1. Teacher to check diagrams. Different triangles have different side-lengths or different angles.

2. Left and right sides are equal.
Top left and top right angles are equal.
Bottom left and bottom right angles are equal.
Left and right sides are equal.
Top and bottom sides are equal.
Bottom left and top right angles are equal.
Top left and bottom right angles are equal.
All sides are equal.
All angles are equal.

3. a) Teacher to check.

4. a) $VW = EF$
$WX = FG$
$VX = EG$
b) $JK = ST$
$KL = TU$
$JL = SU$

5. a) $<A = <D$
$<B = <E$
$<C = <F$
b) $<M = <P$
$<N = <Q$
$<O = <R$

6. $<A = <D$
$<B = <E$
$<C = <F$
$<A = <D$
$<B = <E$
$<C = <F$

7. a) $<A = <D$
$<B = <E$
$<C = <F$
$<A = <D$
$<B = <E$
$<C = <F$
b) $<R = <W$
$<S = <Y$
$<T = <X$

8. No, she forgot to check that corresponding sidelengths are equal.

9. The sum of the angles in a triangle is $180^\circ$, so $<R$ and $<A$ are determined by the remaining angles.

10. $\triangle ABC \cong \triangle RST$

11. a) $<A = <D$  
$<B = <E$  
$<C = <F$

b) $<G = <J$  
$<H = <K$  
$<I = <L$

12. $PQ = KL$
$QR = LM$
$PR = KM$
$<P = <K$
$<Q = <L$
$<R = <M$

13. $PR = LM$
$<Q = <K$
$<R = <M$

14. a) $AB = 4.8$ cm
$AC = 3.4$ cm
$BC = 2.0$ cm
$DE = 4.6$ cm

b) Draw diagonals in the diagrams for a).

15. None of Tom's statements is correct.
$\triangle ABC \cong \triangle XYZ$

Investigation
A. 4 squares: B,C,D,E,F,G
5 squares: A,H,I,K
B. $B \parallel F$, $C \parallel D$, $E \parallel G$, $A \parallel I$, $H \parallel K$
C. Yes.
D. No, for instance A and H have the same areas but are not congruent.

1. Congruence rule: SAS
$\triangle ABC \cong \triangle DEF$

2. Answers may vary.

3. Answers may vary.

4. $<Q = <Y$

5. Need to know one of the following: $BC = FG$, $CD = GH$, or $BD = FH$

6. a) $<C \neq <F$

7. a) Answers may vary.
Teacher to check.
8. \( \triangle ABC \cong \triangle GHI \). Corresponding angles agree and so do corresponding sides.

9. They need not be similar. It’s possible that \( \angle A = \angle D \), \( AB = DE \), yet \( \angle A \) is the odd angle in the isosceles triangle while \( \angle D = \angle E \) in the other triangle.

10. a) From L to R: 2, 3, 6, 7
    b) Don’t know for certain that any of them are lines of symmetry.

Investigation
A. \( BC = DE, AC = EF, \) \( \angle B = \angle D \)
B. Can’t use SAS because neither triangle has the known angle between the two known sides.
C. No.
D. No, neither SSA nor ASS is a congruence rule. There may be more than one triangle corresponding to given data.

11. Answers may vary. Teacher to check.

12. Congruent triangles are similar because they have the same corresponding angles. Similar triangles are not always congruent because their corresponding sidelengths may be different.

13. a) Answers may vary.
    b) Teacher to check.
    c) Teacher to check.

14. a) Yes. Each angle must be 60° in an equilateral triangle, so all angles are equal. Since one pair of sides are equal, all sides are of equal length.
    b) No. It’s possible that they have different sidelengths.

15. Knowing two pairs of corresponding angles leaves one pair unknown.

**Worksheet G7-16**

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1. a) Left point
    b) Top point
    c) Uppermost point

2. a) Teacher to check.
    b) Teacher to check.
    c) They have the same length.

3. a) B is not on the arc.
    b) B is on the arc.

4. a) 2
    b) 1
    c) 0

5. a) i) Teacher to check.
    ii) Teacher to check.

6. a) Teacher to check.

7. Teacher to check.

8. a) Teacher to check.
    b) They have the same length.

**Worksheet G7-17**

_page 118_

1. a) Teacher to check.
    b) Teacher to check.
    c) Teacher to check.

2. Teacher to check.

3. a) Scalene right
    b) Isosceles obtuse
    c) Isosceles obtuse
    d) Isosceles obtuse
    e) Equilateral acute

4. a) \( AC = BC \), both are radii
    b) \( AC = AB \), both are radii
    c) \( AB = AC = BC \), all sides are radii

5. a) E
    b) C
    c) E

d) A

e) B

f) D

BONUS The sum of the lengths of the two short sides must be at least the length of the long side.

**Worksheet G7-18**

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1. a) B
    b) E
    c) D
    d) A
    e) C, F

2. a) SSS, \( \angle A = \angle D \)
    b) SAS, \( BC = EF \), or SAS, \( AB = DE \)

3. \( A \cong C \), use SAS

4. a) ASA
    b) SAS
    c) SSS
    d) SSS

5. a) i) Teacher to check.
    ii) Teacher to check.
    iii) Teacher to check.

6. Teacher to check.

7. Teacher to check.

8. Teacher to check.

9. In 5. we showed that \( \triangle ABD \cong \triangle CBD \) by SSS, which means that \( \angle ADB = \angle CBD \). Since \( \angle ADB + \angle CBD = \angle ABC \), we see that the median bisects the angle \( \angle ABC \).

**Worksheet G7-20**

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1. a) \( QR = PR \), OP = OQ
    b) Teacher to check.

2. a) Teacher to check.
    (Follow Step 1 above.)
    b) Teacher to check.
    (Follow Steps 2 and 3 above.)
    c) Teacher to check.
    (Follow Step 4 above.)

3. Teacher to check.

4. Teacher to check.

5. Answers may vary. Teacher to check.
6. a) \( QT = QS \)  
   b) \( TU = SU \) in length  
   c) \( \triangle QTU \cong \triangle QSU \)  
   d) SAS  
7. a) Angles made at unequal side are equal. This is an isosceles triangle.  
    b) All angles are equal. This is an equilateral triangle.  
8. a) \( 180^\circ + 3 = 60^\circ \)  
   b) Teacher to check.  
   c) \( \angle CAD = 30^\circ, \angle CDA = 90^\circ \)  
9. a) Repeat Yen's construction, and then bisect the 60° angle.  
    b) Teacher to check.  

**Worksheet G7-21**  
*page 127*  
1. a) Teacher to check.  
   b) Teacher to check.  
Investigation  
A. Teacher to check.  
B. \( \angle D = \angle E \)  
C. \( \triangle DFC \cong \triangle EFC \), by SSS.  
D. \( 180^\circ \), since the two angles combined form a straight angle.  
E. Yes. The median to the unequal side of an isosceles triangle is a perpendicular bisector.  
F. \( DE \perp CF \)  

**Worksheet G7-22**  
*page 128*  
1. a) Opposing sides on the hexagon appear parallel.  
   b) The two horizontal lines, and the two lines that slope up from left to right.  
2. Teacher to check.  
3. a) Right angles occur at K and L.  
   b) \( 90^\circ + 90^\circ + \angle KFL = 180^\circ + \angle KFL \)  

**Worksheet G7-23**  
*page 129*  
1. Teacher to check.  
2. \( \angle QOR = 90^\circ, \angle POR = 180^\circ \)  
3. a) Teacher to check.  
   b) SSS  
   c) \( \angle DBA \)  
   d) \( \triangle ABE \cong \triangle CBE \), since \( AB = BC \), and \( \angle ABD = \angle CBD \).  
   e) BD is an extension of the median to the unequal side in an isosceles triangle. Use the Isosceles Triangle Theorem.  
4. a) Each of the angles constructed is 90° and there are 4 of them, for a total of 360°.  
   b) There are two 180° angles for a total of 360°.  
   c) 6  
5. a) \( 45^\circ \)  
   b) Teacher to check.  
   c) Teacher to check.  
6. a) \( \angle DBC = 120^\circ \)  
   b) \( \angle DBC = 30^\circ \)  
   c) \( \angle DBC = 30^\circ \)  
   d) \( \angle DAB = 30^\circ \)  
7. \( 90^\circ \)  
   \( 45^\circ \)  
8. a) Teacher to check.  
   b) Teacher to check.  
   c)  

**Worksheet G7-24**  
*page 131*  
1. Teacher to check. Answers may vary.  
2. a) Teacher to check.  
   b) \( AD = BD \)  
   c) \( 90^\circ \)  
   d) \( 90^\circ \)  
   e) \( \triangle ADC \cong \triangle BDC \)  
   f) \( AC = BC \)  
   g) \( AE = BE \)  
   h) No, \( AE = BE \) in any case since \( \triangle ADE \cong \triangle BDE \).  
   i) No.  
   j) Median, line of symmetry.  
Investigation  
AC = BC  
A. Isosceles  
B. Teacher to check.  
C. No, the angle bisector of \( \angle ACB \) is a perpendicular bisector of AB because \( \triangle ABC \) is isosceles.  
3. BD = 3 cm. \( \triangle ABC \) is isosceles with \( \angle A = \angle B = 60^\circ \). It follows that \( \triangle ABC \) is actually equilateral. This means that AB = 6 cm. Since D is the midpoint of AB, it must be that BD = 3 cm.