

G.GPE.B.4: Triangles in the Coordinate Plane

1 The coordinates of the vertices of $\triangle RST$ are $R(-2,-3)$, $S(8,2)$, and $T(4,5)$. Which type of triangle is $\triangle RST$?

- 1) right
- 2) acute
- 3) obtuse
- 4) equiangular

2 Triangle ABC has vertices $A(0,0)$, $B(3,2)$, and $C(0,4)$. The triangle may be classified as

- 1) equilateral
- 2) isosceles
- 3) right
- 4) scalene

3 Which type of triangle can be drawn using the points $(-2,3)$, $(-2,-7)$, and $(4,-5)$?

- 1) scalene
- 2) isosceles
- 3) equilateral
- 4) no triangle can be drawn

4 If the vertices of $\triangle ABC$ are $A(-2,4)$, $B(-2,8)$, and $C(-5,6)$, then $\triangle ABC$ is classified as

- 1) right
- 2) scalene
- 3) isosceles
- 4) equilateral

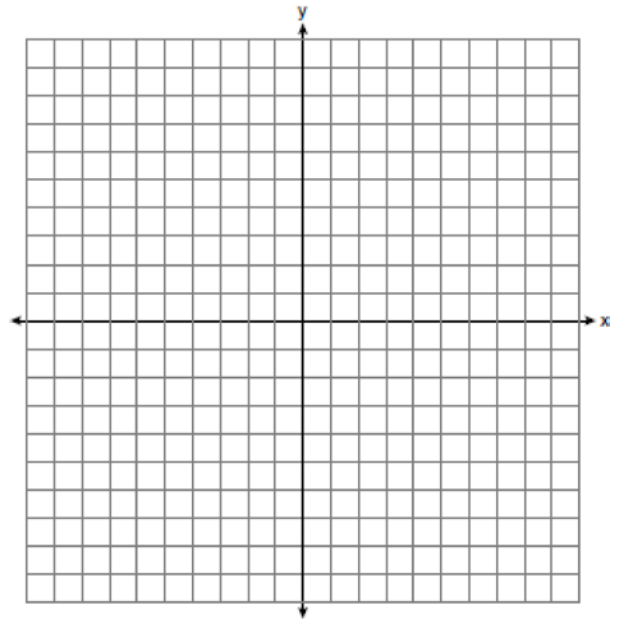
5 The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?

- 1) $m\angle A = m\angle B$
- 2) $m\angle A = m\angle C$
- 3) $m\angle ACB = 90$
- 4) $m\angle ABC = 60$

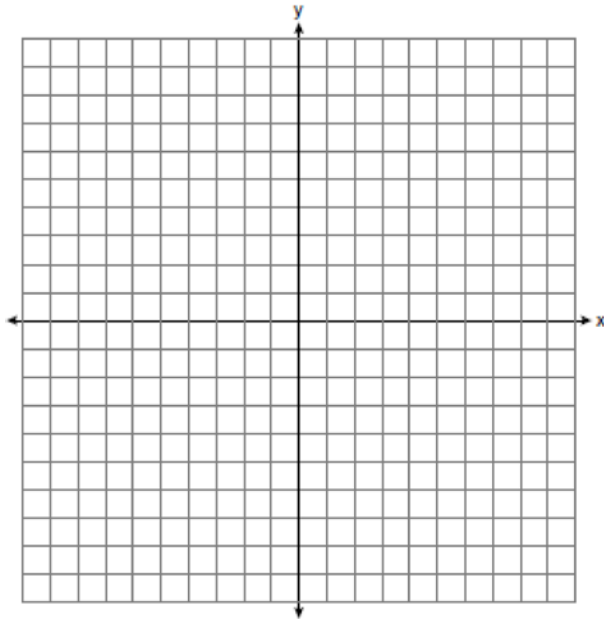
6 Given: Triangle RST has coordinates $R(-1,7)$, $S(3,-1)$, and $T(9,2)$

Prove: $\triangle RST$ is a right triangle

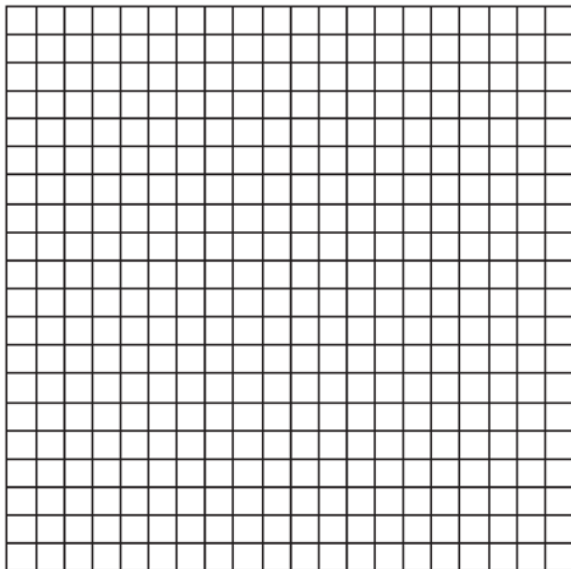
[The use of the set of axes below is optional.]



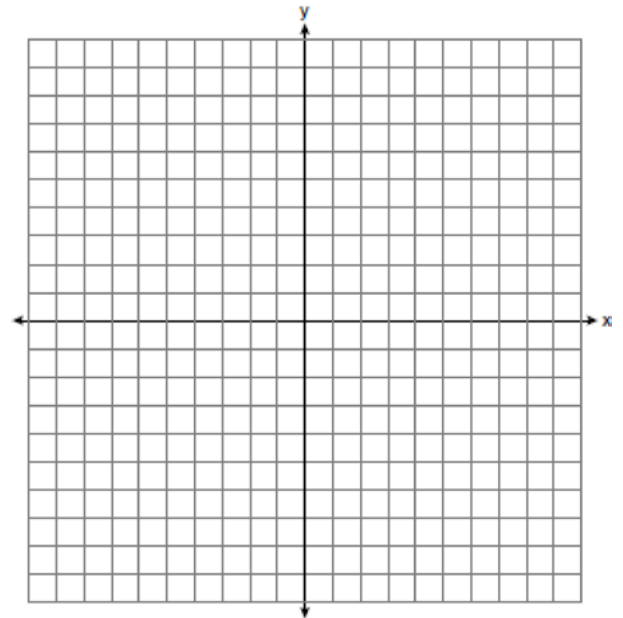
- 7 Triangle ABC has vertices with $A(x, 3)$, $B(-3, -1)$, and $C(-1, -4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]



- 8 Given: $J(-4, 1)$, $E(-2, -3)$, $N(2, -1)$
 Prove: $\triangle JEN$ is an isosceles right triangle.
 [The use of the grid is optional.]



- 9 Triangle PQR has vertices $P(-3, -1)$, $Q(-1, 7)$, and $R(3, 3)$, and points A and B are midpoints of \overline{PQ} and \overline{RQ} , respectively. Use coordinate geometry to prove that \overline{AB} is parallel to \overline{PR} and is half the length of \overline{PR} . [The use of the set of axes below is optional.]



G.GPE.B.4: Triangles in the Coordinate Plane Answer Section

1 ANS: 1

$$m_{RT} = \frac{5-3}{4-2} = \frac{2}{2} = 1 \quad m_{ST} = \frac{5-2}{4-8} = \frac{3}{-4} = -\frac{3}{4}$$

Slopes are opposite reciprocals, so lines form a right angle.

REF: 011618geo

2 ANS: 2 REF: 061115ge

3 ANS: 2 REF: 081226ge

4 ANS: 3

$$AB = 8 - 4 = 4. \quad BC = \sqrt{(-2 - (-5))^2 + (8 - 6)^2} = \sqrt{13}. \quad AC = \sqrt{(-2 - (-5))^2 + (4 - 6)^2} = \sqrt{13}$$

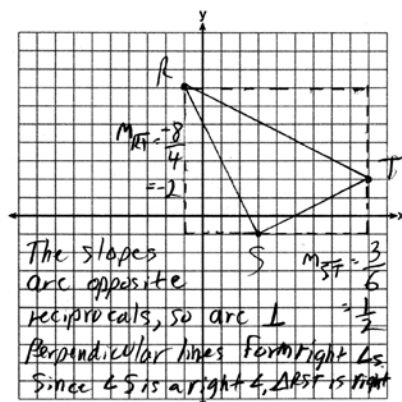
REF: 011328ge

5 ANS: 1

Since $\overline{AC} \cong \overline{BC}$, $m\angle A = m\angle B$ under the Isosceles Triangle Theorem.

REF: fall0809ge

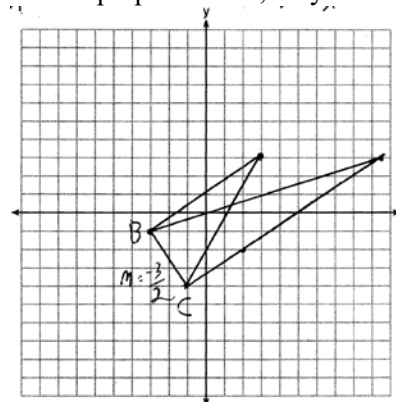
6 ANS:



REF: 011637ge

7 ANS:

The slopes of perpendicular line are opposite reciprocals. Since the lines are perpendicular, they form right angles



and a right triangle. $m_{\overline{BC}} = -\frac{3}{2}$ $-1 = \frac{2}{3}(-3) + b$ or $-4 = \frac{2}{3}(-1) + b$

$$m_{\perp} = \frac{2}{3} \quad -1 = -2 + b \quad \frac{-12}{3} = \frac{-2}{3} + b$$

$$1 = b$$

$$3 = \frac{2}{3}x + 1$$

$$-\frac{10}{3} = b$$

$$2 = \frac{2}{3}x$$

$$3 = \frac{2}{3}x - \frac{10}{3}$$

$$3 = x$$

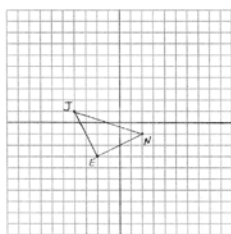
$$9 = 2x - 10$$

$$19 = 2x$$

$$9.5 = x$$

REF: 081533geo

8 ANS:



To prove that $\triangle JEN$ is a right triangle, prove that its legs are perpendicular by showing their

slopes are opposite reciprocals: $m_{\overline{JE}} = \frac{1 - 3}{-4 - -2} = \frac{4}{-2} = -2$

$$m_{\overline{EN}} = \frac{-3 - -1}{-2 - 2} = \frac{-2}{-4} = \frac{1}{2}$$

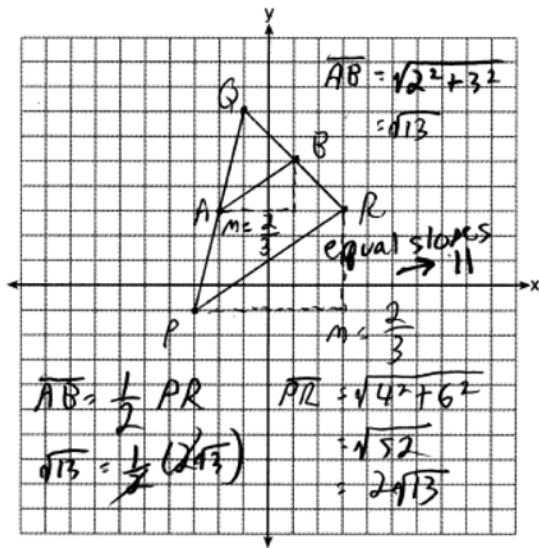
To prove that $\triangle JEN$ is an isosceles triangle, prove that its legs are congruent by using the distance formula:

$$d_{\overline{JE}} = \sqrt{(-4 - (-2))^2 + (1 - (-3))^2} = \sqrt{20}$$

$$d_{\overline{EN}} = \sqrt{(-2 - 2)^2 + (-3 - -1)^2} = \sqrt{20}$$

REF: 011029b

9 ANS:



REF: 081732geo