

STUDY GUIDE

UNIT 2: BASIC PROOFS AND ANGLE RELATIONSHIPS

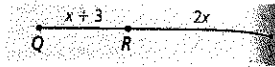
CONDITIONAL STATEMENTS AND BASIC PROOFS

- 1) Identify the hypothesis and conclusion of each conditional statement.
 - a) If a person is eighteen years old, then that person can vote.
 - b) A figure is a quadrilateral if it is a parallelogram.
- 2) Determine if each conditional is true. If false, give a counterexample.
 - a) If an animal is a bird, then it has wings.
 - b) If the season is fall, then it is October.
- 3) Write the statement as a conditional statement.
 - a) Numbers that are multiples of four are divisible by 2.
- 4) Write the converse, inverse, and contrapositive of the conditional statement.
If it is Sunday, then it is the weekend.
- 5) Write the conditional statement and converse of the biconditional statement.
 - a) Three points are coplanar if and only if they lie in the same plane.
- 6) Determine if the biconditional is true. If false, give a counterexample.
 - a) Two angles are complementary if and only if they are both acute.

- 7) Write a 2-column proof

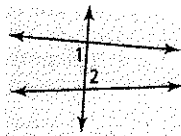
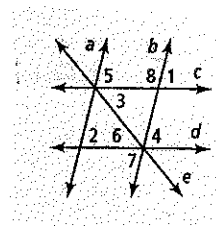
Given: $QS = 42$

Prove: $x = 13$

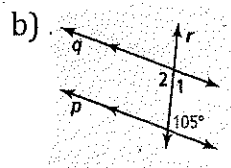
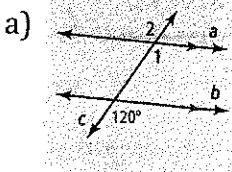


PARALLEL LINES AND A TRANSVERSAL

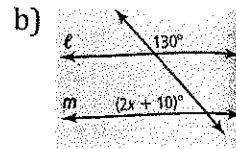
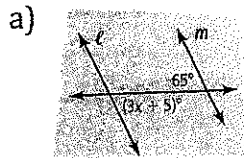
- 8) Identify all numbered angle pairs that form the given type of angle pair. Then name the two lines and transversal that form each pair.
 - a) Alternate Exterior Angles
 - b) Corresponding Angles
 - c) Consecutive Interior Angles
- 9) Classify the angle pair formed by $\angle 1$ and $\angle 2$.



- 10) Find $m\angle 1$ and $m\angle 2$. Justify your answer.

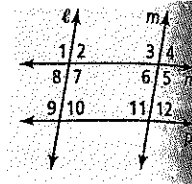


11) Find the value of x for which line l is parallel to line m .



12) Use the given information to decide which lines, if any, are parallel. Justify your conclusion.

- a) $\angle 1 = \angle 9$
- b) $m\angle 3 + m\angle 6 = 180$
- c) $\angle 5 \cong \angle 11$



PARALLEL AND PERPENDICULAR LINES

13) Find the slope of the line passing through $(6, -2)$ and $(1, 3)$

14) Write an equation of the line with a slope of $-\frac{1}{2}$ and passes through $(1, -9)$

15) Determine whether \overline{AB} and \overline{CD} are *parallel*, *perpendicular*, or *neither*.

- a) $A(2, 8), B(-1, -2), C(3, 7), D(0, -3)$
- b) $A(-1, -4), B(2, 11), C(1, 1), D(4, 10)$

16) Write an equation of the line parallel to $y = 8x - 1$ that contains $(-6, 2)$ in slope-intercept and standard form.

17) Write an equation of the line perpendicular to $y = \frac{1}{6}x + 4$ that passes through $(3, -3)$ in slope-intercept and standard form.

Unit 2 Study Guide

1) p = hypothesis (if) q = conclusion (then)

1.) a) p = a person is 18 years old
 q = that person can vote

b) p = it is a parallelogram
 q = a figure is a quadrilateral

2.) a) True b) False, it is fall in November

3) If a number is a multiple of 4, then it is divisible by 2

4) Converse: If it is the weekend, then it is Sunday
Inverse: If it is not Sunday, then it is not Sunday
Contrapositive: If it is not the weekend, then it is not Sunday

5) Conditional Statement: If 3 points are coplanar, then they lie on the same line.
Converse: If 3 points lie on the same line, then they are coplanar

6.) True Complementary angles have a sum of 90°

7.) Statements

$$QS = 42$$

$$QR + RS = QS$$

$$(x+3) + 2x = 42$$

$$3x + 3 = 42$$

$$3x = 39$$

$$x = 13$$

Reasons

Given

Segment Addition Postulate

Substitution property

Combining like terms

Subtraction property of equality

Division property of equality

8.) a) $\angle 1$ & $\angle 7$ 2 lines (parallel) = line c & d
transversal = line b

b) $\angle 5$ & $\angle 1$ 2 lines = line a & b
transversal = line c

$\angle 1$ & $\angle 4$ 2 lines = line c & d
transversal = line b

$\angle 4$ & $\angle 2$ 2 lines = line a & b
transversal = line d

$\angle 5$ & $\angle 2$ 2 lines = line c & d
transversal = line a

c) $\angle 5$ & $\angle 8$ 2 lines = line a & b
transversal = line c

9.) Alternate Interior Angles

10.) a) $m\angle 1 = 120^\circ$ because $\angle 1$ and identified angle of 120° are corresponding so they are \cong .

$m\angle 2 = 120^\circ$ because $\angle 2$ and identified angle of 120° are alternate exterior so they are \cong .

b) $m\angle 1 = 75^\circ$ because $\angle 1$ and identified angle of 105° are consecutive interior meaning they are supplementary ($=180^\circ$)

$m\angle 2 = 105^\circ$ because $\angle 1$ & $\angle 2$ form a linear pair meaning they add to be 180°

11.) a) $3x + 5 = 65$

$$\begin{array}{r} 3x + 5 = 65 \\ -5 \quad -5 \\ \hline 3x = 60 \end{array}$$

$$\boxed{x = 20}$$

b) $2x + 10 = 130$

$$\begin{array}{r} 2x + 10 = 130 \\ -10 \quad -10 \\ \hline 2x = 120 \end{array}$$

$$\boxed{x = 60}$$

$\begin{array}{r} 7.0 \\ 180 \\ -105 \\ \hline 75 \end{array}$

- 12) a) lines n & p are parallel because $\angle 1$ & $\angle 9$ are corresponding angles and if corresponding angles are \cong , the lines are parallel.
- b.) Cannot say any lines are parallel, $L3$ & $L6$ form a linear pair.
- c.) lines n & p are parallel because $\angle 5$ & $\angle 11$ are alternate interior angles and if alternate interior angles are \cong , the lines are parallel.

13) Slope = $\frac{y-y_1}{x-x_1} = \frac{-2-3}{6-1} = \frac{-5}{5} = \boxed{-1}$

14) point-slope form: $y-9 = -\frac{1}{2}(x-1)$
 $y+9 = -\frac{1}{2}(x-1)$

Slope intercept form: $y+9 = -\frac{1}{2}x + \frac{1}{2}$
 $y = -\frac{1}{2}x - 8\frac{1}{2}$ or $y = -\frac{1}{2}x - \frac{17}{2}$

Standard form: $\frac{1}{2}x + y = -\frac{17}{2}$
 $x + 2y = -17$

15) a) \overleftrightarrow{AB} \overleftrightarrow{CD}
 $A(2,8)$ $\frac{8-2}{3} = \frac{10}{3}$ $C(3,7)$ $\frac{7-3}{3-0} = \frac{10}{3}$
 $B(-1,2)$ $\frac{2-1}{3} = \frac{1}{3}$ $D(0,-3)$ $\frac{3-0}{3} = 1$
parallel

b) \overleftrightarrow{AB} \overleftrightarrow{CD}
 $A(-1,4)$ $\frac{-4-11}{-3} = \frac{-15}{-3} = \frac{15}{3} = 5$ $C(1,1)$ $\frac{1-10}{1-4} = \frac{-9}{-3} = 3$
 $B(2,11)$ $\frac{11-2}{-1-2} = \frac{9}{-3} = -3$ $D(4,10)$ $\frac{10-4}{4-1} = \frac{6}{3} = 2$
Neither

16.) Slope = 8
point = $(-6, 2)$

$$y - 2 = 8(x - -6)$$

$$y - 2 = 8(x + 6)$$

$$y - 2 = 8x + 48$$

$$y = 8x + 50 \leftarrow \text{Slope-intercept}$$

$$y = 8x + 50$$

$$-8x + y = 50 \text{ OR } 8x - y = -50 \leftarrow \text{Standard form}$$

17.) Slope = $\frac{-6}{10} = -6$
point = $(3, -3)$

$$y - -3 = -6(x - 3)$$

$$y + 3 = -6x + 18$$

$$y = -6x + 15 \leftarrow \text{Slope-intercept}$$

$$y = -6x + 15$$

$$6x + y = 15 \leftarrow \text{Standard form}$$