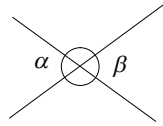


平面図形の基本性質の確認

1. 対頂角

対頂角は等しい

$$\alpha = \beta$$

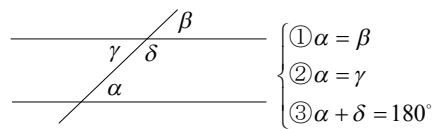


2. 平行線と角

2直線が平行 \Leftrightarrow ① 同位角は等しい

② 錯角は等しい

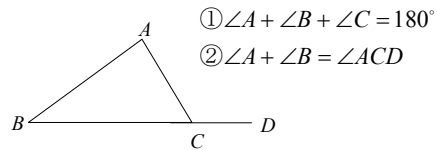
③ 同側内角の和は 180°



3. 三角形の内角と外角

① 内角の和は 180°

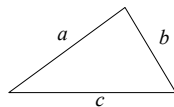
② 外角は隣接しない内角の和に等しい



4. 三角形の3辺の長さの性質

1つの三角形において

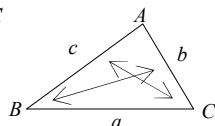
$$|a-b| < c < a+b$$



5. 三角形の辺と角の大小関係

1つの三角形において

$$b > c \Leftrightarrow \angle B > \angle C$$

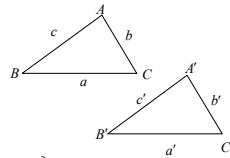


6. 三角形の合同条件

① 3辺相等

② 2辺夾角相等

③ 2角夾辺相等



$$a = a', b = b', c = c'$$

$$a = a', c = c', \angle B = \angle B'$$

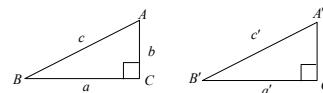
$$a = a', \angle B = \angle B', \angle C = \angle C'$$

$$\left. \begin{array}{l} \\ \\ \end{array} \right\} \triangle ABC \cong \triangle A'B'C'$$

7. 直角三角形の合同条件

① 斜辺と1つの鋭角がそれぞれ等しい

② 斜辺と他の1辺がそれぞれ等しい

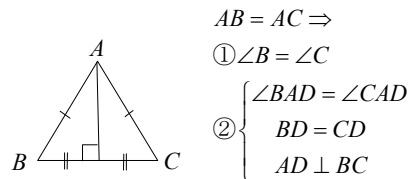


$$\left. \begin{array}{l} \textcircled{1} c = c', \angle A = \angle A' \\ \textcircled{2} c = c', a = a' \end{array} \right\} \triangle ABC \cong \triangle A'B'C'$$

8. 二等辺三角形の性質

① 両底角が等しい

② 頂点の二等分線と底角の垂直二等分線は一致する



$$AB = AC \Rightarrow$$

$$\textcircled{1} \angle B = \angle C$$

$$\textcircled{2} \begin{cases} \angle BAD = \angle CAD \\ BD = CD \\ AD \perp BC \end{cases}$$

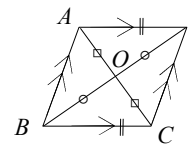
9. 平行四辺形の性質

① 2組の向かい合う辺はそれぞれ等しい

② 1組の向かい合う辺が平行で等しい

③ 2組の向かい合う角はそれぞれ等しい

④ 対角線は互いに他を2等分する



$$\textcircled{1} AB = DC, AD = BC$$

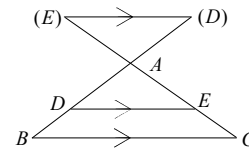
$$\textcircled{2} AD \parallel BC, AD = BC$$

$$\textcircled{3} \angle A = \angle C, \angle B = \angle D$$

$$\textcircled{4} AO = CO, BO = DO$$

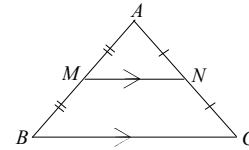
10. 三角形の辺と平行線

$$DE \parallel BC \Leftrightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$$



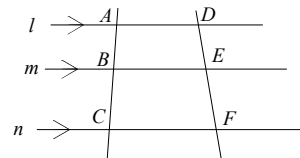
11. 中点連結定理

$$AM = MB, AN = NC \Rightarrow MN \parallel BC, MN = \frac{1}{2} BC$$



12. 平行線と比

$$l \parallel m \parallel n \Rightarrow \frac{AB}{AC} = \frac{DE}{DF}, \frac{AB}{BC} = \frac{DE}{EF}$$

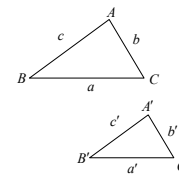


13. 三角形の相似

① 2角相等

② 2辺の比と夾角相等

③ 3辺の比の相等



$$\angle A = \angle A', \angle B = \angle B'$$

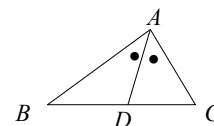
$$b : c = b' : c', \angle A = \angle A'$$

$$a : a' = b : b' = c : c'$$

$$\left. \begin{array}{l} \\ \\ \end{array} \right\} \triangle ABC \sim \triangle A'B'C'$$

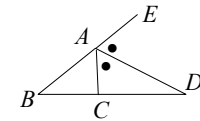
14. 内角の二等分線

$$\angle BAD = \angle CAD \Leftrightarrow \frac{BD}{DC} = \frac{AB}{AC}$$



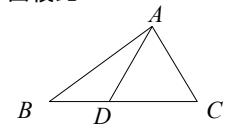
15. 外角の二等分線

$$\angle CAD = \angle EAD \Leftrightarrow \frac{BD}{DC} = \frac{AB}{AC}$$



16. 等高な三角形の面積比

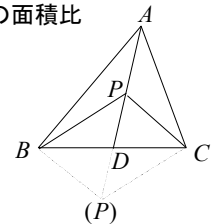
$$\frac{\triangle ABD}{\triangle ADC} = \frac{BD}{DC}$$



17. 底辺共通な三角形の面積比

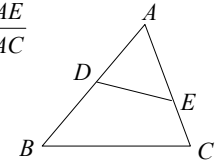
$$\frac{\triangle PBC}{\triangle ABC} = \frac{PD}{AD}$$

$$\frac{\triangle PAB}{\triangle PAC} = \frac{BD}{CD}$$



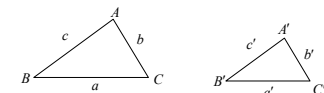
18. 1つの角が等しい三角形の面積比

$$\frac{\triangle ADE}{\triangle ABC} = \frac{AD}{AB} \cdot \frac{AE}{AC}$$



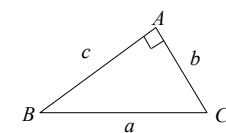
19. 相似形の面積比

$$\triangle ABC \sim \triangle A'B'C' \Rightarrow \frac{\triangle A'B'C'}{\triangle ABC} = \left(\frac{A'B'}{AB}\right)^2$$



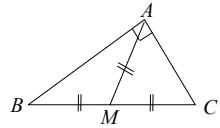
20. 三平方の定理

$$\angle A = 90^\circ \Rightarrow AB^2 + AC^2 = BC^2$$



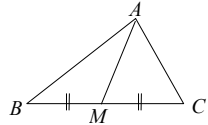
21. 直角三角形の性質

$$\angle A = 90^\circ \Rightarrow AM = BM = CM$$



22. 中線定理

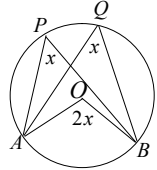
$$BM = MC \Rightarrow AB^2 + AC^2 = 2(AM^2 + BM^2)$$



23. 円周角の定理

1つの弧に対する

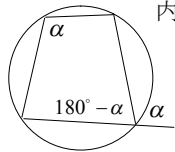
- ① 円周角は等しい
- ② 円周角は中心角の半分の大きさ



24. 円に内接する四角形

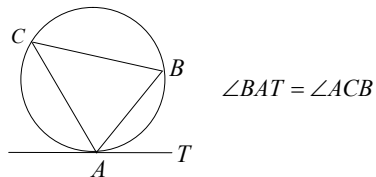
四角形は円に内接する \Leftrightarrow ① 対角の和が 180°

- ② 1つの外角が、それと隣り合う内角の対角に等しい



25. 接弦定理

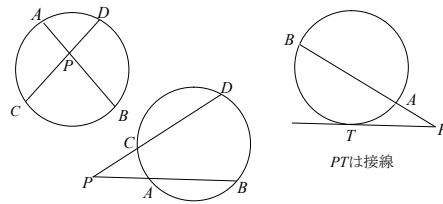
円周上の点 A における接線と弦 AB の作る角は、弧 AB の上に立つ円周角に等しい



26. 方べきの定理

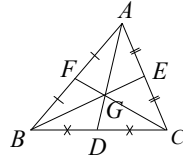
$$PA \cdot PB = PC \cdot PD$$

$$PA \cdot PB = PT^2$$



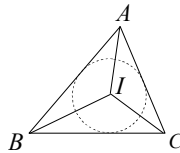
27. 重心

- ① 3つの中線の交点
- ② 各中線を 2:1 に内分する



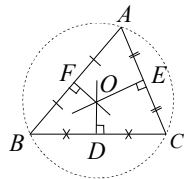
28. 内心

- ① 各頂点の内角の二等分線の交点
- ② 内接円の中心



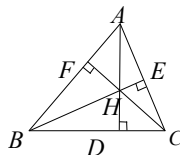
29. 外心

- ① 各辺の垂直二等分線の交点
- ② 外接円の中心



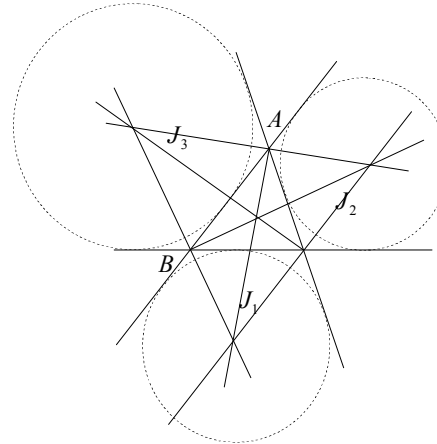
39. 垂心

各頂点から辺への垂線の交点



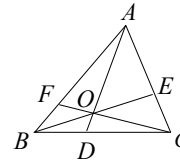
31. 傍心

- ① 1つの内角の二等分線と他の2つの外角の二等分線の交点
- ② 傍心円の中心



32. チェバの定理

$$\frac{AF}{FB} \cdot \frac{BD}{DC} \cdot \frac{CE}{EA} = 1$$



33. メネラウスの定理

$$\frac{BD}{DC} \cdot \frac{CE}{EA} \cdot \frac{AF}{FB} = 1$$

