**Example 20** Self Tutor

You estimate a fence's length to be 70 m whereas its true length is 78.3 m. Find, correct to one decimal place:

**a** the error **b** the percentage error.

**a** $\text{error} = V_A - V_E$
$= 70 - 78.3$
$= -8.3$ m

**b** percentage error
$= \dfrac{|V_A - V_E|}{V_E} \times 100\%$
$= \dfrac{|-8.3|}{78.3} \times 100\%$
$\approx 10.6\%$

**Example 21** Self Tutor

Alan wants to lay carpet on his 4.2 m by 5.1 m lounge room floor. He estimates the area of the lounge room by rounding each measurement to the nearest metre.

**a** Find Alan's estimate of the lounge room area.

**b** The carpet costs \$39 per square metre. Find the cost of the carpet using Alan's estimate of the area.

**c** Find the actual area of Alan's lounge room.

**d** Find the percentage error in Alan's estimation.

**e** Will Alan have enough carpet to cover his lounge room? How should he have rounded the measurements?

**a** Area $\approx 4$ m $\times 5$ m
$\approx 20$ m$^2$

**b** Cost $= 20 \times \$39$
$= \$780$

**c** Actual area $= 4.2 \times 5.1$
$= 21.42$ m$^2$

**d** Percentage error $= \dfrac{|V_A - V_E|}{V_E} \times 100\%$
$= \dfrac{|20 - 21.42|}{21.42} \times 100\%$
$\approx 6.63\%$

**e** Alan only has 20 m$^2$ of carpet, so he will not have enough to cover his lounge room. He should have rounded the measurements *up* to make sure he had enough carpet.