Unit 11 · Construction

ANSWER KEY · FOR TEACHERS

Full marks 22

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. sketch
2. alternate
3. height
4. half
5. twice
6. bisector

Each carries 0.5 mark. **K · 3**

2 Multiple choice

i. **b.** $\triangle DBC$, for any point D on ST **K · 1**

Same base BC, and the corner on the parallel line: the same height, so the same area.

ii. **b.** 4 cm **U · 1**

A triangle is half the parallelogram on the same base, so the parallelogram needs half the base: 4 cm.

iii. **c.** 10 cm **U · 1**

The triangle needs twice the base: $BE = AB$, so $AE = 10$ cm.

iv. **c.** SQ **A · 1**

The diagonal SQ cuts off $\triangle QRS$. The line through R parallel to it moves R to G on PQ produced, keeping the area.

v. **a.** 4 cm **A · 1**

P must be on the upper line, and no point of it is closer to A than 5 cm.

3 Short answers

a. **MARKING SCHEME** **U · 2**

- ✓ The same base SQ.
- ✓ Between the same parallels SQ and RH.

b. **MARKING SCHEME** **A · 2**

- ✓ $\triangle ADC = ½$ rectangle $DCFE$.
- ✓ $\triangle ADC = ½\ \triangle ABC$, so they are equal.

4 Constructions

a. **ANSWER** **A · 4**

Draw $AB = 5$ cm; at B construct 60° and cut $BC = 4.5$ cm; arcs of 4.5 cm from A and 5 cm from C give D. Produce DC both ways to ST. At B construct 90°, meeting ST at Q; cut $QP = BA$ on ST and join AP. Area of $ABQP$ = area of $ABCD$, as they stand on the same base AB between $AB \parallel ST$. (Each about 19.5 cm^2.)

MARKING SCHEME

- ✓ $ABCD$ correctly constructed.
- ✓ ST through D and C.
- ✓ $ABQP$ with the right angle at B.
- ✓ The relation with its reason.

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b. **ANSWER** **A · 4**

Construct $\triangle PQR$ from its sides; through P draw $ST \parallel QR$. Bisect QR at M. At Q construct $\angle MQX = 60°$, meeting ST at X; cut $XY = QM = 3$ cm along ST and join MY: $QMYX$ is the parallelogram.
Area of $QMYX = 2 \times$ area of $\triangle PQM$ (the same base QM, the same parallels) = area of $\triangle PQR$ (PM is a median).

MARKING SCHEME

- ✓ $\triangle PQR$ correctly constructed.
- ✓ The parallel through P and the midpoint M.
- ✓ The parallelogram on QM with 60°.
- ✓ The relation with its reason.

5 Think

ANSWER **HA · 2**

Do the quadrilateral step twice. Draw the diagonal AC and, through B, a line parallel to it to meet DC produced at F: $AFDE$ is a quadrilateral of the same area. Then draw AD and, through E, a line parallel to it to meet CD produced at G: $\triangle AFG$ has the area of $ABCDE$.

MARKING SCHEME

- ✓ One corner removed by a line parallel to a diagonal, making a quadrilateral.
- ✓ Repeated, giving a triangle.

6 Activity: Check by measuring

(not marked)

WHAT STUDENTS SHOULD FIND

The two areas come within a few percent of each other (in the first construction, about 19.5 cm^2 each). Small differences come from the pencil's thickness, a compass that slips, and reading the ruler to the nearest millimeter.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	4	4	12	2	**22**

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