

Honors Geometry – Chapter 3 Test Practice

Answer Sheet

Find x and y, and state the theorems

1. **$x = 61, y = 61$**

x is a vertical angle with 61° (Vertical Angles Congruence Theorem). y corresponds to 61° (Corresponding Angles Theorem).

2. **$x = 12, y = 7$**

$8x = 96$ (Corresponding Angles Theorem), so $x = 12$.

$11y + 19 = 96$ (Alternate Interior Angles Theorem), so $11y = 77$ and $y = 7$.

3. **$x = 5, y = 13$**

$8x + 2 = 42$ (Vertical Angles Congruence Theorem), so $x = 5$.

$6(2y - 3) + 42 = 180$ (Consecutive Interior Angles Theorem), so $6(2y - 3) = 138$, $2y - 3 = 23$, $2y = 26$, and $y = 13$.

Distance from point A to the line

4. **$7\sqrt{2} / 2 \approx 4.95$**

$y = -x$ becomes $x + y = 0$. Distance = $|3 + 4| / \sqrt{2} = 7/\sqrt{2}$.

5. **$3\sqrt{10} \approx 9.49$**

$y = \frac{1}{3}x - 2$ becomes $x - 3y - 6 = 0$. Distance = $|-3 - 21 - 6| / \sqrt{10} = 30/\sqrt{10} = 3\sqrt{10}$.

Find x so that $m \parallel n$

6. **$x = 97$**

The angles are corresponding, so set them equal (Corresponding Angles Converse).

7. **$x = 6$**

Alternate exterior angles: $8x = 4x + 24$, so $4x = 24$ (Alternate Exterior Angles Converse).

8. **$x = 9$**

The interior angles on the same side of the transversal are supplementary: $11x + 33 + 6x - 6 = 180$, so $17x = 153$ (Consecutive Interior Angles Converse).

Parallel and perpendicular lines through a point

9. **(a) $y = 2x + 12$ (b) $y = -\frac{1}{2}x - \frac{1}{2}$**

(a) Slope 2: $y - 2 = 2(x + 5)$.

(b) Slope $-\frac{1}{2}$: $y - 2 = -\frac{1}{2}(x + 5)$.

10. **(a) $y = -\frac{1}{3}x - \frac{28}{3}$ (b) $y = 3x - 6$**

(a) Slope $-\frac{1}{3}$: $y + 9 = -\frac{1}{3}(x + 1)$.

(b) Slope 3: $y + 9 = 3(x + 1)$.

Reasoning and applications

11. **The student is assuming $k \parallel \ell$.**

The diagram does not mark k and ℓ as parallel. The student is trying to use the Perpendicular Transversal Theorem: if a transversal is perpendicular to one of two parallel lines, it is perpendicular to the other.

12. Method (grid coordinates needed)

Read the points for the aquarium, shopping mall, and subway from the graph, then:

- Line q passes through the aquarium and the shopping mall. Find the slope, then use $y - y_1 = m(x - x_1)$.
- Line p is perpendicular to q and passes through the subway, so its slope is the negative reciprocal of q 's slope.
- Set the two equations equal and solve for x , then substitute to find y .
- Distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ grid units, multiplied by 50 yards per unit.

13. Definitions to match against the cube

- Skew: two lines on different faces that never meet and are not parallel.
- Perpendicular: two lines on the same face that meet at a right angle.
- Parallel: two lines on the same face running the same direction, or matching edges on opposite faces.
- Congruent corresponding angles: same position at two intersections along one transversal, with the two lines parallel.
- Congruent alternate interior angles: between the two parallel lines, on opposite sides of the transversal.