Unit 12 · Circle

ANSWER KEY · FOR TEACHERS

Full marks 26

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. central angle → **f.** its vertex is the center, its arms are two radii — K · 3
2. inscribed angle → **a.** its vertex is on the circle, its arms are two chords
3. minor arc → **d.** the shorter of the two arcs between two points
4. major arc → **e.** the longer arc, named with a third point on it
5. semicircle → **g.** the arc cut off by a diameter, 180°
6. cyclic quadrilateral → **b.** a quadrilateral with all four corners on one circle

Each carries 0.5 mark.

2 Multiple choice

i. **c.** 70° — K · 1

The central angle is double the inscribed angle on the same arc, so the inscribed angle is half of 140°.

ii. **c.** 90° — K · 1

The angle in a semicircle is a right angle.

iii. **b.** 105° — U · 1

P and R are opposite corners, and opposite angles of a cyclic quadrilateral add up to 180°.

iv. **a.** 38° — U · 1

Inscribed angles on the same arc are equal. 142° would be right only if D were on the other side of AB.

v. **d.** reflex 220° — A · 1

Twice 110° is 220°: the inscribed angle stands on the major arc, so the central angle on it is reflex.

3 Very short answers

a. MARKING SCHEME — K · 1

✓ Supplementary, or add up to 180°.

b. MARKING SCHEME — K · 1

✓ Equal.

4 Short answers

a. MARKING SCHEME — U · 2

✓ Reflex $\angle AOC = 230°$.

✓ $\angle ABC = 115°$.

b. MARKING SCHEME — U · 2

✓ The equation $3x + 10 = 2(x + 15)$.

✓ $x = 20$, with the angles 70° and 35°.

c. MARKING SCHEME — A · 2

✓ The supplementary pair is A and C, not A and B.

✓ $\angle C = 110°$.

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5 Long answers

a. **ANSWER** A · 4

1. $\angle APC = \angle ABC$: inscribed angles on the same arc AC.
2. $\angle BQD = \angle BCD$: inscribed angles on the same arc BD.
3. $\angle ABC = \angle BCD$: from 1, 2 and the given $\angle APC = \angle BQD$.
4. $AB \parallel CD$: the alternate angles made by BC are equal.

MARKING SCHEME

- ✓ $\angle APC = \angle ABC$ with its reason.
- ✓ $\angle BQD = \angle BCD$ with its reason.
- ✓ $\angle ABC = \angle BCD$.
- ✓ The conclusion, by alternate angles.

b. **ANSWER** A · 4

1. $\angle ADC + \angle ABC = 180°$: opposite angles of a cyclic quadrilateral.
2. $\angle ABC + \angle CBE = 180°$: angles on the straight line ABE.
3. $\angle ADC + \angle ABC = \angle ABC + \angle CBE$: from 1 and 2.
4. $\angle ADC = \angle CBE$: taking $\angle ABC$ from both sides.

MARKING SCHEME

- ✓ Statement 1 with its reason.
- ✓ Statement 2 with its reason.
- ✓ Statement 3.
- ✓ The conclusion.

6 Think

ANSWER HA · 2

No. A parallelogram's opposite angles are equal. If it were cyclic, they would also add up to 180°, so each would be 90°, and it would be a rectangle.

MARKING SCHEME

- ✓ No.
- ✓ Equal and supplementary opposite angles must be 90° each, a rectangle.

7 Activity: Verify it

(not marked)

WHAT STUDENTS SHOULD FIND

In each circle the two angles agree, to within a degree or so of measuring error. Conclusion: inscribed angles standing on the same arc are equal.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	7	6	11	2	**26**

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