Exterior Angle Theorem

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Exterior Angle Theorem** |

|  |
| --- |
| Given:Prove: $m∠ABC=m∠BCD+m∠CDB$ |
| Statements | Reasons |
| $$m∠ABC=m∠BCD+m∠CDB$$ | Ext. $∠$ Thm. |

 |
| The measure of an exterior angle on a triangle is equal to the added measures of the two remote (far away) interior angles. |

**Fill in the blanks on the proofs below.**

|  |  |  |
| --- | --- | --- |
| 1. |  | 2. |
| Given: $m∠FGH=62˚, m∠GHF=51˚$ Prove: $m∠EFH=113˚$ |  | Given: $m∠FGH=62˚, m∠GHF=51˚$ Prove: $m∠EFH=113˚$ |
| Statements | Reasons |  | Statements | Reasons |
| $$m∠FGH=62˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $m∠FGH=62˚, m∠GHF=51˚,$ $∠EFH \& ∠HFG $are a lin. pair | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠GHF=51˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠FGH+m∠GHF+m∠HFG=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠EFH=m∠FGH+m∠GHF$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$62+51+m∠HFG=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠EFH=62+51$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$113+m∠HFG=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠EFH=113˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠HFG=67˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |  | $$m∠HFG+m∠EFH=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |  | $$67˚+m∠EFH=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |  | $$m∠EFH=113˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

|  |  |  |
| --- | --- | --- |
| 3. |  | 4. |
| Given: $m∠LMN=50˚, m∠MNL=70˚$ Prove: $m∠KLN=120˚$ |  | Given: : $m∠KLN=120˚, m∠MNL=70˚$ Prove: $m∠LMN=70˚$ |
| Statements | Reasons |  | Statements | Reasons |
| $$m∠KLN=m∠LMN+m∠MNL$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠KLN=120˚, $$$$m∠MNL=70˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠LMN=50˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠KLN=m∠LMN+m∠MNL$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠MNL=70˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$120=m∠LMN+70$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠KLN=50+70$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$50=m∠LMN$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$m∠KLN=120˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠LMN=70˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Our focus this unit has been on proofs. However, it is just as important for you to be able to solve a problem (without the proof structure). For the following problems, use what you know to determine the answer.**

Lines Cut by a Transversal

|  |  |
| --- | --- |
| 5. $ ∠LMN$ & $∠PMQ$ are corresponding angles on parallel lines. $m∠LMN=24°$. What is the $m∠PMQ$?(If ||, Corresponding Angles: \_\_\_\_\_$ ≅$ \_\_\_\_\_, so \_\_\_\_\_ = \_\_\_\_\_) | 6.$ ∠BAC$ & $∠DAE$ are corresponding angles on parallel lines. $m∠DAE=(4x+5)°$ & $m∠BAC=(6x-25)°$. What is $m∠DAE$?(If ||, Corresponding Angles: \_\_\_\_\_$ ≅$ \_\_\_\_\_, so \_\_\_\_\_ = \_\_\_\_\_) |
| 7. $ ∠UVW$ & $∠RST$ are alternate interior angles on parallel lines. $m∠UVW=91°$. What is the $m∠RST$?(If ||, Alternate Angles: \_\_\_\_\_$ ≅$ \_\_\_\_\_, so \_\_\_\_\_ = \_\_\_\_\_) | 8.$ ∠PQR$ & $∠GHK$ are alternate exterior angles on parallel lines. $m∠PQR=(2x-7)°$ & $m∠GHK=(3x-18)°$. What is $m∠GHK$?(If ||, Alterate Angles: \_\_\_\_\_$ ≅$ \_\_\_\_\_, so \_\_\_\_\_ = \_\_\_\_\_) |
| 9. $ ∠UVW$ & $∠RST$ are same side interior angles on parallel lines. $m∠UVW=91°$. What is the $m∠RST$?(If ||, Same Side Angles: \_\_\_\_\_$+$ \_\_\_\_\_ = 180$°$) | 10.$ ∠PQR$ & $∠GHK$ are same side interior angles on parallel lines. $m∠PQR=(2x-7)°$ & $m∠GHK=(3x-18)°$. What is $m∠GHK$?(If ||, Same Side Angles: \_\_\_\_\_$+$ \_\_\_\_\_ = 180$°$) |

Triangle Sum

|  |  |
| --- | --- |
| 11. On $△$*ABC*, $m∠A=74° \& m∠B=39°$. What is the $m∠C$?(In a $△$, the angles: \_\_\_\_\_$+$ \_\_\_\_\_ $+$ \_\_\_\_\_ = 180$°$) | 12. On $△$*LMN*, $m∠L=\left(5x-1\right)°, m∠M=(3x+6)° \& m∠N=(4x+7)°$. What is the $m∠N$?(In a $△$, the angles: \_\_\_\_\_$+$ \_\_\_\_\_ $+$ \_\_\_\_\_ = 180$°$) |
| 13. Find the measurement of the missing angle.(In a $△$, the angles: \_\_\_\_\_$+$ \_\_\_\_\_ $+$ \_\_\_\_\_ = 180$°$) | 14. Find the value of *x* and the measurement of all of the angles.(In a $△$, the angles: \_\_\_\_\_$+$ \_\_\_\_\_ $+$ \_\_\_\_\_ = 180$°$) |

Exterior Angles

|  |  |
| --- | --- |
| 15. On $△$*ABC*, $m∠A=74° \& m∠B=39°$. What is the measure of the exterior angle $(m∠BCD)$?(On a $△$: remote angles$\rightarrow $ \_\_\_$+$ \_\_\_ $=$ \_\_\_ $\leftarrow $exterior angle) | 16. On $△$*LMN*, $m∠L=\left(5x-1\right)°, m∠M=\left(3x+6\right)° $$\& m∠N=(14x-19)°$. What is the $m∠N$?(On a $△$: remote angles$\rightarrow $ \_\_\_$+$ \_\_\_ $=$ \_\_\_ $\leftarrow $exterior angle) |
| 17. Find the measure of the angle marked with a “?”.(On a $△$: remote angles$\rightarrow $ \_\_\_$+$ \_\_\_ $=$ \_\_\_ $\leftarrow $exterior angle) | 18. Solve for *x* and find the measure of the exterior angle.(On a $△$: remote angles$\rightarrow $ \_\_\_$+$ \_\_\_ $=$ \_\_\_ $\leftarrow $exterior angle) |

Pythagorean theorem

|  |  |
| --- | --- |
| 19. $△$*ABC* is a right triangle. The hypotenuse is 8 cm long and one of the two remaining sides (called “legs”) is 2 cm long. Find the measurement of the missing side length.(Pythagorean Theorem: $a^{2}+b^{2}=c^{2} \leftarrow c$ = hypotenuse) | 20. $△$*LMN* is a right triangle. The hypotenuse is 15 in long and one of the two remaining sides (called “legs”) is 10 in long. Find the measurement of the missing side length.(Pythagorean Theorem: $a^{2}+b^{2}=c^{2} \leftarrow c$ = hypotenuse) |
| 21. Find the measurement of the missing side length.(Pythagorean Theorem: $a^{2}+b^{2}=c^{2} \leftarrow c$ = hypotenuse) | 22. Find the measurement of the missing side length.(Pythagorean Theorem: $a^{2}+b^{2}=c^{2} \leftarrow c$ = hypotenuse) |