

7. [12 points] Last winter, Mollie Mole kept very careful records of her dwindling supply of earthworms. She had 450 grams of earthworms at the beginning of the winter, and 23.5% of her earthworm supply was eaten during the first 10 days of winter.

*For this problem, you must find your answers algebraically and show each step carefully.*

- a. [2 points] *Do not round your answers.*

How many grams of earthworms did Mollie eat during the first 10 days of last winter?

**Answer:** \_\_\_\_\_

How many grams of earthworms were left in Mollie's supply after the first 10 days of last winter?

**Answer:** \_\_\_\_\_

Let  $W(d)$  be the number of grams of earthworms in Mollie's supply  $d$  days after the start of last winter.

- b. [4 points] Assuming that Mollie's supply of earthworms decreased exponentially during the first 10 days of last winter, find a formula (in *exact form*) for  $W(d)$  for  $0 \leq d \leq 10$ .

**Answer:**  $W(d) =$  \_\_\_\_\_

- c. [1 point] According to your formula above, by what percent did Mollie's supply of earthworms decrease each day during the first 10 days of last winter?

**Answer:** \_\_\_\_\_

- d. [5 points] After the first 10 days, for the rest of last winter, Mollie's remaining supply of earthworms decreased by 6.5% each day. How many total days of winter had passed when her supply dropped below 5 grams? *Remember to find your answer algebraically, showing each step carefully. Then round to the nearest day.*

**Answer:** \_\_\_\_\_