Math 241 Homework Solutions
Section 1.1 # 5-8, 12, 23-27, 28

5. No, the curve is not a graph of a function because a vertical line intersects the graph more than once.

6. Yes, the curve is a graph of a function because it passes the vertical line test. The domain is [-2,2] and the range is [-1,2].

7. Yes, the curve is a graph of a function because it passes the vertical line test. The domain is [-3,2] and the range is $[-3,2)\cup[-1,3]$.

8. No, the curve is not a graph of a function because a vertical line intersects the graph more than once.

12. The summer solstice (the longest day of the year) is around June 21, and the winter solstice (the shortest day of the year) is around December 22. So the graph will look like this:
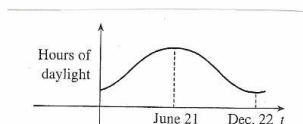
23. $f(x)$ is defined for all x where $3x-1\neq 0 \Rightarrow x\neq \frac{1}{3}$. Therefore, the domain is $(-\infty,\frac{1}{3})\cup(\frac{1}{3},\infty)$.

24. $f(x)$ is defined for all x where $x^2+3x+2\neq 0 \Rightarrow (x+1)(x+2)\neq 0 \Rightarrow x\neq -1$ and $x\neq -2$. Therefore, the domain is $(-\infty,-2)\cup(-2,-1)\cup(-1,\infty)$.

25. $f(t)$ is defined for $t\geq 0$. Therefore, the domain is $[0,\infty)$.

26. $g(u)$ is defined for $u\geq 0$ and $4-u\geq 0 \Rightarrow u\leq 4$. Therefore, the domain is $[0,4]$.

27. $h(x)$ is defined when $x^2-5x>0 \Rightarrow x(x-5)>0$. The expression $x(x-5)$ is positive when $x<0$ or $x>5$. So the domain is $(-\infty,0)\cup(5,\infty)$.

28. $h(x) = \sqrt{4-x^2}$, so let $y = \sqrt{4-x^2} \Rightarrow y^2 = 4-x^2 \Rightarrow x^2 + y^2 = 4$, so the graph is the top half of a circle with radius 2 and center at the origin. The function is defined when $4 - x^2 \geq 0 \Rightarrow (2-x)(2+x) \geq 0 \Rightarrow x \leq 2 \ and \ x \geq -2$, therefore the domain is $[-2,2]$. From the graph we see that the range is $[0,2]$.