**Adjacent angles**

**Complementary angles**

**Pairs of Angles**

**Supplementary angles**

**Vertical angles**

**Linear Pair of Angles**

**Adjacent Angles**

|  |  |
| --- | --- |
| $ T S$ $$ $$$ K L$ | **Adjacent angles are angles that share a common side and have the same vertex, but have no interior points in common.** |

**A Linear Pair of Angles**

|  |  |
| --- | --- |
| $ C$ $$ A O B$$ | **Two angles form a linear pair if and only if they are adjacent and their non-common sides are opposite rays.** |

**Sample Problem 1**: **Tell whether the angles are only adjacent, adjacent and form a linear pair or not adjacent.**

|  |  |  |  |
| --- | --- | --- | --- |
| **a.** | $$∠BOH and ∠AOR $$$$∠HOR and ∠AOR$$$∠BOH and ∠AOH$ $ R H$ $$ $$$$ A O B$$ | **b.**  | $$∠SFV and ∠SFC $$$$∠TFP and ∠SFP$$$∠CFP and ∠SFV$ $ P C $$$ S F T$$$$ V $$ |
|  | $$∠BOH and ∠AOR-not adjacent$$$$∠HOR and ∠AOR- adjacent$$$$∠BOH and ∠AOH-adjacent and linear pair$$ |  | $$∠SFV and ∠SFC- adjacent and linear pair $$$$∠TFP and ∠SFP- adjacent and linear pair$$$∠CFP and ∠SFV- not adjacent$  |

**Complementary and Supplementary Angles**

|  |  |
| --- | --- |
| $ $$G$$ 55° 35° $$$ $$$$ K $$ | **Two angles are complementary if and only if the sum of their degree measures is**$ 90$ **.**$$m∠K+m∠G=90$$ |
| $ $$ 120° 60° $$$ Z L$$ | **Two angles are supplementary if and only if the sum of their degree measures is** $80$ **.**$$m∠Z+m∠L=180$$ |

**Sample Problem 2**: **Name a pair of adjacent complementary angles.**

|  |  |  |  |
| --- | --- | --- | --- |
| **a.** | $ P K C $$$ 75° 30°$$$$ 15° 60°$$$$ S F T$$ | **b.** | $ T C $$ Q 40°$$$ 45° 62°$$$ 45° B$$$ M 28° $$$$ J $$$$ N $$ |
|  | $$m∠TFC+m ∠CFK=60+30=90$$$$∠TFC and ∠CFK$$$$m∠KFP+m ∠PFS=75+15=90$$$$∠KFP and ∠PFS$$ |  | $$m∠JMQ+m ∠QMT=45+45=90$$$$∠JMQ and ∠QMT$$$$m∠BMC+m ∠NMB=62+28=90$$$$∠BMC and ∠NMB$$ |

**Sample Problem 3**: **Name a pair of adjacent supplementary angles.**

|  |  |  |  |
| --- | --- | --- | --- |
| **a.** | $ H $$$ $$$$ 100° 80°$$$$ D 144° C 36° A$$$$ S $$ | **b.** | $ Y H $$ X 40°$$ 45° 50°$$ L$$$ 135° J $$$$ $$$$ I $$ |
|  | $$m∠DCH+m ∠HCA=100+80=180$$$$∠DCH and ∠HCA$$$$m∠DCS+m ∠ACS=144+36=180$$$$∠DCS and ∠ACS$$ |  | $$m∠YJX+m ∠XJI=45+135=180$$$$∠YJX and ∠XJI$$$$m∠IJL+m ∠LJY=90+\left(50+40\right)=180$$$$∠IJL and ∠LJY$$ |

**Congruent angles**

|  |  |
| --- | --- |
| $ $$60°$$ $$ 60°$$L$$M$$$ $$ | **Two angles are congruent if and only if they have the same degree measure.**  |
| $$m∠L =m∠M $$$$∠L ≅∠M $$ |

**Vertical Angles**

|  |  |
| --- | --- |
| $$ $$$ K E $ $ 2$$ 1 T 3$$ 4 $$L$$A $ | **Two angles are vertical if and only if they are two nonadjacent angles formed by a pair of intersecting lines.****Vertical angles are congruent.** |
| $$∠2 ≅∠4 $$$$∠1 ≅∠3 $$ |

**Sample Problem 4**: **Find the indicated angle measures.**

|  |  |  |
| --- | --- | --- |
| **a.** | $m∠ADG=38$**Find** $ m∠LDC$ **,**$ m∠LDA, and m∠CDG.$$ G C$$$ 38°$$$$ D $$$ A L$  | $$m∠ADG=38$$$$∠ADG and ∠LDC are vertical angles$$$$m∠ADG=m ∠LDC$$$$m ∠LDC=38 $$$$m∠ADG+m∠CDG=180 $$$$m∠CDG=180-m∠ADG$$$$m∠CDG=180-38$$$$m∠CDG=142$$$$∠CDG and ∠LDA are vertical angles$$$$m∠LDA=m∠CDG$$$m∠LDA=142$ |
| **b.** | $m∠DMR=121$**Find** $ m∠TMF$ **,**$ m∠FMR, and m∠TMD$$ R D$$$ 121°$$$$ $$$$ M $$$ F T$  | $$m∠DMR=121$$$$∠DMR and ∠TMF are vertical angles$$$$m∠DMR=m∠TMF$$$$m ∠TMF=121 $$$$m∠DMR+m∠FMR=180 $$$$m∠FMR=180-m∠DMR$$$$m∠FMR=180-121$$$$m∠FMR=59$$$$∠TMD and ∠FMR are vertical angles$$$$m∠TMD=m∠FMR$$$m∠TMD=59$ |