Lesson 2.8.2: Direct and Indirect Proofs

Total points = 30

A. Direct proof

1. Statements

- 1. Given √
- 2. Subtraction Property.
- 3. Simplification√
- 2. Statements
 - 1. Given√
- 2. Given√
- 3. Transitive Property√
- Subtraction Property√
- 5. Simplification√
- 3. Statements
 - 1. Given ✓
 - 2. Definition of linear pair ✓
- 3. Supplement postulate√
- Definition of supplementary angles√
- 5. Definition of linear pair√
- 6. Supplement postulate√
- 7. Definition of supplementary angles√
- 8. Transitive property√
- 9. Subtraction property√
- 10. Definition of congruent angles√
- B. Indirect proof
- 1. Assume: If x = 2, then 3x 5 = 10.

$$3x-5+5=10+5$$

$$3x = 15$$

$$\frac{3x}{2} = \frac{13}{2}$$

 $3x = 15\checkmark$ $\frac{3x}{3} = \frac{15}{3}\checkmark$ $x = 5 \rightarrow \text{Contradiction }\checkmark$

Therefore, the original statement is true.✓

2. Assume: If x = 3, then 4x - 4 = 12.

$$4x-4+4=12+4$$

$$4x = 16 \checkmark$$

$$\frac{4x}{4} = \frac{16}{4} \checkmark$$

$$\frac{4x}{4} = \frac{16}{4}$$

 $x = 4 \rightarrow$ Contradiction \checkmark

Therefore, the original statement is true. \checkmark

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- A. Direct proof
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- 1. Given ✓
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- 8. Transitive property√
- 9. Subtraction property√
- 10. Definition of congruent angles√

B. Indirect proof

1. Assume: If
$$x = 2$$
, then $3x - 5 = 10$.

$$3x - 5 + 5 = 10 + 5$$

$$\frac{3x}{3x} = \frac{15}{3}$$

$$\frac{1}{3} = \frac{1}{3} \checkmark$$

$$3x = 15\checkmark$$

$$\frac{3x}{3} = \frac{15}{3}\checkmark$$

$$x = 5 \rightarrow \text{Contradiction}\checkmark$$

Therefore, the original statement is true.✓

2. Assume: If
$$x = 3$$
, then $4x - 4 = 12$.

$$4x - 4 + 4 = 12 + 4$$

$$4x = 16.4$$

$$\frac{1}{4} = \frac{1}{4}$$

$$4x = 16 \checkmark$$

$$\frac{4x}{4} = \frac{16}{4} \checkmark$$

$$x = 4 \rightarrow \text{Contradiction} \checkmark$$

Therefore, the original statement is true. ✓

Lesson 2.8.2: Direct and Indirect Proofs

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- A. Direct proof
- 1. Statements
 - 1. Given √
 - 2. Subtraction Property√
 - 3. Simplification√
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 - 1. Given ✓
 - 2. Definition of linear pair ✓
 - 3. Supplement postulate√
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- 5. Definition of linear pair√
- 6. Supplement postulate√
- 7. Definition of supplementary angles√
- 8. Transitive property.
- 9. Subtraction property√
- 10. Definition of congruent angles√ B. Indirect proof
- 1. Assume: If x = 2, then 3x 5 = 10.

$$3x-5+5=10+5$$
 \checkmark

$$3x = 15$$

 $3x = 18$

$$\frac{3x}{3} = \frac{13}{3}$$

 $3x = 15 \checkmark$ $\frac{3x}{3} = \frac{15}{3} \checkmark$ $x = 5 \rightarrow \text{Contradiction } \checkmark$

Therefore, the original statement is true.✓

2. Assume: If
$$x = 3$$
, then $4x - 4 = 12$.

$$4x-4+4=12+4$$
 \checkmark $4x=16$ \checkmark

$$4x = 16 \checkmark$$

$$\frac{4x}{4} = \frac{16}{4} \checkmark$$

$$\frac{1}{4} = \frac{1}{4}$$

 $\stackrel{4}{x} = 4 \stackrel{4}{\rightarrow} \text{Contradiction} \checkmark$

Therefore, the original statement is true. \checkmark

Lesson 2.8.2: Direct and Indirect Proofs

Total points = 30

- A. Direct proof
- 1. Statements
 - 1. Given ✓
- 2. Subtraction Property√
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- 6. Supplement postulate√
- 5. Definition of linear pair√
- Definition of supplementary angles√ 8. Transitive property√
- 9. Subtraction property√
- 10. Definition of congruent angles√
- 1. Assume: If x = 2, then 3x 5 = 10. 3x - 5 + 5 = 10 + 5

B. Indirect proof

$$3x = 15\sqrt{3x} = 15$$

$$3x = 15\checkmark$$

$$\frac{3x}{3} = \frac{15}{3}\checkmark$$

$$x = 5 \rightarrow \text{Contradiction}\checkmark$$

Therefore, the original statement is true.✓

2. Assume: If
$$x = 3$$
, then $4x - 4 = 12$.

$$4x - 4 + 4 = 12 + 4$$

$$4x = 16$$

$$\frac{4x}{4} = \frac{16}{4}$$

$$4x = 16 \checkmark$$

$$\frac{4x}{4} = \frac{16}{4} \checkmark$$

$$x = 4 \rightarrow \text{Contradiction} \checkmark$$

Therefore, the original statement is true. ✓