frac{1}{25}$

4. Find the inverse algebraically. Show work.

a. $y=\sqrt{\frac{x-7}{3}}-8$

f^{-1}: $x=\sqrt{\frac{y-7}{3}}-8$

$y=3(x+8)^2+7, \quad x \geq -8$

b. $y=\frac{x-6}{2x+5}-4$

$x=\frac{y-6}{2y+5}-4$

$x+4=\frac{y-6}{2y+5}$

$(x+4)(2y+5)=y-6$

$2xy+5x+8y+20=y-6$

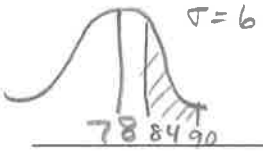
$2xy+7y=-5x-26$

$y(2x+7)=-5x-26$

$y=\frac{-5x-26}{2x+7}$

5. Draw a normal curve. Write what you'd enter into the calculator. DO NOT SOLVE.

a. In the lovely town of Odenton, MD, the mean high temperature for the month of September is 78°F with a standard deviation of 6°. Assuming that the temperature data is normally distributed, how many days in September would you expect the high temperature to be between 84° and 90°?

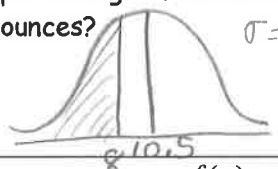


normalcdf(84,90,78,6)

b. Mr. Templin promised that if we all score at least 50% on the test, we will pass. Sadly, the test was a killer, and he said the mean was 46% with a standard deviation of 4%. If the scores were normally distributed, what percentage of the class passed?

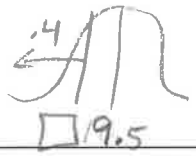
normalcdf(50,10^99,46,4)

c. Math Club sells their famous chocolate chip cookies with a mean of 10.5 ounces and a standard deviation of 0.75. If the data is normally distributed, what percentage of the Math Club's cookies are below 8 ounces?



normalcdf(-10^99,8,10.5,.75)

d. My πpod has an average playtime of 9.5 hours with a standard deviation of 1.5 hours. ~~What percent of the time will my πpod play longer than 11 hours?~~ What time would be the 40th percentile?



invNorm(.4,9.5,1.5)

6. Given $f(x)=7-3x$, $g(x)=x^2-5$

a. Find $f(g(-2))$ → $f[(-2)^2-5]$ → $f[-1]$ → $7-3(-1)$ → 10

b. Find $g(f(x))$

$(7-3x)^2-5$ → $49-42x+9x^2-5$

$9x^2-42x+44$

7. Calculate the vertex of $y=2x^2+8x-15$

$y=2[x^2+4x+4]-15-8$

$y=2(x+2)^2-23$

vertex $(-2,-23)$

$y=-9x^6-15x^5+36x^4$

8. Solve the system algebraically $\begin{cases} 3^{2x+4y}=\frac{1}{9} \\ 3^{x+3y}=\frac{1}{81} \end{cases}$

$3^{2x+4y}=3^{-2}$ → $2x+4y=-2$

$3^{x+3y}=3^{-4}$ → $-2(x+3y=-4)$ → $-2x-6y=8$

$2x+4y=-2$

$-2y=6$

$y=-3$

$x+3(-3)=-4$

$x=5$

9. Find the x-intercepts of ~~$y=6x^6-27x^5+48x^4$~~

$0=-9x^6-15x^5+36x^4$

$0=-3x^4[3x^2+5x-12]$

$0=-3x^4(3x-4)(x+3)$

$x=0$ $x=\frac{4}{3}$ $x=-3$

10. Solve $x+2\sqrt{x}=35$ $U=\sqrt{x}$

$x+2\sqrt{x}-35=0$

$U^2+2U-35=0$

$(U+7)(U-5)=0$

$U=-7$ $U=5$

$\sqrt{x}=-7$ $\sqrt{x}=5$

$x=25$

11. Solve $2^{\sqrt{x+8}\cdot 5}=16^{4\sqrt{x+8}}$ $U=\sqrt{x+8}$

$2^{U^5}=16^{4U}$

$2^{U^5}=(2^4)^{4U}$

$U^5=16U$

$U^5-16U=0$

$U(U^4-16)=0$

$U(U^2-4)(U^2+4)=0$

$U(U+2)(U-2)(U^2+4)=0$

$U=0$ $U=-2$ $U=2$ $U=\pm 2i$

$\sqrt{x+8}=0$ $\sqrt{x+8}=-2$ $\sqrt{x+8}=2$

$x+8=0$ $x+8=4$

$x=-8$ $x=-4$