Two-column Proof

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| Given: $∠1 and ∠6$ are vertical angles. $m∠1=\left(4x-2\right)˚$ and $m∠6=\left(8x-14\right)˚$Prove: $m∠6=10˚$ |
| **Statements** | **Reasons** |
| $∠1 and ∠6$ are vertical angles, $m∠1=\left(4x-2\right)˚$ and $m∠6=\left(8x-14\right)˚$ | 1. |
| $$∠1≅∠6$$ | 2. |
| $$m∠1=m∠6$$ | 3. |
| $$\left(4x-2\right)˚=\left(8x-14\right)˚$$ | 4. |
| $$-2=4x-14$$ | 5. |
| $$12=4x$$ | 6. |
| $$3=x$$ | 7. |
| $$x=3$$ | 8. |
| $$m∠6=\left(8(3)-14\right)˚$$ | 9. |
| $$m∠6=10˚$$ | 10. |

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| Given:$ ∠3 and ∠5$ are complementary angles. $m∠3=\left(6x+4\right)˚$ and $m∠5=\left(2x+6\right)˚$Prove: $m∠3=64˚$ |
| **Statements** | **Reasons** |
| $∠3 and ∠5$ are complementary angles. $m∠3=\left(6x+4\right)˚$ and $m∠5=\left(2x+6\right)˚$ | 11. |
| $$m∠3+m∠5=90˚$$ | 12. |
| $$\left(6x+4\right)˚+\left(2x+6\right)˚=90˚$$ | 13. |
| $$8x+10=90$$ | 14. |
| $$8x=80$$ | 15. |
| $$x=10$$ | 16. |
| $$m∠3=\left(6(10)+4\right)˚$$ | 17. |
| $$m∠3=64˚$$ | 18. |

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| Given: $H is the midpoint of \overbar{GI}$. $GH=5$Prove: $GI=10$ |
| **Statements** | **Reasons** |
| $H is the midpoint of \overbar{GI}$. $GH=5$ | 19. |
| $$2(GH)=GI$$ | 20. |
| $$2(5)=GI$$ | 21. |
| $$10=GI$$ | 22. |
| $$GI=10$$ | 23. |

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| Given: $m∠5=\left(20x+1\right)˚$ and $m∠8=\left(16x+13\right)˚$ Prove: $x=3$ |
| **Statements** | **Reasons** |
| $m∠5=\left(20x+1\right)˚$ and $m∠8=\left(16x+13\right)˚$ | 24.  |
| $∠5 and ∠8$ are **[#25.]** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles | [🡨Do #25 first] 26. |
| $$∠5≅∠8$$ | 27. |
| $$m∠5=m∠8$$ | 28. |
| $$\left(20x+1\right)˚=\left(16x+13\right)˚$$ | 29. |
| $$4x+1=13$$ | 30. |
| $$4x=12$$ | 31. |
| $$x=3$$ | 32. |

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| Given: $m∠3=25˚$ and $m∠6=155˚$ Prove: $h||k$ |
| **Statements** | **Reasons** |
| $m∠3=25˚$ and $m∠6=155˚$ | 33. |
| $$m∠3+m∠6=m∠3+m∠6$$ | 34. |
| $$m∠3+m∠6=\left(25\right)˚+\left(155\right)˚$$ | 35. |
| $$m∠3+m∠6=180˚$$ | 36. |
| $$h||k$$ | 37. |

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| Given: Prove: $m∠DEF=49˚$ |
| **Statements** | **Reasons** |
| $∠DEF$ and $∠FEG$ are a linear pair | 38. |
| $$m∠DEF+m∠FEG=180˚$$ | 39. |
| $$m∠FEG=131˚$$ | 40. |
| $$m∠DEF+131˚=180˚$$ | 41. |
| $$m∠DEF=49˚$$ | 42. |