Plane geometry
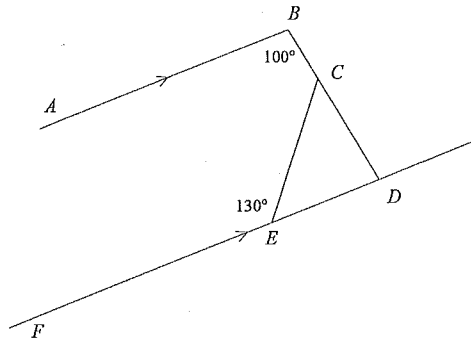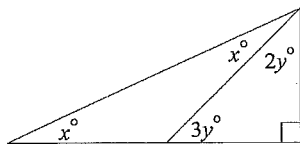
Solutions   Main Menu

95 In the diagram below, AB is parallel to FD, $\angle ABC = 100°$ and $\angle CEF = 130°$

What is the value of $\angle BCE$?
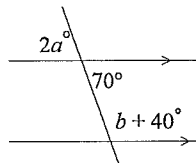
(A) 100°   (B) 110°

(C) 120°   (D) 130°

96

What is the value of x?

(A) 18°   (B) 27°

(C) 36°   (D) 45°

97

What are the values of a and b?

(A) $a = 35°, b = 30°$ (B) $a = 35°, b = 70°$
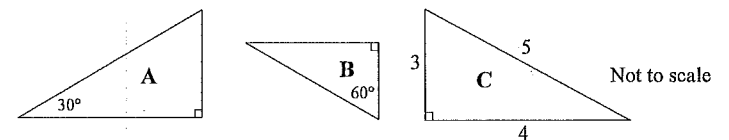
(C) $a = 70°, b = 30°$ (D) $a = 70°, b = 70°$

98 The sum of the interior angles of a regular polygon is 2520°. What is the size of each interior angle?

(A) 140°30'

(B) 157°30'

(C) 210°

(D) 315°

99 Which of the following is *not* a property of a rectangle?

(A) All angles are equal.

(B) Adjacent sides are equal.
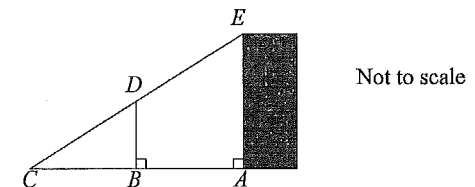
(C) Diagonals bisect each other.

(D) Diagonals are equal.

100

Which of the following statements is correct?

(A) Triangle A is similar to Triangle B

(B) Triangle A is similar to Triangle C

(C) Triangle C is similar to Triangle B

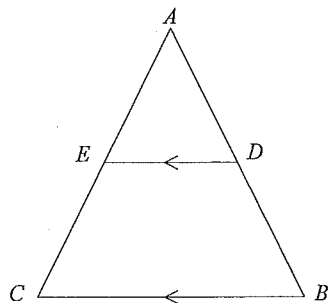(D) Triangle A, B and C are all similar

101 In the diagram, $\triangle ACE$ is similar to $\triangle BCD$, $AE = 12$, $BD = 4$ and $BC = 6$.

What is the value of AB?
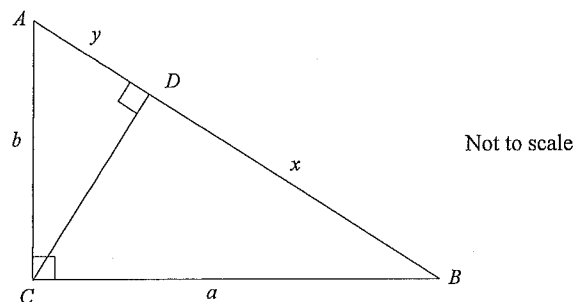
(A) 8 cm   (B) 10 cm

(C) 12 cm   (D) 18 cm

102 In the diagram below, ABC is a triangle and DE is parallel to BC.

Given that $AD = 2$, $BD = 5$ and $DE = 1.5$, what is the value of BC?

(A) 4.00

(B) 5.25

(C) 7.50

(D) 9.33

103 Let $BC = a$, $AC = b$, $BD = x$ and $AD = y$. Triangle ADC is similar to triangle ABC.

Not to scale

Which of the following statements is correct?

(A) $\dfrac{b}{y} = \dfrac{a}{x}$

(B) $\dfrac{b}{y} = \dfrac{x+y}{a}$

(C) $\dfrac{b}{y} = \dfrac{x+y}{b}$

(D) $\dfrac{b}{y} = \dfrac{a}{b}$

104 In the diagram below $BE = 3$ cm, $AE = BD = x$, $DC = 11x$ and $\angle BDE = \angle BAC$.
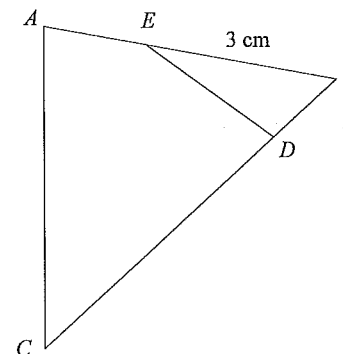
What is the value of x?

(A) $\dfrac{1}{2}$

(B) $\dfrac{3}{4}$

(C) 1

(D) $1\dfrac{1}{2}$

105 Which test proves $\triangle ABD \equiv \triangle BCD$?

Not to scale
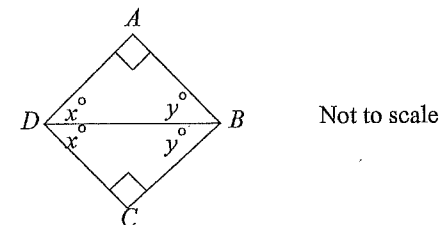
(A) AAA

(B) AAS

(C) SAS

(D) RHS

106 In the diagram below $PQRS$ is parallelogram and $PA = BR$.
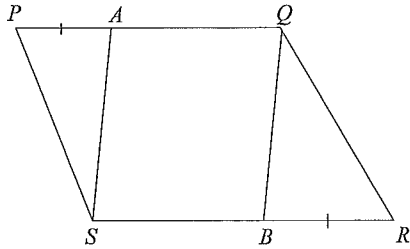
Which test proves $\triangle PAS \equiv \triangle QRS$?

(A) AAA

(B) AAS

(C) SAS

(D) RHS

107 In the diagram below, $ABCD$ is a square. X, Y and Z are points on sides AB, BC and CD respectively such that $XB = YC = ZD$.

Which test proves $\triangle BXY \equiv \triangle CYZ$?

(A) AAA

(B) AAS

(C) SAS

(D) RHS

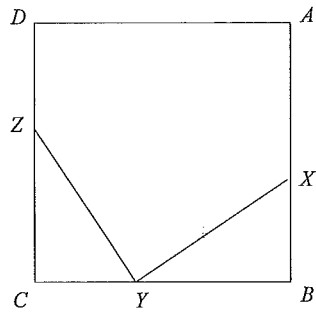| Plane geometry		Main Menu
	Solution	**Criteria**
95	$\angle CDE + 100 = 180$ (co-interior angles supplementary *AB//FD*) $\angle CDE = 80$ $\angle CED + 130 = 180$ (*FD* is a straight line and measures 180°) $\angle CED = 50$ $\angle BCE = \angle CED + \angle CDE$ (exterior angle theorem) $\angle BCE = 50 + 80$ $\quad\quad\quad = 130$	1 Mark: D
96	$2y + 3y + 90 = 180$ (angle sum of a triangle is 180) $\quad\quad 5y = 90$ $\quad\quad\quad y = 18$ $x + x = 3y$ (exterior angle theorem) $\quad 2x = 3 \times 18$ $\quad\quad x = 27$	1 Mark: B
97	$2a = 70$ (vertically opposite angles are equal) $\quad a = 35$ $(b + 40) + 70 = 180$ (co-interior angles are supplementary) $\quad\quad\quad b = 70$	1 Mark: B
98	To calculate the number of sides (angles) $2520 = (2n - 4) \times 90°$ $\quad 28 = 2n - 4$ $\quad\quad n = 16$ Interior angle $= \dfrac{2520}{16} = 157.5 = 157°30'$	1 Mark: B
99	Adjacent sides are equal is not a property of a rectangle.	1 Mark: B
100	Triangles A and B have matching angles. Triangle C does not have matching angles. (Use trigonometry to check - $\tan\theta = \dfrac{3}{4}$) $\quad\quad\quad \theta = 36.9°$	1 Mark: A
101	Corresponding sides are in proportion with similar triangles. $\dfrac{AC}{6} = \dfrac{12}{4}$ $\quad\quad AB = 18 - 6$ $\quad\quad\quad\quad\quad\quad\quad = 12$ cm $AC = 18$	1 Mark: C
102	$\triangle ABC$ is similar to $\triangle ADE$ (equiangular) $\dfrac{BC}{(5+2)} = \dfrac{1.5}{2}$ (corresponding sides in similar triangles) $BC = \dfrac{1.5 \times 7}{2}$ $\quad\quad = \dfrac{21}{4} = 5.25$	1 Mark: B
103	Ratio of the matching sides in similar triangles. $\dfrac{b}{y} = \dfrac{x+y}{b}$	1 Mark: C
104	$\triangle BDE$ is similar to $\triangle ABC$ (equiangular) $\dfrac{3}{x} = \dfrac{12x}{x+3}$ (corresponding sides in similar triangles) $3(x+3) = 12x^2$ $12x^2 - 3x - 9 = 0$ $4x^2 - x - 3 = 0$ $(4x+3)(x-1) = 0$ $x = 1$ $(x \neq -\tfrac{3}{4})$	1 Mark: C
105	$\angle ADB = \angle DDC = x°$ $\angle ABD = \angle DBC = y°$ $DB = DB$ $\triangle ABD \equiv \triangle BCD$ (AAS)	1 Mark: B
106	$PS = QR$ (opposite sides of a parallelogram are equal) $PA = BR$ (given data) $\angle APS = \angle QRB$ (opposite angles of a parallelogram are equal) $\triangle PAS \equiv \triangle QRS$ (SAS)	1 Mark: C
107	$\angle XBY = \angle ZCY = 90°$ (angles in a square measure 90°) $XB = YC$ (given data) $BY = CZ$ (see below) $\quad BC = CD$ (equal sides of a square) $\quad YC = ZD$ (given data) $\quad BY = BC - YC$ and $CZ = CD - ZD$ (diagram) $\quad$ Therefore $BY = CZ$ (same quantity) $\triangle BXY \equiv \triangle CYZ$ (SAS)	1 Mark: C