Unit 1 Review

Key

1. Give the number of significant figures in each of the following.

   a) 10.0005 g 6

   b) 0.003423 mm 4

   c) 2900 ft 2

   d) 8.9×10^5 L 2

2. Determine the answer for each of the following. Be sure to use the correct number of significant figures.

   a) 27.34 + 6.90 + 13.124 = 47.364 → 47.36

   b) 2.8023 − 4.762 = −1.9597 → −1.960

   c) $0.32 \times 14.50 \times 120 =$ 556.8 → 560

   d) $24.1 / 0.005 =$ 4820 → 5000

3. Convert each of the following into correct scientific notation.

   1747 1.747×10^3

   0.00000984 9.84×10^{-6}

   3200.0×10^2 3.2000×10^5

   0.002014×10^2 2.014×10^{-1}

   25600000000000000 2.56×10^{16}

4. Express the following numbers in scientific notation.

   a). 810,000 g 8.1×10^5 g

   b). 0.000634 g 6.34×10^{-4} g

   c). 60,000,000 g 6×10^7 g

5. State the number of significant digits in the following measurements.

   a). 3218 kg 4

   b). 60.080 kg 5

   c). 0.000534 kg 3

6. Add/Subtract as indicated and round the answer using the correct number of significant digits.

   a). 85.26 g + 4.7 g 89.96 → 90.0 g

   b). 1.07 km + 0.608 km 1.678 → 1.68 km

   c). 186.4 kg − 57.83 kg 128.57 → 128.6 kg

7. Multiply/Divide as indicated and round the answer using the correct number of significant digits.

a). (5,108 m)(4.2107 m) 21508.2556 → 21,510 m^2
4 5

b). (1.67×10^{-2} km)(8.5×10^{-6} km) 14.195×10^{-8} → 1.4×10^{-7} km^2
3 2

c). (2.6×10^4 cm)(9.4×10^3 cm) 24.44×10^7 → 2.4×10^8 cm^2
2 2

8. Use the following data about the distance a dog has walked away from his doghouse to make a graph using the graph paper on the following page:

Time (s)	0	5	10	15	20	25	30	35	40
Distance (m)	0	4	8	12	25	20	15	10	0

9. Based on your graph, approximately what distance is the dog from the doghouse after 17 seconds?

About 17.5 m

10. Based on your graph, approximately at what time(s) is the dog 7 m away from the doghouse?

About 8.5s and about 36.5 s

11. Use the following data about the speed a car is driving to make a graph using the graph paper on the following page:

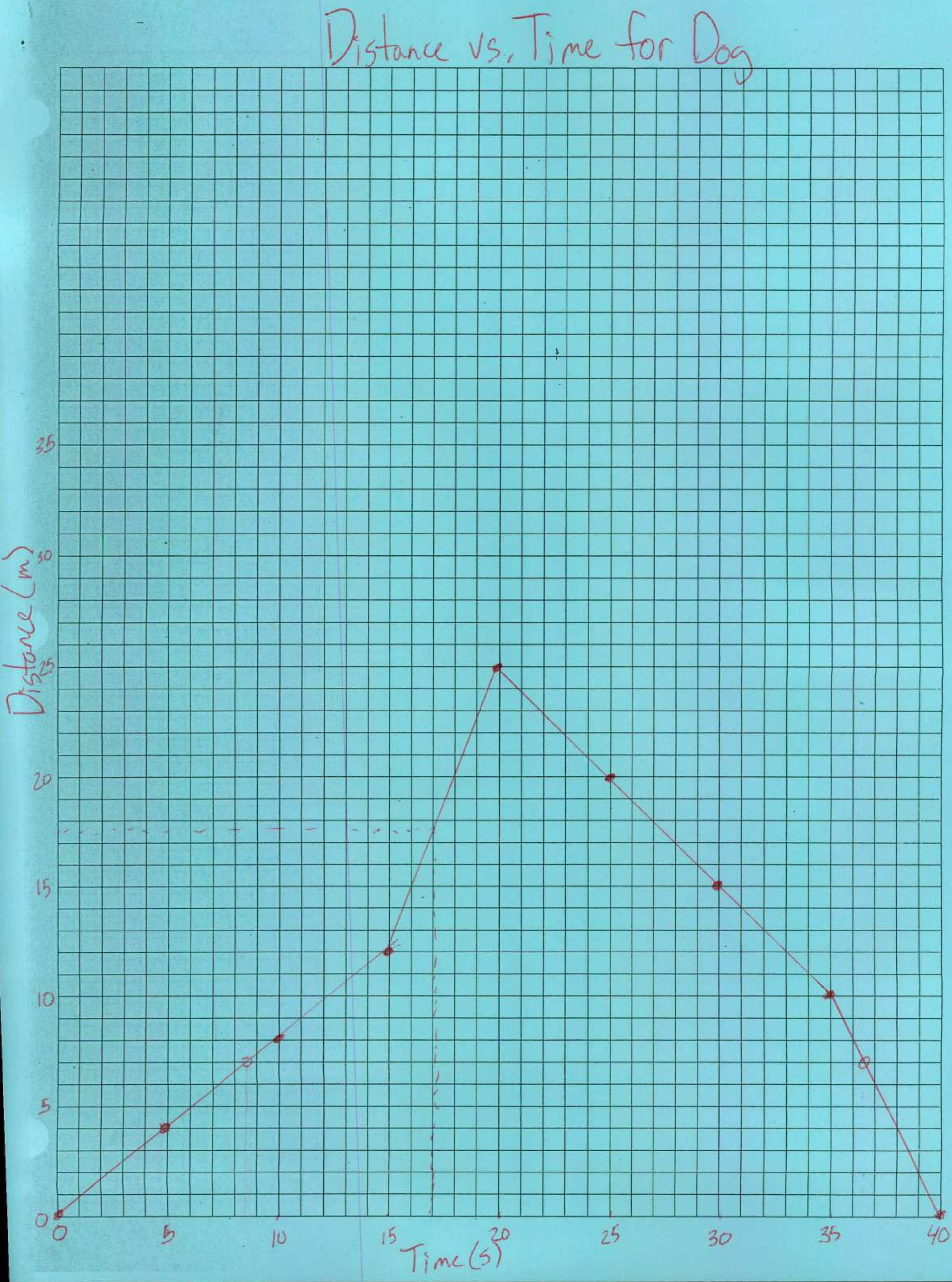
Time (s)	0	2	4	6	8	10	12	14	16
Speed (m/s)	0	7	14	21	28	35	42	42	42

12. Based on your graph, what is the slope between 0 seconds and 12 seconds? What are the units of the slope?

$\frac{42-0}{12-0}$ 3.5 m/s/s

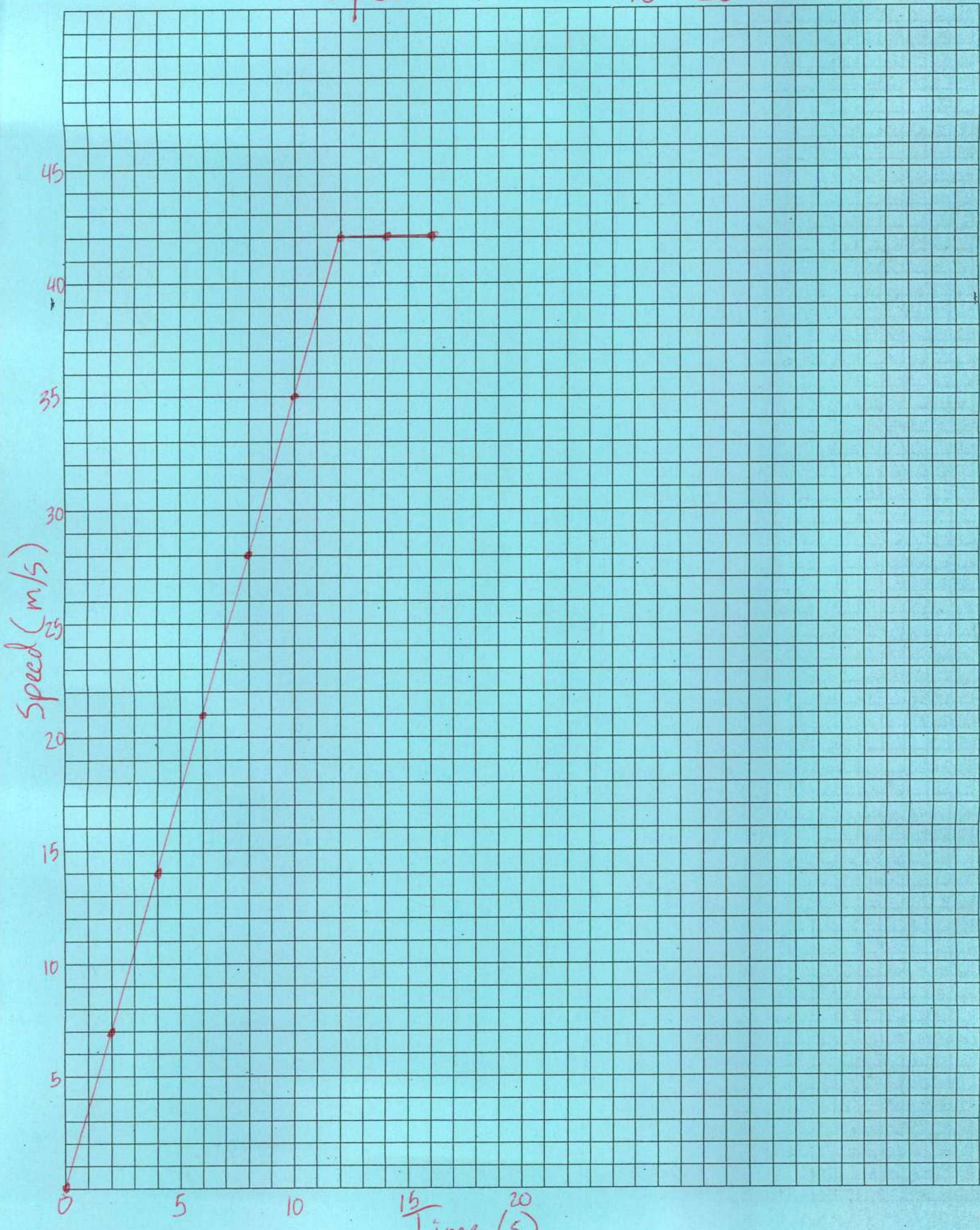
13. What happens to the speed after 12 seconds?

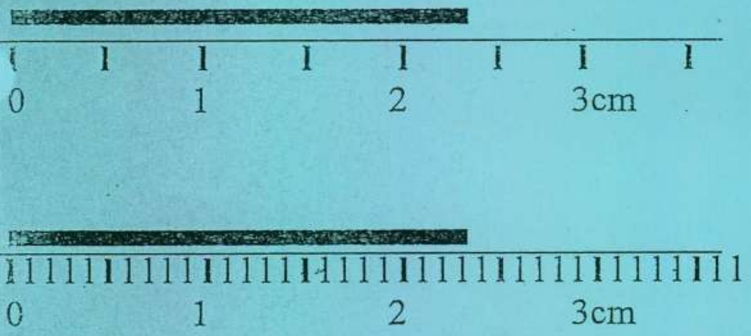
It stays at 42 m/s



Distance vs. Time for Dog
Distance (m)
Time (s)
0
5
10
15
20
25
30
35
40

Speed vs. Time for Car





14. The two lines above are identical, but are being measured with two different rulers. Write down your best report for the length of the line as measured with each ruler. Are your measurements different? If so, why?

top: 2.3 ± 0.25cm

bottom: 2.35 ± 0.05cm

They are different because the bottom ruler gives a more precise measurement.

15. Which of the above rulers would give a more accurate measurement? Why?

They seem equally accurate. Both would give the same value for a measurement, to the nearest half of a cm. Neither is more or less correct.

16. Which of the above rulers would give a more precise measurement? Why?

The bottom ruler is more precise. It can measure to the nearest tenth of a cm, rather than the nearest half cm.

17. Which of the above rulers would give you a measurement with less uncertainty? Would either measurement have no uncertainty? Could any measurement ever have zero uncertainty?

Bottom ruler would have less uncertainty, but both would still have some uncertainty. No measurement can ever have zero uncertainty.

18. Why is it important to make a measurement multiple times, rather than just measuring once?

Measuring multiple times can reduce uncertainty by taking an average.