



Interpolation: finding values between measured points

Extrapolation: finding values beyond measured points by extending the graph using a dotted line

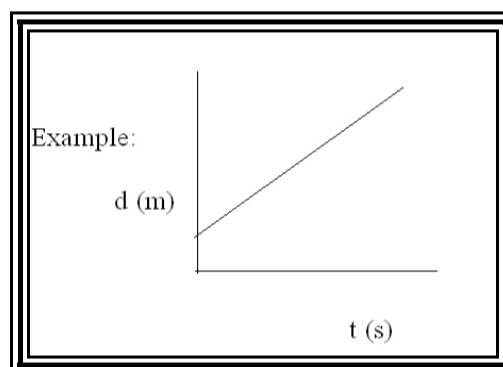
Slope : Refers to the steepness of a line. It represents a mathematical relationship between the variables, and can be calculated by

$$\text{Slope} = \frac{\text{Rise}}{\text{Run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

Types of Relationships

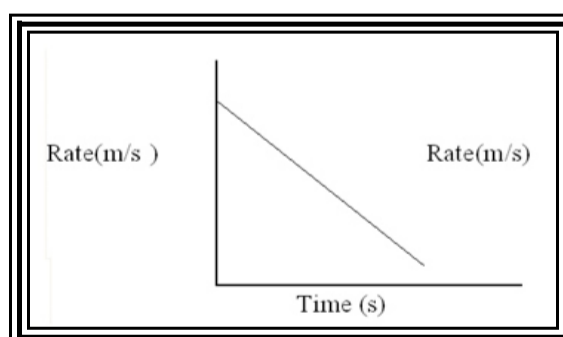
1. **Direct Proportionality** occurs when a change in the independent variable causes a corresponding change in the dependent variable, as in the case of the straight line graph.

- Written mathematically as $y \propto x$
- spoken as “y is directly proportional to x”



2. **Inverse (indirect) Proportionality** occurs when a change in the independent variable causes an inverse (or reciprocal) change in the dependent variable

- Written mathematically as $y \propto 1/x$
- spoken as “y is inversely proportional to x”



When a line of best fit is a straight line, there is a simple relationship between the two variables. This relationship can be represented by a general mathematical equation:

$$y = mx + b$$

where :

- y is the dependent variable = DISTANCE
- x is the independent variable = TIME
- m is the slope (steepness) of the line
- b is the y-intercept (i.e. where the graph crosses the y-axis)

PART A: Multiple Choice

1. Find the slope of the line that passes through the points (2,7) and (2,-6).
 - (A) 1
 - (B) 0
 - (C) undefined
 - (D) -1

2. Find the slope of the line that passes through the points (4,10) and (2,10).
 - (A) 1
 - (B) 0
 - (C) undefined
 - (D) -1

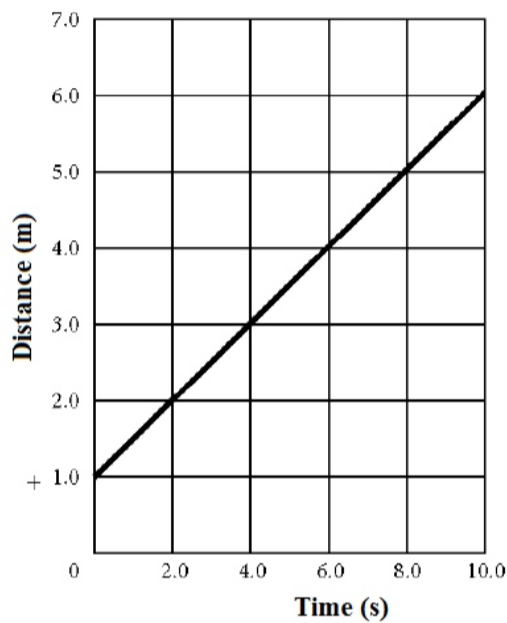
3. Find the slope of the line that (10, -1) contains and (-8, 6)
 - (A) $\frac{2}{5}$
 - (B) $-\frac{7}{18}$
 - (C) $-\frac{18}{7}$
 - (D) $\frac{5}{2}$

4. Find the slope of the line that contains (2, -10) and (-4, 2)
 - (A) $\frac{1}{4}$
 - (B) -2
 - (C) 4
 - (D) $-\frac{1}{2}$

5. Which of the following describes the y-intercept?
 - (A) Point where the graph crosses the x- axis
 - (B) Point where the graph crosses the y- axis
 - (C) Point where the graph is at the vertex
 - (D) The graph is undefined

6. Find the slope of the line that contains (-2,-2) and (-10, -9)
- (A) $\frac{8}{7}$
- (B) $\frac{11}{12}$
- (C) $\frac{12}{11}$
- (D) $\frac{7}{8}$

Use the graph below to answer questions 7-12



7. Which term would describe the mathematics relationship shown by the graph?
- (A) 0
- (B) Directly proportional
- (C) Inversely proportional
- (D) Undefined
8. What is the slope of the graph?
- (A) 0
- (B) 0.5
- (C) 1.0
- (D) 2.0
9. What are the units of the slope?
- (A) m
- (B) m/s
- (C) s
- (D) s/m
10. What is the y- intercept of the graph?
- (A) -1
- (B) 0
- (C) 1
- (D) 2

11. Using interpolation, what is the distance at 4.0 s?

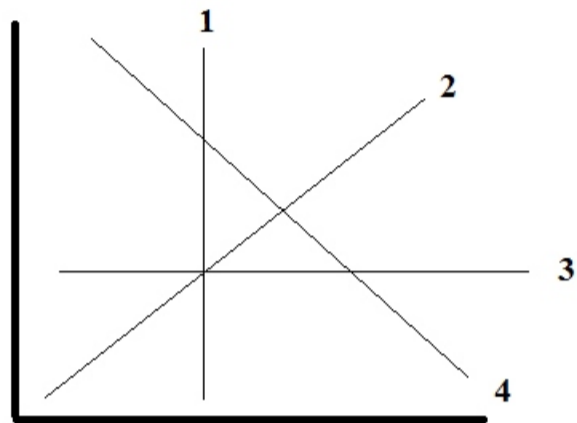
- (A) 0 m
- (B) 1.0 m
- (C) 3.0 m
- (D) 4.0 m

12. Using interpolation, at what time did the object travel 4.5 m?

- (A) 0 s
- (B) 4.4 s
- (C) 7.0 s
- (D) 10. s

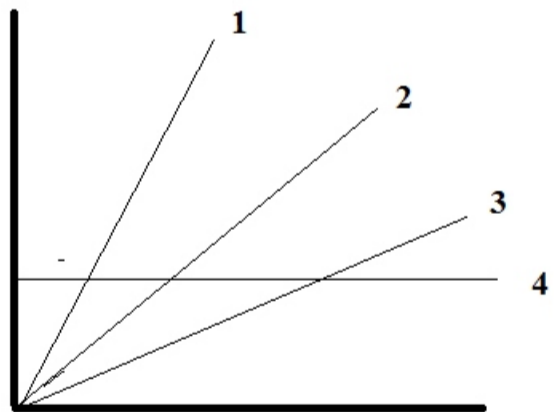
13. Which of the following lines has a negative slope?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

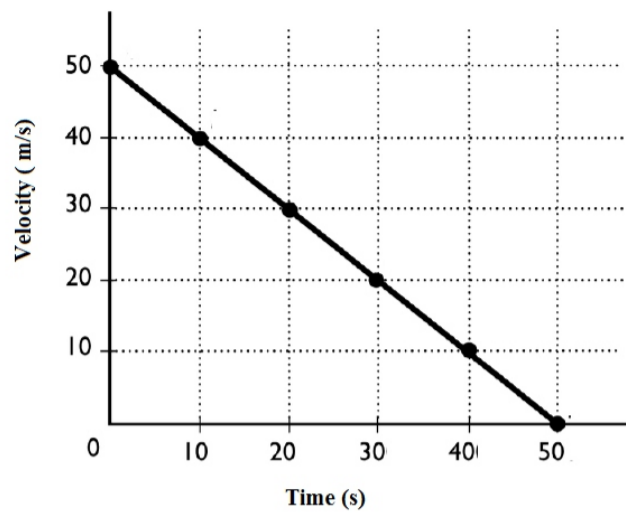


14. Which of the following lines has the greatest slope?

- (A) 1
- (B) 2
- (C) 3
- (D) 4



Use the graph below to answer questions 15-18



15. Which term would describe the mathematics relationship shown by the graph?
- (A) 0
 - (B) Directly proportional
 - (C) Inversely proportional
 - (D) Undefined
16. What is the slope of the graph?
- (A) -2.0
 - (B) -1.0
 - (C) 0
 - (D) 1.0
17. What are the units of the slope?
- (A) m
 - (B) m/s
 - (C) m/s/s
 - (D) s/m
18. What is the y- intercept of the graph?
- (A) 0
 - (B) 50
 - (C) 100
 - (D) 150
19. What is velocity of the car at 20 s?
- (A) 0 m/s
 - (B) 30 m/s
 - (C) 40 m/s
 - (D) 50 m/s
20. Which of the following best describes the slope of a line?
- (A) It is always equal to zero
 - (B) It is always undefined
 - (C) It is constant for every point on the graph
 - (D) It changes for every point on the graph