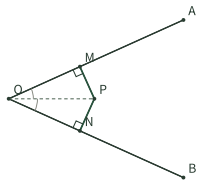
Angle bisectors: perpendicular distances and the forward proof

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Worked example 1

OP bisects ∠AOB. P is inside the angle, PM⊥OA and PN⊥OB. Prove PM=PN using congruent triangles.

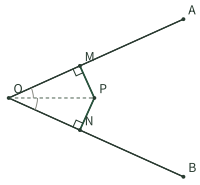


Geometry diagram; not drawn to scale except for construction tasks.

Guided attempt 2

OP bisects ∠AOB, P is inside the angle, PM⊥OA and PN⊥OB. Complete the proof table without using PM=PN as an input.

1. ∠OMP=∠___=90° because ___.
2. ∠MOP=∠___ because ___.
3. ___=___ is common, so △OPM≅△OPN by ___.
4. Therefore ___=___, by ___.

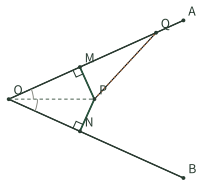


Geometry diagram; not drawn to scale except for construction tasks.

Prerequisite 3

M,Q lie on OA. PM⊥OA, while PQ is oblique. Which segment measures the distance from P to OA?

A. PQ
B. OM
C. PM
D. OP

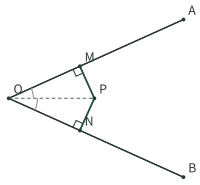


Geometry diagram; not drawn to scale except for construction tasks.

Prerequisite 4

OP bisects ∠AOB=64°. Find ∠AOP.

A. 64°
B. 90°
C. 128°
D. 32°



Geometry diagram; not drawn to scale except for construction tasks.

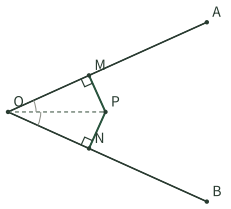
Angle bisectors: perpendicular distances and the forward proof

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Independent practice 5

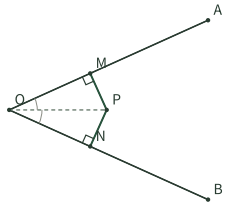
P lies on the internal bisector of ∠AOB; PM⊥OA and PN⊥OB. If PM=6.4 cm, find PN and name the property.



Geometry diagram; not drawn to scale except for construction tasks.

Independent practice 6

OP is the internal bisector of ∠AOB=74°. Find ∠PON.

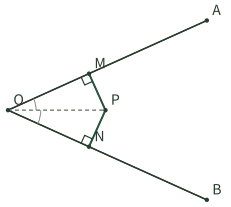


Geometry diagram; not drawn to scale except for construction tasks.

Independent practice 7

P lies on the internal bisector; PM⊥OA and PN⊥OB. PM=2x+1 cm and PN=3x−2 cm. Find x and check that both lengths are positive.

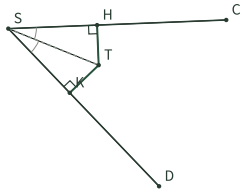
$$2x + 1 = 3x - 2$$



Geometry diagram; not drawn to scale except for construction tasks.

Independent practice 8

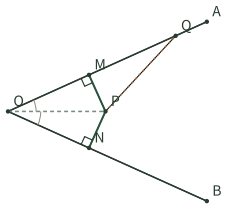
ST bisects ∠CSD and T is inside the angle. TH⊥SC and TK⊥SD. Prove TH=TK; choose the triangles yourself.



Geometry diagram; not drawn to scale except for construction tasks.

Exit question 9

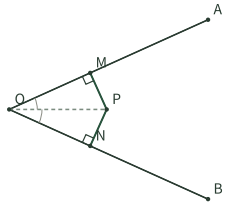
P lies on the angle bisector and PN⊥OB. Someone gives PQ=3 cm, where Q lies on OA but PQ is not perpendicular to OA. Must PN=3 cm? Explain.



Geometry diagram; not drawn to scale except for construction tasks.

Exit question 10

A lamp P stands inside the angle formed by two straight paths, on their internal angle bisector. Its shortest distance to the first path is 9 m. Find its shortest distance to the second path.



Geometry diagram; not drawn to scale except for construction tasks.