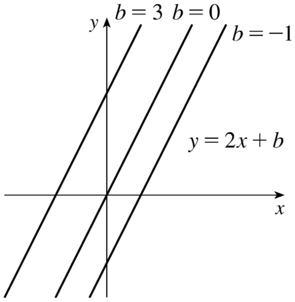
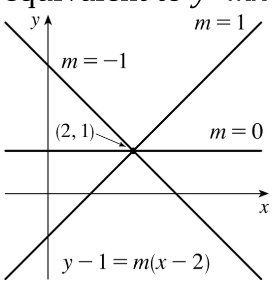
5. **(a)** An equation for the family of linear functions with slope 2 is $y=f(x)=2x+b$, where b is the y –intercept.

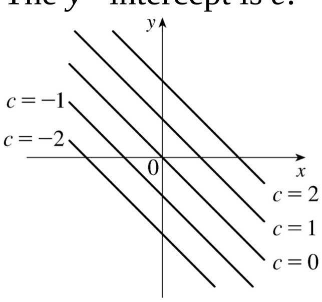


(b) $f(2)=1$ means that the point $(2,1)$ is on the graph of f. We can use the point–slope form of a line to obtain an equation for the family of linear functions through the point $(2,1)$. $y–1=m(x–2)$, which is equivalent to $y=mx+(1–2m)$ in slope–intercept form.



(c) To belong to both families, an equation must have slope $m=2$, so the equation in part (b), $y=mx+(1–2m)$, becomes $y=2x–3$. It is the *only* function that belongs to both families.

7. All members of the family of linear functions $f(x)=c–x$ have graphs that are lines with slope –1. The y –intercept is c.



11. **(a)** Using N in place of x and T in place of y , we find the slope to be

$$\frac{T_2-T_1}{N_2-N_1} = \frac{80-70}{173-113} = \frac{10}{60} = \frac{1}{6}$$. So a linear equation is $T-80=\frac{1}{6}(N-173) \Leftrightarrow T-80=\frac{1}{6}N-\frac{173}{6} \Leftrightarrow$

$$T=\frac{1}{6}N+\frac{307}{6}\left[\frac{307}{6}=51.1\overline{6}\right].$$

(b) The slope of $\frac{1}{6}$ means that the temperature in Fahrenheit degrees increases one–sixth as rapidly as the number of cricket chirps per minute. Said differently, each increase of 6 cricket chirps per minute corresponds to an increase of 1

$^\circ$ F.

(c) When $N = 150$, the temperature is given approximately by $T = \frac{1}{6}(150) + \frac{307}{6} = 76.1\overline{6}^\circ$ F $\approx 76^\circ$ F.