

Points, Lines, Planes, and Angle Relationships: math practice, Grade 10 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Point, line, or plane?

★ ★ ★

For each object, say whether it is best modeled by a point, a line, or a plane.

- a. A dot marking a city on a map
- b. A perfectly straight road that continues forever in both directions
- c. The flat surface of a calm lake, imagined to extend forever
- d. The tip of a sharpened pencil
- e. A huge sheet of glass with no edges

2 Adding two segments

★ ★ ★

Point Q is between P and R . If $PQ = 14.5$ cm and $QR = 9.3$ cm, find PR .

3 Midpoint on a number line

★ ★ ★

A segment on a number line has endpoints at -6 and 10 . Find its length and its midpoint.

4 Complement and supplement



An angle measures 37° . Find the measure of its complement and of its supplement.

5 Vertical angles



Two lines intersect. One of the four angles measures 48° . Find the other three.

6 A linear pair



Two angles form a linear pair. One measures x° and the other measures $(x + 30)^\circ$. Find both angles.

7 Angle addition



Ray OB lies inside the right angle $\angle AOC$. If $m\angle AOB = 28^\circ$, find $m\angle BOC$.

8 Segment addition with algebra



Point M is between L and N . $LM = (3x + 2)$, $MN = (2x + 7)$ and $LN = 44$, all in centimeters. Find x , then LM and MN .

9 Midpoint and distance



Let $A(-3, 8)$ and $B(9, -2)$. Find the midpoint of $\overline{AB}$ and the exact length AB , then round the length to the nearest hundredth.

10 Find the other endpoint



The midpoint of $\overline{AB}$ is $M(4, -1)$ and one endpoint is $A(7, 2)$. Find B .

11 Bisector equation



Ray BD bisects $\angle ABC$. $m\angle ABD = (4x + 3)^\circ$ and $m\angle DBC = (6x - 17)^\circ$. Find x and $m\angle ABC$.

12 Supplement equals three complements



The supplement of an angle is exactly three times its complement. Find the angle.

13 Vertical angles with variables



Two lines intersect. Two vertical angles measure $(5x - 12)^\circ$ and $(3x + 20)^\circ$. Find x , the measure of these angles, and the measure of each of the other two angles.

14 True or false?



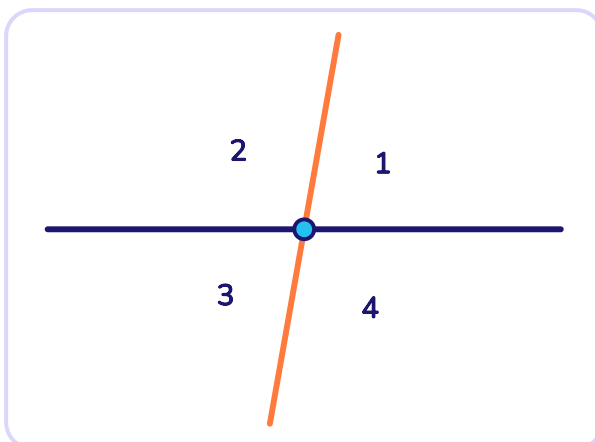
Decide whether each statement is true or false. Justify with a reason or a counterexample.

- If two angles are supplementary, they form a linear pair.
- Vertical angles are always congruent.
- Every segment has exactly one midpoint.

15 Intersecting lines



Two lines intersect, forming $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$ in order around the point. $\angle 1$ and $\angle 2$ form a linear pair with $m\angle 1 = (2x + 10)^\circ$ and $m\angle 2 = (3x - 5)^\circ$.



Find x and the measures of all four angles.

16 A hiking map



On a trail map, one unit on each axis is 1 mile. The trailhead is at $T(2, 3)$ and the cabin is at $C(14, 12)$. The hikers plan to rest at the midpoint of the straight path from T to C .

- Find the coordinates of the rest stop.
- Find the straight-line distance from the trailhead to the cabin in miles, and convert it to kilometers (1 mile $\approx$ 1.609 km).

17 Four points on a fence



Points A , B , C , D lie in this order along a straight fence. $AB = 2x$, $BC = (x + 3)$, $CD = (3x - 1)$ and $AD = 50$ feet.

- Find x and the length of each section.
- The midpoint of $\overline{AD}$ lies on which section? How far is it from B ?

18 Three adjacent angles



Rays OB and OC lie inside $\angle AOD$, which measures 150° . $m\angle AOB = x^\circ$, $m\angle BOC = (2x + 10)^\circ$ and $m\angle COD = (3x - 4)^\circ$.

- Find x and each angle.
- Does the bisector of $\angle AOD$ lie between OB and OC ? Explain.

19 Proof: vertical angles



Two lines intersect and form $\angle 1$, $\angle 2$, $\angle 3$ in order (so $\angle 1$ and $\angle 3$ are vertical angles). Complete a two-column proof that $m\angle 1 = m\angle 3$.

20 Bisectors of a linear pair



Two angles form a linear pair. A ray bisects each of them. Show that the two bisectors are perpendicular. Then check with a linear pair of 50° and 130° .

21 Endpoint and length



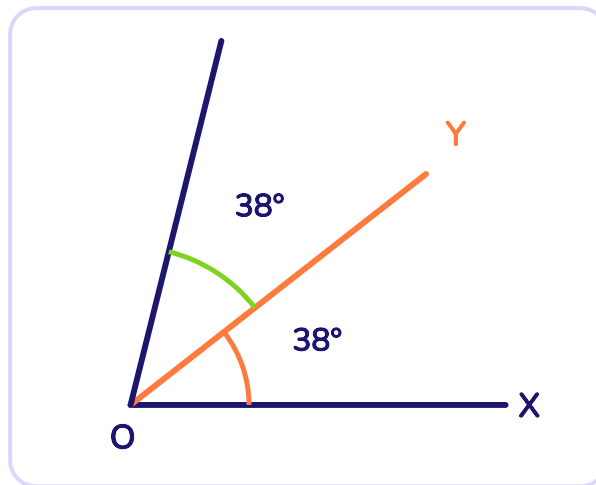
The midpoint of $\overline{PQ}$ is $M(-1.5, 4)$ and $P(-5, 7)$. Find Q and the length PQ to the nearest hundredth.

22

Why does the construction work?

★★★

Describe how to bisect $\angle ABC$ with a compass and straightedge, then explain why the ray you draw really splits the angle into two equal angles.



(The figure shows a finished bisector for reference.)

**Test yourself: quick challenge for Grade 10**[Change level](#)

Level : **Grade 10**

6 random questions, instant feedback.

**Start the challenge****Speed drill for Grade 10: how many in 60 seconds?**

Keep exploring with Zyro

Practice solutions

Points, Lines, Planes, and Angle Relationships: practice solutions, Grade 10

Math lessons

Points, Lines, Planes, and Angle Relationships: math lesson, Grade 10

Math quizzes

Points, Lines, Planes, and Angle Relationships: math quiz, Grade 10

Practice solutions

Reasoning and Proof: practice solutions, Grade 10

✓ **Practice solutions**

Parallel and Perpendicular Lines:
practice solutions, Grade 10

■ **Math lessons**

Reasoning and Proof: math lesson,
Grade 10

Zyro vous emmène sur nos sites partenaires

Embarquez pour d'autres planètes du savoir et leurs applis.

Décollage