73. (a) \[ \begin{array}{c}
-2\pi & -\pi & \pi & 2\pi \\
-2x_{-2x_{-2x}} & -\pi \pi & \pi & 2\pi \\
\end{array} \]

74. (a) \[ \begin{array}{c}
-1 & 1 & 1 & 1 \\
1 & 1 & 1 & 1 \\
-1 & -1 & -1 & -1 \\
\end{array} \]

(b) \[ \begin{array}{c}
-\sqrt{2} & -1 & 1 & \sqrt{2} \\
-1 & -1 & -1 & 1 \\
\end{array} \]

(c) \[ \begin{array}{c}
-1 & 1 & 1 & 1 \\
1 & 1 & 1 & 1 \\
-1 & -1 & -1 & -1 \\
\end{array} \]

(d) \[ \begin{array}{c}
-\pi & \pi/2 & \pi/2 & \pi \\
\end{array} \]

75. Yes, e.g. \( f(x) = x^k \) and \( g(x) = x^n \) where \( k \) and \( n \) are integers.

76. If \( x \geq 0 \) then \( |x| = x \) and \( f(x) = g(x) \). If \( x < 0 \) then \( f(x) = |x|^{p/q} \) if \( p \) is even and \( f(x) = -|x|^{p/q} \) if \( p \) is odd; in both cases \( f(x) \) agrees with \( g(x) \).

**EXERCISE SET 1.4**

1. (a) \( y = 3x + b \)  
   (b) \( y = 3x + 6 \)  
   (c) \[ \begin{array}{c}
   y = 3x + 6 \\
   y = 3x + 2 \\
   y = 3x - 4 \\
   \end{array} \]

2. Since the slopes are negative reciprocals, \( y = -\frac{1}{3}x + b \).

3. (a) \( y = mx + 2 \)
   (b) \( m = \tan \phi = \tan 135^\circ = -1 \), so \( y = -x + 2 \)
   (c) \[ \begin{array}{c}
   m = -1 \\
   m = 1 \\
   m = 1.5 \\
   \end{array} \]

4. (a) \( y = mx \)
   (b) \( y = m(x - 1) \)
   (c) \( y = -2 + m(x - 1) \)
   (d) \( 2x + 4y = C \)
5. Let the line be tangent to the circle at the point \((x_0, y_0)\) where \(x_0^2 + y_0^2 = 9\). The slope of the tangent line is the negative reciprocal of \(y_0/x_0\) (why?), so \(m = -x_0/y_0\) and \(y = -(x_0/y_0)x + b\). Substituting the point \((x_0, y_0)\) as well as \(y_0 = \pm \sqrt{9 - x_0^2}\) we get \(y = \pm \frac{9 - x_0x}{\sqrt{9 - x_0^2}}\).

6. Solve the simultaneous equations to get the point \((-2, 1/3)\) of intersection. Then \(y = \frac{1}{3} + m(x + 2)\).

7. The \(x\)-intercept is \(x = 10\) so that with depreciation at 10% per year the final value is always zero, and hence \(y = m(x - 10)\). The \(y\)-intercept is the original value.

8. A line through \((6, -1)\) has the form \(y + 1 = m(x - 6)\). The intercepts are \(x = 6 + 1/m\) and \(y = -6m - 1\). Set \(-6 + 1/m)(6m + 1) = 3\), or \(36m^2 + 15m + 1 = (12m + 1)(3m + 1) = 0\) with roots \(m = -1/12, -1/3\); thus \(y + 1 = -(1/3)(x - 6)\) and \(y + 1 = -(1/12)(x - 6)\).

9. (a) The slope is \(-1\).

(b) The \(y\)-intercept is \(y = -1\).

(c) They pass through the point \((-4, 2)\).

(d) The \(x\)-intercept is \(x = 1\).

10. (a) horizontal lines

(b) The \(y\)-intercept is \(y = -1/2\).
11. (a) VI  (b) IV  (c) III  (d) V  (e) I  (f) II

12. In all cases $k$ must be positive, or negative values would appear in the chart. Only $kx^{-3}$ decreases, so that must be $f(x)$. Next, $kx^2$ grows faster than $kx^{3/2}$, so that would be $g(x)$, which grows faster than $h(x)$ (to see this, consider ratios of successive values of the functions). Finally, experimentation (a spreadsheet is handy) for values of $k$ yields (approximately) $f(x) = 10x^{-3}$, $g(x) = x^2/2$, $h(x) = 2x^{1.5}$.

13. (a) 

(b) 

(c)