

Quadrilaterals and Polygons: math test solutions, Grade 10 – download the PDF

Test solutions with the detailed point scale. Add up your points and spot what to review.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Angle sums

/ 3 pts

(a) $(11 - 2) \cdot 180^\circ = 1620^\circ$. (1 pt)

(b) $n = 360 \div 15 = 24$ sides. (1 pt) Each interior angle is $180^\circ - 15^\circ = 165^\circ$. (1 pt)

2 A parallelogram

/ 4 pts

(a) Consecutive angles are supplementary: $2x + 20 + 3x - 10 = 180$, so $5x = 170$ and $x = 34$. (1 pt) $\angle W = 88^\circ$, $\angle X = 92^\circ$; then $\angle Y = 88^\circ$, $\angle Z = 92^\circ$ (opposite angles). (1 pt)

(b) The diagonals bisect each other: $3t + 1 = 5t - 9$, so $t = 5$. (1 pt) $WO = 16$, so $WY = 32$. (1 pt)

3 True or false?

/ 3 pts

- (a) True: opposite sides of a rhombus are congruent, which proves a parallelogram. (1 pt)
- (b) False: in a 6 by 8 rectangle the diagonals are congruent but not perpendicular (only in a square). (1 pt)
- (c) False: a kite with sides 3, 3, 5, 5 in order has no pair of parallel sides. (1 pt)

4 A rhombus

/ 4 pts

- (a) Half-diagonals 9 and 12 form a right triangle: $\sqrt{81 + 144} = \sqrt{225} = 15$ cm. (2 pts)
- (b) $4 \cdot 15 = 60$ cm. (1 pt)
- (c) $\frac{18 \cdot 24}{2} = 216$ cm². (1 pt)

5 An isosceles trapezoid

/ 3 pts

- (a) $m = \frac{10 + 24}{2} = 17$ in. (1 pt)
- (b) Each leg covers a horizontal offset of $\frac{24 - 10}{2} = 7$ in, so
 $h = \sqrt{25^2 - 7^2} = \sqrt{576} = 24$ in. (1 pt)
- (c) Area = $17 \cdot 24 = 408$ in². (1 pt)

6 Coordinate proof

/ 3 pts

- (a) Midpoint of $\overline{AC}$: (3.5, 3.5); midpoint of $\overline{BD}$: (3.5, 3.5). The diagonals bisect each other. (1 pt)
- (b) $AB = \sqrt{16 + 1} = \sqrt{17}$ and $BC = \sqrt{1 + 16} = \sqrt{17}$: adjacent sides are congruent, so the parallelogram is a rhombus. (1 pt)
- (c) Slope of $\overline{AB}$ is $\frac{1}{4}$ and slope of $\overline{BC}$ is 4. The product is $1 \neq -1$, so the sides are not perpendicular. (1 pt)



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