

For this entire problem, let $A = (2, 3)$, $B = (3, -6)$, and $C = (-2, -2)$.

1. Which is longer: \overline{AB} or \overline{AC} ?
2. Is $\triangle ABC$ scalene, isosceles, or equilateral? Explain.
3. Compute the perimeter of $\triangle ABC$, rounded to the nearest tenth.
4. Find a fourth point D on \overrightarrow{AB} for which $BD = BA$.
5. Find a fifth point E on \overrightarrow{AC} where $CE = 2AE$.
6. Find a sixth point F on \overrightarrow{BC} where $BF = 3BC$.

1. Segment \overline{AB} is the hypotenuse of a 1-by-9 right triangle, so its length is $\sqrt{82}$ while \overline{AC} is only the hypotenuse of a 4-by-5 right triangle, having a length of just $\sqrt{41}$. The longer segment is \overline{AB} .
2. Side \overline{BC} is the hypotenuse of a 5-by-4 right triangle, just as \overline{AC} is, so the triangle is isosceles.
3. The perimeter is $\sqrt{82} + \sqrt{41} + \sqrt{41} = 9.1 + 6.4 + 6.4 = 21.9$ (no units).
4. $D = (4, 15)$
5. $E = (6, 8)$ or $(-10, -12)$
6. $F = (8, 6)$ or $(18, -18)$