习题 5.1

1. 同向，垂直.

2. $5\boldsymbol{a} - 11\boldsymbol{b} + 7\boldsymbol{c}$

3. 证明：设四边形 $ABCD$ 的对角线 AC，BD 互相平分于点 O，则 $\overrightarrow{AO} = \overrightarrow{OC}$，$\overrightarrow{DO} = \overrightarrow{OB}$，于是 $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = \overrightarrow{OC} + \overrightarrow{DO} = \overrightarrow{DC}$，由此可见 $\overrightarrow{AB} /\!/ \overrightarrow{DC}$，$|\overrightarrow{AB}| = |\overrightarrow{DC}|$，因此四边形 $ABCD$ 是平行四边形.

4. $\overrightarrow{D_1A} = -\dfrac{1}{5}\boldsymbol{a} - \boldsymbol{c}$，$\overrightarrow{D_2A} = -\dfrac{2}{5}\boldsymbol{a} - \boldsymbol{c}$，$\overrightarrow{D_3A} = -\dfrac{3}{5}\boldsymbol{a} - \boldsymbol{c}$，$\overrightarrow{D_4A} = -\dfrac{4}{5}\boldsymbol{a} - \boldsymbol{c}$.

5. $\overrightarrow{BC} = \boldsymbol{a} + \boldsymbol{b}$，$\overrightarrow{CD} = \boldsymbol{b}$，$\overrightarrow{DE} = -\boldsymbol{a}$，$\overrightarrow{EF} = -(\boldsymbol{a} + \boldsymbol{b})$.