ILLAWARRA TUTORING

In this worksheet you will develop your ability to formulate the equation of a line given specific conditions. You will use techniques such as identifying the gradient and intercept, applying point-slope form and slope-intercept form, and interpreting word problems to extract the linear relationship.

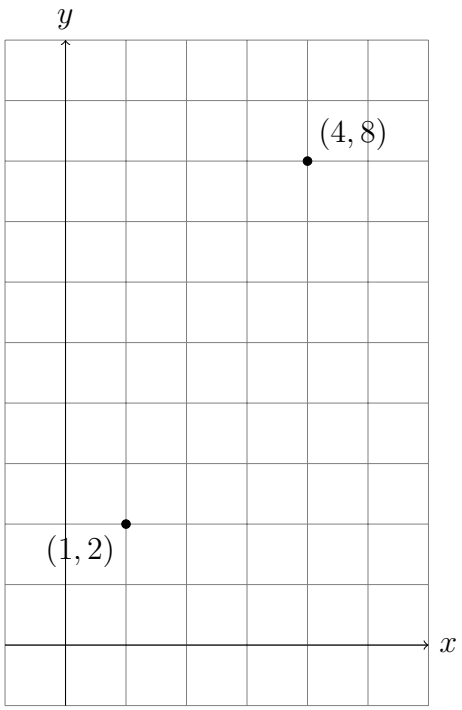
Easy Questions

1. Write the equation of the line with $m = 2$ and y-intercept $b = 3$.
2. Find the equation of the line that passes through the point $(0, -4)$ and has a gradient of 5.
3. Determine the equation of the line with gradient 1 passing through the point $(2, 3)$. Express your answer in the form $y = mx + c$.
4. For the line given by the equation $y = -3x + 2$, state the gradient and the y-intercept.
5. Find the equation of the line that has a y-intercept of 2 and passes through the point $(3, 8)$.

Intermediate Questions

6. Write the equation of the line that passes through the points $(1, 2)$ and $(3, 6)$.
7. Determine the gradient and y-intercept of the line passing through the points $(0, -1)$ and $(4, 3)$.
8. From the equation $y = \frac{2}{3}x + 5$, identify the gradient and the y-intercept.
9. Find the equation of the line with gradient -2 that passes through the point $(-1, 4)$ using the point-slope form.
10. Determine the equation of the line that goes through $(2, -3)$ and $(5, 0)$.
11. Write the equation of the line with gradient 3 that passes through the point $(0, 1)$.
12. Write the equation in point-slope form for a line with gradient -1 passing through $(6, 2)$.
13. Find the equation in slope-intercept form of the line that passes through $(3, -2)$ with a gradient of 4.

14. Refer to the diagram below and write the equation of the line that passes through the points $(1, 2)$ and $(4, 8)$.



15. Using the table below, determine the equation of the line.

x	y
0	-1
2	3
4	7

16. Convert the equation $2x - 3y = 6$ into slope-intercept form and state the gradient and y-intercept.

17. A line crosses the y-axis at $(0, 3)$ and the x-axis at $(5, 0)$. Write the equation of this line in slope-intercept form.

18. Find the equation of the line with gradient $\frac{1}{2}$ that passes through the point $(8, 1)$ using the point-slope form.

19. Determine the equation of the line with gradient -3 that passes through the point $(-2, 4)$.

20. Write the equation of the line that passes through $(10, -5)$ with gradient $-\frac{1}{2}$ using the point-slope formula.

Hard Questions

21. A taxi company charges a fixed fare of $4plus2$ per kilometre. Write the linear equation for the total cost y in terms of the distance travelled x (in kilometres).

22. A mobile phone plan has a monthly fee of $20 plus charges of $0.10 per minute of call time. Write a linear equation that relates the total bill y to the number of minutes x.

23. The temperature y (in degrees Celsius) varies linearly with time x (in hours). If at $x = 0$ the temperature is $15°$ and at $x = 6$ it is $27°$, determine the linear equation that models the temperature.

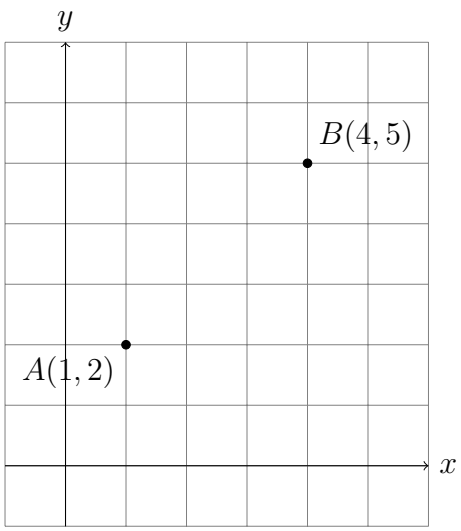
24. A car is purchased with an initial deposit of $1000 followed by monthly payments of $300. Write the linear equation that represents the total amount y paid after x months.

25. A custom printing service charges a set-up fee of $50 plus $5 per item printed. Write the linear equation relating the total cost y to the number of items x, then calculate the total cost for printing 20 items.

26. Given the equation $4y - 8x = 20$, convert it into slope-intercept form and state both the gradient and the y-intercept.

27. The following two expressions represent the equation of a line: $y = mx + c$ and $y - 3 = 2(x - 1)$. Convert the second expression into slope-intercept form and determine the values of m and c.

28. Refer to the diagram below. The points $A(1, 2)$ and $B(4, 5)$ are plotted. Write the equation of the line that passes through these two points.



29. The line through the points $(k, 2)$ and $(3, 8)$ has a gradient of 3. Find the value of k and hence determine the equation of the line.

30. The entrance fee to a theme park is \$30 and each ride costs \$4. Write a linear equation representing your total expenditure y in terms of the number of rides x. Then, calculate the total expenditure for 10 rides.