ICNS 100 Homework 1

Problem 2.5

6. **a.** $f(0) = 0, f(2) = 1, f(3) = 3, f(4) = 2$

b. Domain: all x such that $0 \le x \le 4$

c. Range: all y such that $0 \le y \le 3$

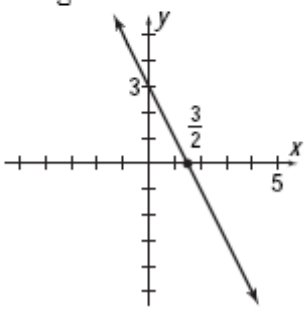
d. $f(x) = 0$ for $x = 0$. So a real zero is 0.

10. $y = 3 - 2x$

If $y = 0$, then $0 = 3 - 2x$, $x = \frac{3}{2}$.

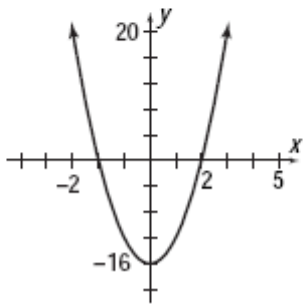
If $x = 0$, then, $y = 3$. Intercepts: $\left(\frac{3}{2}, 0\right)$, $(0, 3)$

y is a function of x. One-to-one.
Domain: all real numbers
Range: all real numbers



14. $y = 4x^2 - 16$

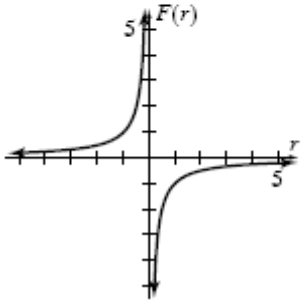
If $y = 0$, then $0 = 4x^2 - 16 = 4(x^2 - 4)$,
$0 = 4(x+2)(x-2)$, $x = \pm 2$.
If $x = 0$, then $y = -16$.
Intercepts: $(\pm 2, 0)$, $(0, -16)$
y is a function of x. Not one-to-one.
Domain: all real numbers
Range: all real numbers ≥ -16



30. $F(r) = -\dfrac{1}{r}$

If $F(r) = 0$, then $0 = -\dfrac{1}{r}$, which has no solution.

Because $r \neq 0$, there is no vertical-axis intercept. Intercept: none.
Domain: all real numbers $\neq 0$
Range: all real numbers $\neq 0$

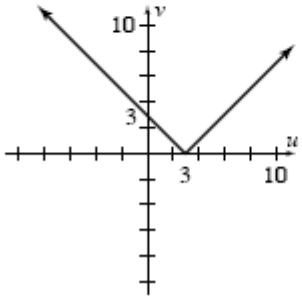


32. $v = H(u) = |u - 3|$

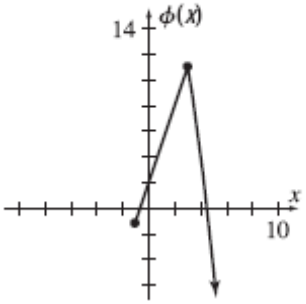
If $v = 0$, then $0 = |u - 3|$, $u - 3 = 0$, so $u = 3$.

If $u = 0$, then $v = |-3| = 3$.

Intercepts: (3, 0), (0, 3).
Domain: all real numbers
Range: all real numbers ≥ 0



36. Domain: all real numbers ≥ -1
Range: all real numbers ≤ 11



40. From the horizontal line test, the graphs which represent one-to-one functions of x are (c) and (d).