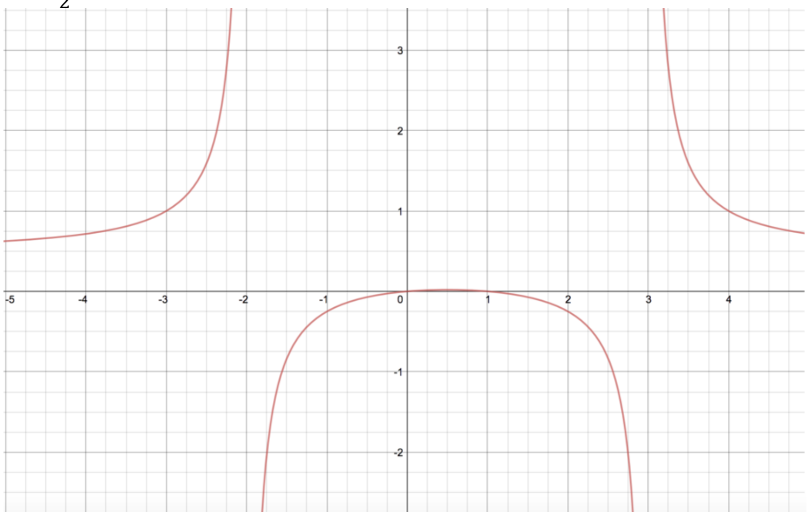
1. $f(x)$ is moved right 2, flipped over the x-axis, and stretched 3 in the y-direction (multiply y values by 3).
   $g(x)$ is moved left 5 spaces and down 7.
   $h(x)$ is flipped over the y-axis and moved up 4 spaces.
2. y-intercept: $(0,0)$; x-intercepts: $(0,0)$, $(1,0)$; Vertical Asymptotes: $x = 3$, $x = -2$; horizontal asymptotes: $y = \frac{1}{2}$; positive: $(-\infty,-2) \cup (0,1) \cup (3,\infty)$; negative: $(-2,0) \cup (1,3)$



y-intercept: $(0,0)$; x-intercepts: $(0,0), (4,0), (-5,0)$; no asymptotes; positive: $(-5,0) \cup (4,\infty)$; negative: $(-\infty,-5) \cup (0,4)$ Sorry, the graph did not turn out well for this one.
3. This factors to $x(x+3)(x-1) > 0$, so the critical points are $x = 0, -3, 1$. If you place these on a number line, you can test values on the intervals between these points; you are looking for which intervals make the inequality true. These are $(-3,0) \cup (1,\infty)$. Second one: $\frac{(x-3)(x+2)}{x-1} \leq 0$ critical points: $x = -2, 1, 3$ solution $(-\infty,-2) \cup (1,3)$. Third one: Subtract the fraction on the right side from both sides and then get a common denominator between the two fractions. $\frac{1}{x-2} - \frac{2}{3x-9} = \frac{3x-9-2x+4}{3(x-3)(x-2)} = \frac{x-5}{3(x-3)(x-2)} < 0$ critical points $x = 2, 3, 5$ solution $(-\infty,2) \cup (3,5)$.
4. Domain: all reals $f^{-1}(x) = \frac{1}{2}(x+3)^2 + \frac{7}{2}$

   Domain: $x \neq 6$ $\quad g^{-1}(x) = \frac{6x+4}{x-3}$

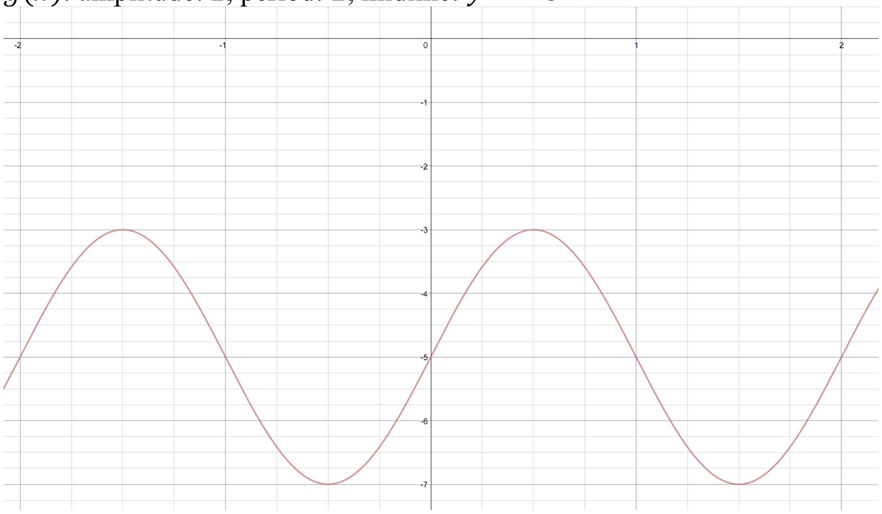
   Domain: All Reals $\quad k^{-1}(x) = -\frac{1}{3}\ln\left(\frac{x-2}{4}\right)$

   Domain: $x > \frac{8}{3}$ $\quad j^{-1}(x) = \frac{1}{3}(10^x + 8)$

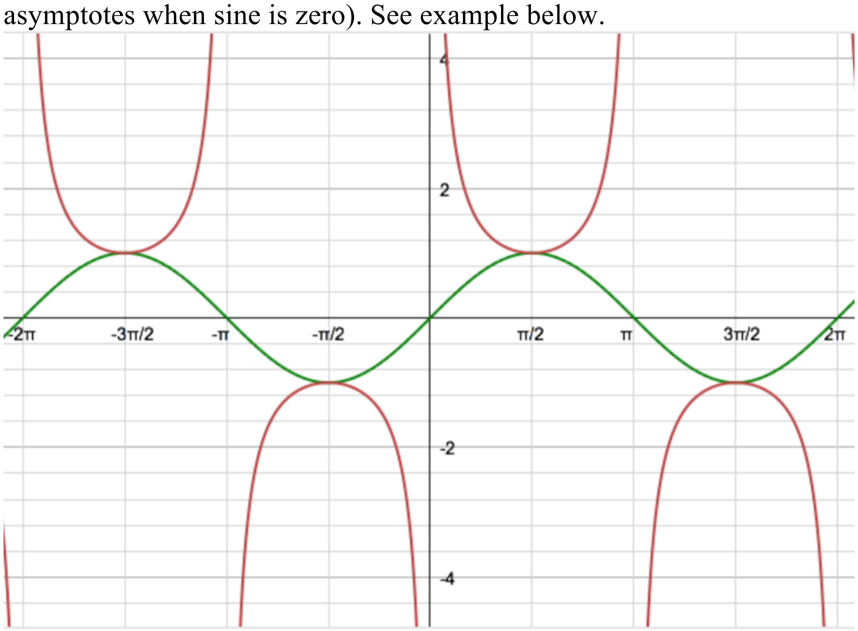
5. First one: take ln of both sides, then move the exponents in front as a multiplication (rules of logs) to get: $(2x-5)\ln 3 = (x+4)\ln 7$, then distribute ln 3 on the left side and ln 7 on the right side. Get everything with an x on one side and everything els on the other, factor out the x, and divide to get $x = \frac{5\ln 3 + 4\ln 7}{2\ln 3 - \ln 7}$;
   Second one: combine into one log to get $log_3\left(\frac{x-6}{x+2}\right) = 2$. Now use the base of the log to rewrite this as an exponential equation $\frac{x-6}{x+2} = 3^2 = 9$. When you solve for x, you get x= -3, so this has no solution since $x = -3$ is not in the domain of the function;
   Third one: Solve for $\cos x$, which gives $\cos x = \pm\sqrt{\frac{1}{2}} = \pm\frac{\sqrt{2}}{2}$, so $x = \frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi$;

Fourth one: sine is $\frac{\sqrt{3}}{2}$ at $\frac{\pi}{3}, \frac{2\pi}{3}$, so this gives $3x + \frac{\pi}{6} = \frac{\pi}{3} + 2k\pi$ *and* $3x + \frac{\pi}{6} = \frac{2\pi}{3} + 2k\pi$ if you solve for x in these equations, you get $x = \frac{\pi}{18} + \frac{2k\pi}{3}$ *and* $\frac{\pi}{6} + \frac{2k\pi}{3}$

6. $g(x)$: amplitude: 2, period: 2, midline: $y = -5$



Be able to use the graph of sine to sketch a graph of cosecant (this helps locate its asymptotes, since secant has asymptotes when sine is zero). See example below.



Be able to use the graph of cosine to sketch a graph of secant (same idea as above).

7. For these, it is probably easiest to draw a right triangle. Remember, your answer to an inverse trig function is an angle, so $cos^{-1}u = \theta$ and that means that$\cos\theta = u$ *or* $\cos\theta = \frac{u}{1}$. Since $\cos\theta = \frac{adjacent}{hypotenuse}$, this tells you that the adjacent leg is u and the hypotenuse is 1. You can use the Pythagorean theorem to find that the opposite leg is $\sqrt{1-u^2}$ so $\cot(cos^{-1}u) = \cot\theta = \frac{adjacent}{opposite} = \frac{u}{\sqrt{1-u^2}}$
Similarly, if $tan^{-1}u = \theta$ *then* $\tan\theta = u$ *or* $\tan\theta = \frac{u}{1} = \frac{opposite}{adjacent}$ completing the triangle using Pythagorean theorem you see that the hypotenuse is $\sqrt{u^2+1}$. So $\sin(tan^{-1}u) = \sin\theta = \frac{opposite}{hypotenuse} = \frac{u}{\sqrt{u^2+1}}$

8. $-\frac{1}{2}$; -2; $-\sqrt{3}$; 0; $-\frac{\pi}{3}$; $\frac{2\pi}{3}$; $\frac{\pi}{6}$