

Boost Free Lessons - Year 9 Maths

Lesson 17: The Gradient Intercept Equation

Name: _____ Grade: _____ Date: _____

Worked Example 1

State the gradient and the y-intercept of $y = 3x - 4$.

1. The equation is already in the form $y = mx + b$.
2. m is the number in front of x , so $m = 3$.
3. b is the constant on its own, so $b = -4$.
4. The y-intercept is the point where the line crosses the y-axis, which is $(0, -4)$.

$m = 3$, y-intercept $(0, -4)$

Worked Example 2

Find the equation of the line with gradient 2 that passes through $(0, -5)$.

1. Start with the general form $y = mx + b$.
2. The gradient is given, so $m = 2$.
3. The point has $x = 0$, which means it is the y-intercept, so $b = -5$.
4. Substitute both values into $y = mx + b$.

$y = 2x - 5$

Remember: $y = mx + b$, where m is the gradient and b is the y-intercept. Lines with the same gradient are parallel.



Question 1: State the gradient m and the y -intercept b for each line.

1. $y = 2x + 5$

2. $y = -3x + 1$

3. $y = x - 7$

4. $y = 4x$

5. $y = -x + 6$

6. $y = 0.5x + 3$

7. $y = 5 - 2x$

8. $y = -\frac{1}{4}x - 2$



Question 2: Write the equation of each line in the form $y = mx + b$.

1. Gradient 3, y-intercept (0, 2)

2. Gradient -2 , y-intercept (0, 5)

3. Gradient 1, passing through (0, 0)

4. Gradient $\frac{1}{2}$, y-intercept (0, -3)

5. Gradient -4 , passing through (0, 1)

6. Gradient 0, passing through (0, 6)



Question 3: Answer the following questions.

1. A line passes through (0, 3) and (2, 7). Find its equation.
2. Rearrange $2y = 6x + 8$ into gradient intercept form, then state m and b .
3. Do the lines $y = 2x + 1$ and $y = 2x - 5$ ever meet? Explain your answer.
4. A taxi fare is given by $C = 3 + 2.5k$, where k is the distance in kilometres. State the gradient and explain what it represents.
5. Find the y -intercept of $y = 7x - 12$.





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Answers: The Gradient Intercept Equation**Question 1**

1. $m = 2, b = 5$
2. $m = -3, b = 1$
3. $m = 1, b = -7$
4. $m = 4, b = 0$
5. $m = -1, b = 6$
6. $m = 0.5, b = 3$
7. $m = -2, b = 5$
8. $m = -\frac{1}{4}, b = -2$

Question 2

1. $y = 3x + 2$
2. $y = -2x + 5$
3. $y = x$
4. $y = \frac{1}{2}x - 3$
5. $y = -4x + 1$
6. $y = 6$

Question 3

1. $y = 2x + 3$
2. $y = 3x + 4$, so $m = 3$ and $b = 4$
3. No. They have the same gradient, so they are parallel and never meet.
4. The gradient is 2.5, which is the cost per kilometre travelled.
5. $(0, -12)$

