Practice Problems 1 - Math 141, Frank Thorne (thornef@mailbox.sc.edu)

Any of these problems that might appear on a quiz, assessment, or the final exam. You will be expected to show your work, write in complete sentences, and explain your reasoning clearly.

(a) Thomas, Ch. 1.1, 7, 8, 11, 15-18, 25-28.

(b) What is a function? (This is the most important question in all of mathematics.)

(c) Thomas, Ch. 1.2, 5, 6, 23-25, 55, 56.

(d) Simplify $\frac{1}{x+1} - \frac{1}{x}$.

(e) Simplify $(abc)^{10}(a^5b^3d^{-2})^{-2}$.

(f) Simplify $\frac{\frac{1}{x+h} - \frac{1}{x}}{h}$.

(g) Simplify $\frac{(x+h)^2 - x^2}{h}$.

(h) Simplify $\frac{(xy^2)^2}{(x^2y)^2}$.

(i) Simplify $(x+2)(x+3) + (x+2)(x-3)$.

(j) Simplify $(x+1)^2(x+2)^3 + (x+1)^3(x+2)^2$.

(k) Factor $x^2 - a^2$.

(l) Factor $x^3 - a^3$.

(m) Factor $x^3 + a^3$.

(n) Define the trigonometric functions $\sin(x)$, $\cos(x)$, $\tan(x)$, $\sec(x)$, $\csc(x)$, and $\cot(x)$.

(o) Draw the unit circle and indicate the following angles on it: 0, $\pi/6$, $\pi/4$, $\pi/3$, $\pi/2$, $2\pi/3$, $3\pi/4$, $5\pi/6$, π, $7\pi/6$, $5\pi/4$, $4\pi/3$, $3\pi/2$, $5\pi/3$, $7\pi/4$, $11\pi/6$. For each angle, compute $\sin(x)$, $\cos(x)$, $\tan(x)$, $\cot(x)$, $\csc(x)$, and $\sec(x)$.

(p) Thomas, Ch. 1.4, 5, 13-20,

(q) Define the exponential and logarithmic functions e^x and $\ln x$.

(r) Thomas, Ch. 1.5, 1-8, 11-12, 24, 35.

(s) Define the term *inverse function*. Give an example of a function that has an inverse, and of a function that does not.

(t) Thomas, Ch. 1.6, 19-22, 25-28.