

**Problem statement** a) Suppose that  $f(x) = x^2$  and  $g(x) = 2^x$ . Compute  $f(-2)$ ,  $g(-2)$ ,  $f(5)$ , and  $g(5)$ . According to the Intermediate Value Theorem and the function values computed, what is the smallest number of roots the equation  $f(x) = g(x)$  can have?

b) Suppose still that  $f(x) = x^2$  and  $g(x) = 2^x$ . Graph  $y = f(x)$  and  $y = g(x)$  carefully on the interval  $-2 \leq x \leq 5$ . How many roots does the equation  $f(x) = g(x)$  appear to have?

c) Draw graphs of two increasing continuous functions which intersect exactly two times.

d) Draw graphs of two increasing continuous functions which intersect exactly three times.

e) Draw graphs of two increasing continuous functions which intersect exactly four times.