# Equation of a Line from Two Points

## Core Worksheet

---

### Worked Examples & Guided Practice

**I Do (Teacher Model)** Find the equation of the line passing through $A(1, 4)$ and $B(3, 10)$. Give your answer in the form $y = mx + c$.

**We Do (Guided Practice)** Find the equation of the line passing through $P(-2, 9)$ and $Q(4, -3)$. Give your answer in the form $y = mx + c$.

**You Do (Independent Practice)** Find the equation of the line passing through $X(-3, -7)$ and $Y(5, 5)$. Give your answer in the form $y = mx + c$.

**Challenge (Extension)** The line $L_1$ passes through $(2, -1)$ and $(6, 7)$. Line $L_2$ is perpendicular to $L_1$ and passes through $(3, 4)$. Find the equation of $L_2$ in the form $ax + by + c = 0$.

---

### Practice Perfect Questions

**Q1.** Find the equation of the line passing through $(0, 3)$ and $(4, 11)$.

**Q2.** Find the equation of the line passing through $(2, 7)$ and $(6, 1)$.

**Q3.** Find the equation of the line passing through $(-1, -4)$ and $(3, 8)$.

**Q4.** Find the equation of the line passing through $(-4, 10)$ and $(2, -2)$.

**Q5.** A line passes through $(1, 5)$ and $(5, 5)$. State its equation and describe its gradient.

**Q6.** Find the equation of the line passing through $(-2, 3)$ and $(4, 6)$, giving your answer in the form $ax + by + c = 0$, where $a, b, c$ are integers.

## Answers & Worked Solutions

### Model Solutions

- **I Do:** $m = \dfrac{10-4}{3-1} = 3 \implies y = 3x+c$. Substitute $(1,4) \implies 4 = 3(1)+c \implies c = 1 \implies y = 3x+1$
- **We Do:** $m = \dfrac{-3-9}{4-(-2)} = -2 \implies y = -2x+c$. Substitute $(-2,9) \implies 9 = -2(-2)+c \implies c = 5 \implies y = -2x+5$
- **You Do:** $m = \dfrac{5-(-7)}{5-(-3)} = \dfrac{12}{8} = 1.5 \implies y = 1.5x+c$. Substitute $(5,5) \implies 5 = 1.5(5)+c \implies c = -2.5 \implies y = 1.5x-2.5$
- **Challenge:** $m_1 = \dfrac{7-(-1)}{6-2} = 2 \implies m_2 = -\dfrac{1}{2}$. $y-4 = -\dfrac{1}{2}(x-3) \implies 2y-8 = -x+3 \implies x+2y-11 = 0$

### Practice Perfect Questions Solutions

**Q1.** $m = 2 \implies y = 2x+3$

**Q2.** $m = -\dfrac{3}{2} \implies y = -1.5x+10$

**Q3.** $m = 3 \implies y = 3x-1$

**Q4.** $m = -2 \implies y = -2x+2$

**Q5.** Gradient $m = 0$. Equation is $y = 5$ (horizontal line).

**Q6.** $m = \dfrac{6-3}{4-(-2)} = \dfrac{1}{2} \implies y = 0.5x+4 \implies x-2y+8 = 0$