Multiple-choice section

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Answer | D | A | D | D | A | C | D | B |

Question 1 [9.2]

D



x = 

= 9

Question 2 [9.1]

A

AAA is not a test for congruency.

Question 3 [9.3]

D



x + 1 = 

x =  – 1

=

Question 4 [9.2]

D

 ≡  is incorrect.

Question 5 [9.6]

A

4α + β = 360°

2α = (360° − β)

θ = 2α

= (360° − β)

= 180° – β

Question 6 [9.6] [10A]

C

β = γ (angles on the same arc)

Question 7 [9.1]

D

Take ratio of corresponding sides.



 = 

3a – 1 = 

3a – 1 = 8

3a = 9

a = 3

Question 8 [9.6] [10A]

B

∠EBD = ∠EOD = 3β

∠ABC = ∠ABE + ∠EBD + ∠CBD

90 = 2α + 3β + α

90 = 3α + 3β

α = 30 – β

Multiple-choice total marks: 8

Short answer section

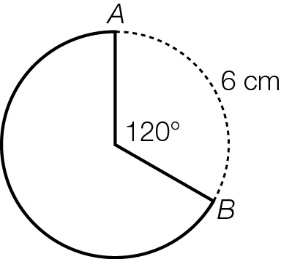
Question 9 2 marks [9.6] [10A]

(a) Each point on a circle is equidistant from the centre of the circle.

(b) A straight line that connects any two points on a circle is a chord.

Question 10 2 marks [9.6] [10A]

When two points on the circumference of a circle are connected to the centre of the circle, the angle that is formed is ‘subtended’ by the arc of the circle at the centre. If the two points are connected to a third point on the circumference, the arc at the circumference subtends the angle that is formed. For example, in the diagram shown, arc AB of length 6 cm subtends an angle of 120° at the centre.



Question 11 4 marks [9.4]





x = 24°, y = 2 units

Question 12 4 marks [9.3]

(a) AB = AC (given)  
 =   
AH is common.  
 ≡  (SAS)

(b) BH = CH (corresponding sides of congruent triangles)  
AH bisects BC  
AH is the perpendicular bisector of BC.

Question 13 3 marks [9.1, 9.2, 9.4]

 so  
XY =   
=  = 36  
   
AC =   
=  = 25  
XY = 36, AC = 25

Question 14 4 marks [9.3]

(a)  (alternate angles)   
 (alternate angles)   
 (vertically opposite angles)  
≡(AAA)

(b)  (alternate angles)   
 (alternate angles)   
AO = OD (given)  
Therefore, CO = OB.  
, so BC is the perpendicular bisector.

Question 15 4 marks [9.3, 9.6]

For :

 is common to both triangles

 (Both are angles in a semicircle)





2DG = DF (diameter = 2 × radius)



Question 16 4 marks [9.3]

∠BCA = ∠ECD (vertically opposite angles)

∠BAC = ∠EDC (alternate angles)

BC = EC (given)

 ≡  (ASA)

AB = DE

DE = EF

So E is the midpoint of DF.

Question 17 3 marks [9.3]

∠BAE = ∠BCD (base angles of isosceles triangle)

∠AEB = ∠CDB (given)

AB = CB (given)

 (ASA)

Question 18 4 marks [9.6] [10A]

(a)  (angle subtended at centre = 2 × angle subtended at circumference)  
 (vertically opposite angles)  


(b)  (vertically opposite angles)  
 ( is isosceles)  
 ( in triangle)  
  


Question 19 4 marks [9.6] [10A]

(a)  (straight angle)  
 (opposite angles of a cyclic quadrilateral are supplementary)   


(b) Similarly   
∠XBC + ∠YDA = ∠ADC + ∠ABC  
∠XBC + ∠YDA = 180°

Short answer total marks: 38

Extended answer section

Question 20 5 marks [9.5]

(a) kite

(b) AB = BC, AD = CD

(c) ∠A = ∠C

(d) They are perpendicular, not equal in length, and they do not bisect each other.

(e) No, not all four triangles are congruent and equal in area. The pairs of triangles that contain the equal length adjacent sides are congruent and equal in area.

Question 21 5 marks [9.2]

|  |  |  |
| --- | --- | --- |
| **(a)** Taking ratio of corresponding sides: | **(b) (i)** k =  – 1  =  – 1  For a = b  = 1 – 1  = 0  c = 0  **(ii)** The triangles are congruent with the second triangle on top of the first triangle. | **(c)** k =  – 1 =  – 1  For a = 2b = 2 – 1 k = 1 c = kd so c = d |

Question 22 6 marks [9.2, 9.4]

(a)  (corresponding angles on parallel lines)

 is common to both triangles

 ~  (AAA)

(b)  (corresponding sides of similar triangles)  
  
  
  
  


(c) AB = BC: k = 1  
AE = 2BD  
ABDM is a parallelogram (2 pairs of opposite sides are parallel)   
BD = AM   
AE = 2AM  
M is the midpoint of AE.

Question 23 5 marks [9.3, 9.4, 9.6] [10A]

(a)  (angle in a semicircle)  
 (angle in a semicircle)  
 (both equal 90°)  
 (alternate angles on parallel lines)  
 is similar to  (AAA)

(b)  (~)  
In  and :  
  
 (both equal 90°)  
AE is common.  
 ≡  (AAS)  
BE = AF  
AB = EF  
  
  
  
CD =2BE

(c) For  and :  
AE = ED (both radii of circle)  
 (~)  
 (vertically opposite angles)  
 ≡   
AF = DG  
AFGC is a rectangle (AC ** EF, all angles right angles)  
AF = CG  
DG = CG  
FG bisects CD.  
 (corresponding angles from congruent triangles)  
 = 90°   
FG is the perpendicular bisector of CD.

Question 24 10 marks [9.1, 9.3, 9.5, 9.6, 9.7] [10A]

(a) For  and :  
 (both = )  
 (base angles of right-angled isosceles triangles)  
AH is common  
   (AAS)

(b)  (base angles of an isosceles triangle)  
 (alternate angles on parallel lines)  
  
EL bisects CED

(c) ∠AOL = 2∠AEL  
90° + ∠COL = 2∠AEL  
∠COL = 2∠AEL – 90°

(d)  (base angles of right-angled isosceles triangles)  
 (corresponding angles on parallel lines)  
 = 135°

(e) For  and :  
 is common   
 (corresponding angles on parallel lines)  
 ~  (AAA)

Question 25 5 marks [9.3]

(a)  (angles of equilateral triangles)  
  
  


(b) For :  
 (proved)  
ED = EC (given)  
EB = EA (given)  
 (SAS)

(c) BD = AC (corresponding sides of congruent triangles)

Question 26 6 marks [9.3]

(a) AB = CB (given)  
AD = CD (given)  
BD is common  
 (SSS)

(b) EDA = EDC (corresponding angles of congruent triangles)  
AD = CD (given)  
ED is common   
 (SAS)

(c) AB = CB (given)  
BE is common  
AE = CE (corresponding sides of congruent triangles)  
 (SSS)

Question 27 8 marks [9.1, 9.3, 9.5, 9.6, 9.7] [10A]

(a)  is common  
 (angle in a semicircle)  
 (line from centre bisecting a chord is perpendicular to the chord)  
  
 |~  (AAA)

(b)  (similar triangles)  
2HD = AD (H midpoint of AD)  
  
  
  
  
HG = 9 cm

(c)  (supplementary angle on straight line)  
 (angle at circumference = angle at centre)  
 =   
 = 50° + 40°  
 = 90°

(d) ∠HIE = ∠CID (vertically opposite angles)  
= 90°  
  
 +   
 +  = 180° (360° in quadrilateral)

Question 28 9 marks [9.2, 9.3, 9.5]

(a)  =  (vertically opposite angles)  
 =  (alternate angles on parallel lines)  
BH = EH (diagonals of parallelogram bisect each other)  
 ≡  (AAS)

(b) CH = FH (corresponding sides of congruent triangles)  
BCEF is a parallelogram (diagonals bisect each other)

(c)  (vertically opposite angles)  
 (corresponding angles on parallel lines)  


(d) (i)  is common.  
 (corresponding angles on parallel lines)  
 <  (AAA)

(ii) DH = HA (diagonals of a parallelogram bisect each other)  
  
  
  
DB = 2DC  
C is the midpoint of DB.

Extended answer total marks: 59

TOTAL test marks: 105