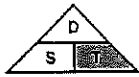


Calculate & Graph Speed, Time, Distance, & Acceleration



$$\text{Distance} = \text{Speed} \times \text{Time}$$



$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$



$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Acceleration} = \frac{\text{Change in Velocity}}{\text{Time}}$$

$$\text{Change in Velocity} = \text{Final Velocity} - \text{Initial Velocity}$$

Directions: Use the equations to answer the following questions. **SHOW YOUR WORK & INCLUDE UNITS.**

1. A football field is about 100 m long. If it takes a person 20 seconds to run its length, how fast were they running?

$$S = \frac{d}{t} = \frac{100}{20} = \boxed{5 \frac{\text{m}}{\text{s}}}$$

2. The pitcher's mound in baseball is 85 m from the plate. If it takes 4 seconds for a pitch to reach the plate, how fast is the pitch?

$$S = \frac{d}{t} = \frac{85}{4} = \boxed{21.25 \frac{\text{m}}{\text{s}}}$$

3. If you drive at 100 km/hr for 6 hours, how far will you go?

$$d = S \cdot t = 100 \frac{\text{km}}{\text{hr}} \cdot 6 = \boxed{600 \text{ km}}$$

4. If you run at 12 m/s for 15 minutes, how far will you go?

$$15 \cdot 60 = 900\text{s} \quad d = S \cdot t = 12 \cdot 900 = \boxed{10,800 \text{ m}}$$

5. Every summer, I drive home to St. Augustine, FL. It is 1,726.9 km from Austin. If I average 100 km/hr, how much time do I spend driving?

$$t = \frac{d}{S} = \frac{1726.9 \text{ km}}{100 \frac{\text{km}}{\text{hr}}} = \boxed{17.27 \text{ hr}}$$

6. If I fly home to St. Augustine, it takes 2 hours and 15 minutes. What is the average speed of the plane?

$$S = \frac{d}{t} = \frac{1726.9 \text{ km}}{2.25 \text{ hrs}} = \boxed{767.5 \frac{\text{km}}{\text{hr}}}$$

7. A bullet travels at 850 m/s. How long will it take a bullet to go 1 km?

$$1 \text{ km} = 1000 \text{ m} \quad t = \frac{d}{S} = \frac{1000 \text{ m}}{850 \frac{\text{m}}{\text{s}}} = \boxed{1.18 \text{ seconds}}$$

8. The Shanghai MagLev train is the world's fastest at 430 km/hr. If you ride for 3 hours, how far will you go?

$$d = S \cdot t = 430 \frac{\text{km}}{\text{hr}} \cdot 3 \text{ hr} = \boxed{1290 \text{ km}}$$

9. How long will it take light moving at 300,000 km/s from the sun to reach us? The average distance from the Sun to Earth is 150,000,000 km.

$$t = \frac{d}{S} = \frac{150,000,000 \text{ km}}{300,000 \frac{\text{km}}{\text{s}}} = \boxed{500 \text{ s}} = \boxed{8.33 \text{ min}}$$

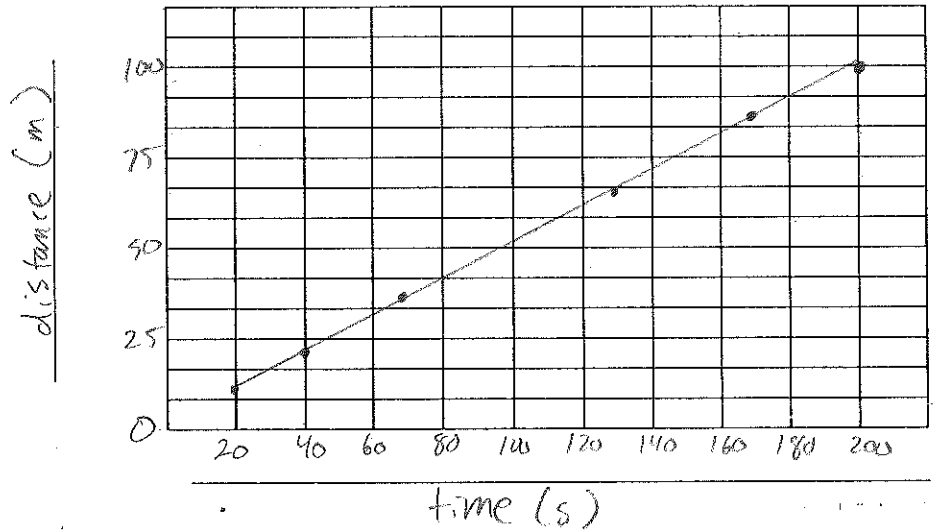
10. At the equator, the circumference of the Earth is 40,070 km. How long does it take Earth to rotate once? How fast is it rotating?

$$S = \frac{d}{t} = \frac{40,070 \text{ km}}{24 \text{ hrs}} = \boxed{1669.6 \frac{\text{km}}{\text{hr}}}$$

Graphing Practice

Graph 1: Using the data in the following table, construct a graph of distance vs. time, and then answer the questions about the graph.

Distance (m)	Time(s)
10	20
20	40
35	70
65	130
85	170
100	200



11. What does a distance vs. time graph represent?

How far an object travels at certain time intervals.

12. Does this graph represent constant or changing speed? How do you know?

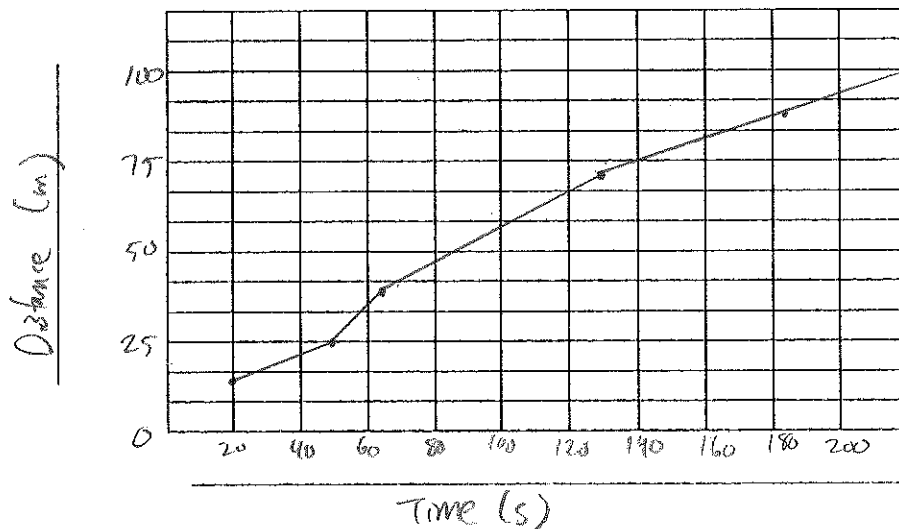
Constant, fairly straight line.

13. What is the average speed?

$$s = \frac{d}{t} = \frac{100\text{m}}{200\text{s}} = 0.5 \frac{\text{m}}{\text{s}}$$

Graph 2: Using the data in the following table, construct a graph of distance vs. time, and then answer the questions about the graph.

Distance (m)	Time (s)
15	20
25	50
40	65
70	130
90	185
100	200



14. Does this graph represent constant or changing speed? How do you know?

Changing, slope changes at multiple points.

15. Which section of the graph represents the highest speed?

Between 50 & 65 seconds because it has the steepest line.