

## Quiz 9

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Analyze the behavior of

$$f(x) = x^2(x - 4)(x + 1).$$

Solution: There are three zeros of  $f$ . They are  $x = 4, 0$ , and  $-1$ . The zero  $0$  has multiplicity  $2$ , so the graph of  $f$  is tangent to the  $x$ -axis at  $x = 0$ . Using the test interval technique, we find that  $f$  is positive to the left of  $-1$  and to the right of  $4$ , but lies below the  $x$ -axis throughout the interval  $(-1, 4)$  except at  $x = 0$  itself.