Get Ready

Solving Equations

You can use opposite operations to isolate a variable in an equation.

1. Solve each equation.

a) $3x + 2 = 14$

b) $7y - 5 = 2y + 10$

c) $\frac{1}{4}z = \frac{1}{3}z - 2$

d) $\sqrt{t} = 0.5$

2. Convert each equation to the form $y = mx + b$.

a) $x - y + 2 = 0$

b) $3x + y - 5 = 0$

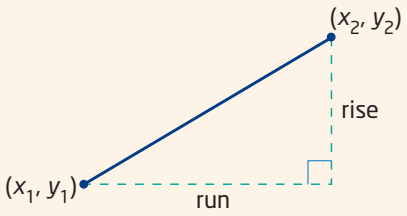
c) $2x - 4y + 7 = 0$

d) $\frac{1}{2}x - 3y + 5 = 0$

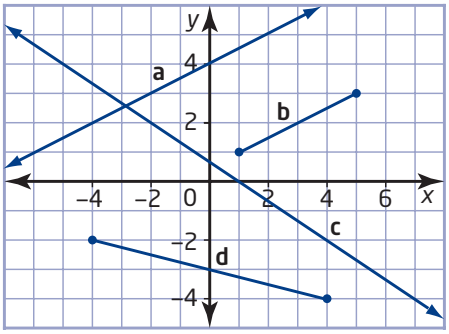
Slope of a Line

You can determine the slope, m, of a line from the coordinates of any two points, (x_1, y_1) and (x_2, y_2), on the line:

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$



3. Find the slope of each line or line segment.



4. Find the slope of the line through each pair of points.

a) (4, 6) and (12, 10)

b) (−4, 6) and (12, 2)

c) (−5, −4) and (3, −8)

d) (2.5, 6.4) and (9.8, 7.6)

Equation for a Line

- If you know the slope and y-intercept of a line, substitute these values directly into $y = mx + b$ to get an equation for the line.
- If you know the slope and the coordinates of a point on the line, substitute into $y = mx + b$ and solve for the y-intercept, b.
- If you know the coordinates of two points on the line, use these coordinates to calculate the slope. Then, use the slope and the coordinates of either point to solve for the y-intercept, b.

5. Find an equation for the line that

a) has slope -2 and y-intercept 4

b) has slope $\frac{2}{7}$ and y-intercept -14

c) has slope 4 and passes through (6, 3)

d) has slope $-\frac{1}{2}$ and passes through $(-2, 4)$

6. Find an equation for the line that passes through each pair of points.

a) A(1, 1) and B(5, 9)

b) C$(-1, 1)$ and D$(-3, -2)$

c) E$(-4, 1)$ and F(2, 4)

d) G$(5, -8)$ and H$(-1, 4)$

Parallel and Perpendicular Lines

- Parallel lines have equal slopes: $m_1 = m_2$.
- The slopes of perpendicular lines are negative reciprocals of each other: $m_2 = -\frac{1}{m_1}$.

7. Find the slope of a line with each property.

a) parallel to the line defined by $y = 3x + 16$

b) parallel to the line defined by $y = -\frac{1}{6}x + 5$

c) perpendicular to the line defined by $y = -4x - 7$

d) perpendicular to the line defined by $y = \frac{3}{4}x + 8$

8. Find an equation for the line that

a) is parallel to the line defined by $y = -3x + 1$ and passes through A$(-3, 5)$

b) is perpendicular to the line defined by $y = -\frac{3}{2}x - \frac{1}{2}$ and passes through B(2, 3)

c) is parallel to the line defined by $y = -\frac{3}{4}x - \frac{1}{2}$ and passes through C$(-5, 1)$

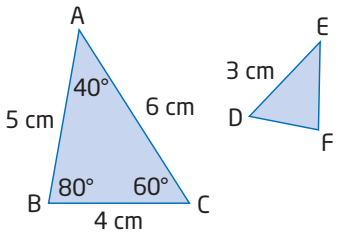
Similar and Congruent Triangles

- Similar geometric figures have the same shape but may differ in size.
- Congruent geometric figures have exactly the same shape and size.

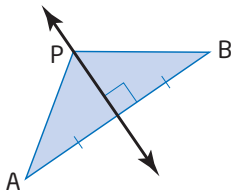
9. $\triangle ABC$ is similar to $\triangle EFD$.

a) Find the measure of $\angle D$.

b) Find the length of side EF.



10. Use congruent triangles to show that any point on the **right bisector** of a line segment is the same distance from both endpoints.



Get Ready

1. **a)** 4 **b)** 3 **c)** 24 **d)** 0.25

2. **a)** $y = x + 2$ **b)** $y = -3x + 5$

c) $y = \frac{1}{2}x + \frac{7}{4}$ **d)** $y = \frac{1}{6}x + \frac{5}{3}$

3. **a)** $\frac{1}{2}$ **b)** $\frac{1}{2}$ **c)** $-\frac{2}{3}$ **d)** $-\frac{1}{4}$

4. **a)** $\frac{1}{2}$ **b)** $-\frac{1}{4}$ **c)** $-\frac{1}{2}$ **d)** $\frac{12}{73}$

5. **a)** $y = -2x + 4$ **b)** $y = \frac{2}{7}x - 14$

c) $y = 4x - 21$ **d)** $y = -\frac{1}{2}x + 3$

6. **a)** $y = 2x - 1$ **b)** $y = \frac{3}{2}x + \frac{5}{2}$

c) $y = \frac{1}{2}x + 3$ **d)** $y = -2x + 2$

7. **a)** 3 **b)** $-\frac{1}{6}$ **c)** $\frac{1}{4}$ **d)** $-\frac{4}{3}$

8. **a)** $y = -3x - 4$ **b)** $y = \frac{2}{3}x + \frac{5}{3}$

c) $y = -\frac{3}{4}x - \frac{11}{4}$

9. **a)** 60° **b)** 2.5 cm

10. If P is any point on the right bisector of line segment AB and Q is the point of intersection of AB and the right bisector, then AQ = QB and $\angle PQA = \angle PQB = 90°$. Side PQ is common to $\triangle PQA$ and $\triangle PQB$. Therefore, $\triangle PQA$ is congruent to $\triangle PQB$ (side-angle-side). PA and PB are corresponding sides, so PA = PB.