107. Understanding Parallel Line Equations

Practice Questions

1. Find the gradient of the line $y = 2x + 5$.
2. Identify a line parallel to $y = -3x + 4$.
3. Write the equation of a line parallel to $y = 4x - 2$ that passes through $(0, 5)$.
4. Is the line $y = -\frac{1}{2}x + 7$ parallel to $y = -\frac{1}{2}x - 3$? Explain why.
5. Find the gradient of the line $3y = 6x + 9$ and determine a parallel equation.
6. Write the equation of a line parallel to $y = -2x + 1$ that passes through $(3, 4)$.
7. Identify a line parallel to $y = \frac{3}{4}x - 6$.
8. Does the equation $x + 2y = 8$ have a parallel line? If so, write one.
9. Find the equation of a line parallel to $y = 5x + 2$ passing through $(-2, 6)$.
10. Write an equation of a line parallel to $y = -7x + 9$ passing through $(1, -2)$.

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Scenario Questions

1. A train moves along a track represented by the equation $y = 3x + 5$. A second train moves parallel on another track. Write an equation for the second train's path.
2. A riverbank follows the equation $y = -2x + 4$. A walkway is built parallel to it. Write an equation for the walkway if it passes through the point $(0, -1)$.
3. A company increases its profits following the equation $y = 2x + 10$. Another company follows the same trend but started with £15,000 profit. Write the equation for the second company's profits.
4. A road has a gradient of $\frac{1}{2}$ and follows the equation $y = \frac{1}{2}x - 3$. A second road is built parallel to it but passes through the point $(4, 5)$. Find the equation of the second road.
5. A telephone cable runs in a straight line following the equation $y = -\frac{3}{4}x + 2$. Another cable runs parallel to it, passing through the point $(6, 4)$. Find the equation of the second cable.
6. A hiking trail follows the equation $y = 5x - 2$. A second trail is built parallel to it and passes through the point $(1, 8)$. Write the equation of the second trail.
7. A factory produces items following the equation $y = 4x + 10$, where y is the total items produced and x is the number of hours worked. Another factory follows the same production rate but starts with 20 items already made. Write the equation for the second factory.
8. A car's fuel consumption follows the equation $y = -0.5x + 30$, where y is the fuel level in litres and x is the distance travelled in km. Another car has the same fuel consumption rate but starts with 40 litres of fuel. Write the equation for the second car.
9. A school's fundraising progress follows the equation $y = 10x + 50$, where y is the total funds raised in £ and x is the number of days. Another school follows the same trend but started with £100. Write the equation for the second school's fundraising progress.
10. A drone's flight path follows the equation $y = 2x + 8$, where y is the altitude in metres and x is the time in seconds. Another drone flies parallel to it but starts at an altitude of 12 metres. Write the equation for the second drone's flight path.

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Practice Questions

1. Gradient: 2
2. Any line with gradient -3, e.g., $y = -3x + c$
3. $y = 4x + 5$
4. Yes, both lines have the same gradient $-\frac{1}{2}$.
5. Gradient: 2, parallel equation: $y = 2x + c$
6. $y = -2x + 10$
7. Any line with gradient $\frac{3}{4}$, e.g., $y = \frac{3}{4}x + c$
8. Yes, any line of the form $x + 2y = c$
9. $y = 5x + 16$
10. $y = -7x + 5$

Scenario Questions

1. Any line with gradient 3, e.g., $y = 3x + c$
2. $y = -2x - 1$
3. $y = 2x + 15$
4. $y = \frac{1}{2}x + 3$
5. $y = -\frac{3}{4}x + 8.5$
6. $y = 5x + 3$
7. $y = 4x + 20$
8. $y = -0.5x + 40$
9. $y = 10x + 100$
10. $y = 2x + 12$