

SECTION 6.2 - COORDINATE GEOMETRY

REVIEW:

① SIMPLIFY $\sqrt{32}$

$4\sqrt{2}$

$$\begin{array}{c} \uparrow \\ 2 \cdot 16 \\ \uparrow \\ 4 \cdot 4 \end{array}$$

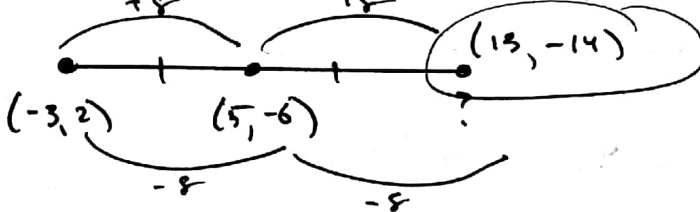
② FIND THE MIDPOINT OF THE SEGMENT WHOSE ENDPPOINTS ARE $(-1, 5)$ AND $(3, -7)$.

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

$$\frac{-7+5}{2} = \frac{-2}{2} = -1$$

$M(1, -1)$

③ FIND THE MISSING ENDPPOINT.



EXAMPLE 1. $\triangle ABC$ HAS VERTICES AT $A(3, 2)$, $B(3, 5)$, AND $C(-4, 2)$.

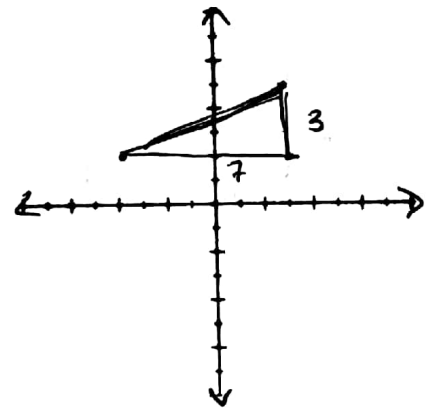
① FIND THE PERIMETER OF $\triangle ABC$.

$$3^2 + 7^2 = 9 + 49 = \sqrt{58}$$

$$P = 3 + 7 + \sqrt{58} = 10 + \sqrt{58}$$

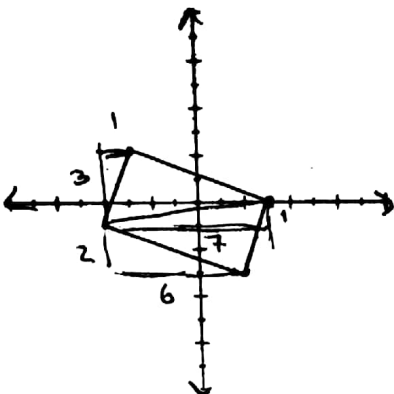
② FIND THE AREA OF $\triangle ABC$.

$$A = \frac{1}{2}bh = \frac{1}{2}(7)(3) = \frac{21}{2} = 10.5$$



EXAMPLE 2. FIND THE LENGTH OF THE DIAGONAL OF THE RECTANGLE GRAPHED BELOW.

$$d = \sqrt{7^2 + 1^2} = \sqrt{50} = 5\sqrt{2}$$



EXAMPLE 3. FIND THE AREA OF THE RECTANGLE

$$\sqrt{1^2 + 3^2} = \sqrt{10}$$

$$\sqrt{2^2 + 6^2} = \sqrt{40}$$

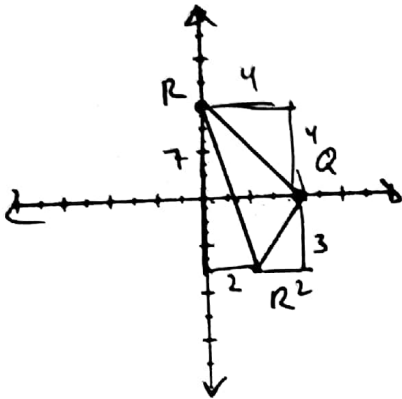
$$A = \sqrt{10} \sqrt{40}$$

$$= \sqrt{400} = 20$$

①

APPLICATIONS.

① FIND THE PERIMETER OF $\triangle PQR$.



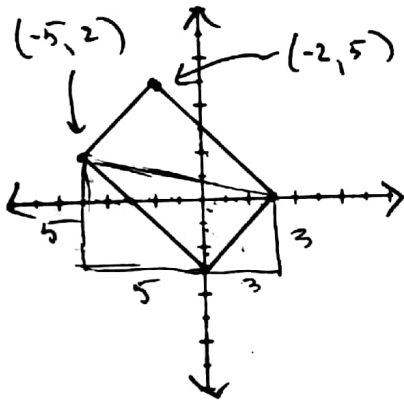
$$\sqrt{4^2 + 4^2} = \sqrt{32} = 4\sqrt{2}$$

$$\sqrt{7^2 + 2^2} = \sqrt{49 + 4} = \sqrt{53}$$

$$\sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13}$$

$$P = 4\sqrt{2} + \sqrt{53} + \sqrt{13} \approx 16.5$$

② FIND THE AREA OF THE RECTANGLE GRAPHED BELOW.



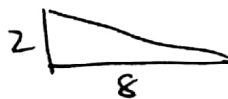
$$\sqrt{3^2 + 3^2} = \sqrt{18} = 3\sqrt{2}$$

$$\sqrt{5^2 + 5^2} = \sqrt{50} = 5\sqrt{2}$$

$$A = (3\sqrt{2})(5\sqrt{2}) = 15 \cdot 2 = 30$$

③ FIND THE LENGTH OF THE DIAGONAL OF THE RECTANGLE IN NUMBER

②.



$$\sqrt{2^2 + 8^2} = \sqrt{4 + 64} = \sqrt{68} \approx 8.2$$

④ FIND THE PERIMETER OF THE RECTANGLE IN NUMBER ②.

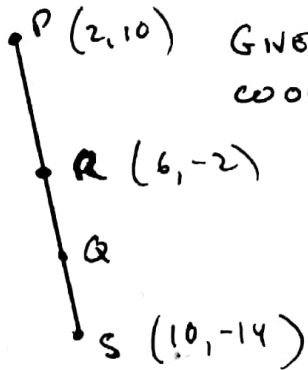
$$P = 3\sqrt{2} + 3\sqrt{2} + 5\sqrt{2} + 5\sqrt{2}$$

$$= 16\sqrt{2} \approx 22.6$$

②

5) R IS THE MIDPOINT OF \overline{PS} . Q IS THE MIDPOINT OF \overline{RS} .

GIVEN $P(2, 10)$ AND $S(10, -14)$, WHAT ARE THE COORDINATES OF Q?



$$R: \frac{2+10}{2} = \frac{12}{2} = 6 \quad \frac{10+(-14)}{2} = \frac{-4}{2} = -2$$

$$(6, -2)$$

$$Q: \frac{6+10}{2} = 8 \quad \frac{-2+(-14)}{2} = \frac{-16}{2} = -8$$

$$(-2, -8)$$

6) WHAT IS THE LENGTH OF A SEGMENT WHOSE ENDPONTS ARE $(3, -2)$ AND $(7, 6)$?

$$d = \sqrt{(7-3)^2 + (6-(-2))^2} = \sqrt{4^2 + 8^2} = \sqrt{16 + 64} = \sqrt{80}$$

$$= 4\sqrt{5} \approx 8.9$$

7) A FLEA SITTING ON A PIECE OF GRAPH PAPER HOPS FROM $A(0, 0)$ TO $B(3, 2)$, THEN TO $C(-4, -2)$, AND FINALLY LANDS AT $D(-4, 3)$.

A) WHAT WAS THE TOTAL DISTANCE THE FLEA TRAVELED?

$$\overline{AB} \quad \sqrt{3^2 + 2^2} = \sqrt{13}$$

$$\overline{CD} \quad \sqrt{(-4-(-4))^2 + (3-(-2))^2} = 5$$

$$\overline{BC} \quad \sqrt{(3-(-4))^2 + (2-(-2))^2} = \sqrt{49 + 16} = \sqrt{65}$$

$$\text{DIST} = \sqrt{13 + \sqrt{65} + 5}$$

B) HOW FAR FROM THE STARTING POINT DID THE FLEA END UP? $A(0, 0) \rightarrow D(-4, 3)$ ≈ 5 UNITS

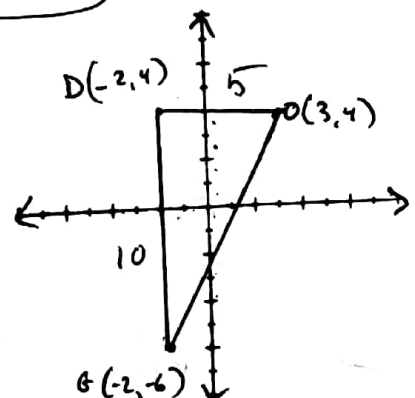
$$\sqrt{(-4)^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25} = 5 \text{ UNITS}$$

8) WHAT IS THE PERIMETER OF $\triangle DOG$?

$$\sqrt{5^2 + 10^2} = \sqrt{125} = 5\sqrt{5}$$

$$P = 10 + 5 + 5\sqrt{5} = 15 + 5\sqrt{5}$$

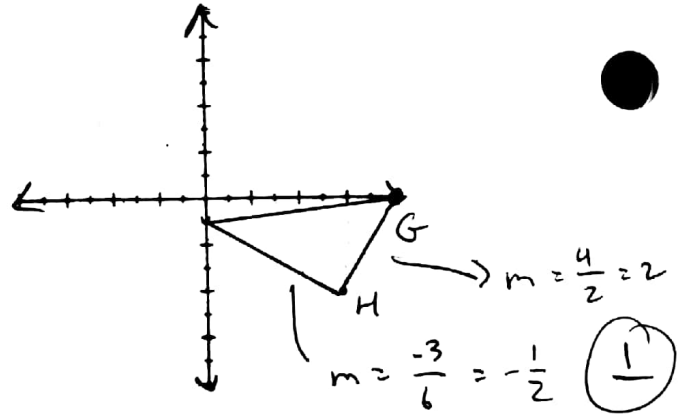
$$\approx 26.1$$



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7) THE VERTICES OF $\triangle GHI$ ARE $G(8,0)$, $H(6,-4)$, AND $I(0,-1)$. WHAT TYPE OF TRIANGLE IS $\triangle GHI$?

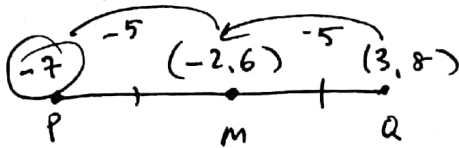
- (A) RIGHT SCALENE
- (B) NON-RIGHT SCALENE
- (C) RIGHT ISOSCELES
- (D) NON-RIGHT ISOSCELES



10) WHICH LINE SEGMENT IS PERPENDICULAR TO THE LINE $y = -\frac{1}{3}x - 10$?

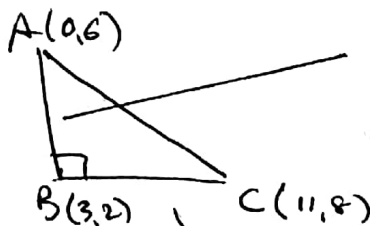
- (A) \overline{AB} WITH ENDPPOINTS $A(-1,4)$ AND $B(5,2)$. $m = \frac{4-2}{-1-5} = \frac{-2}{-6} = \frac{1}{3}$ ✗
- (B) \overline{CD} WITH ENDPPOINTS $C(-1,4)$ AND $D(-4,-5)$. $m = \frac{4-(-5)}{-1-(-4)} = \frac{9}{3} = 3$ ✓
- (C) \overline{FG} WITH ENDPPOINTS $F(-1,4)$ AND $G(2,5)$. $m = \frac{5-4}{2-(-1)} = \frac{1}{3}$ ✗
- (D) \overline{RS} WITH ENDPPOINTS $R(-1,4)$ AND $S(0,-10)$. $m = \frac{4-(-10)}{-1-0} = \frac{14}{-1}$ ✗

11) M IS THE MIDPOINT OF \overline{PQ} . M IS LOCATED AT $M(-2,6)$ AND Q IS LOCATED AT $Q(3,8)$. IF THE COORDINATES OF P ARE (x,y) , WHAT IS THE VALUE OF x?



-7

12) A RIGHT TRIANGLE HAS VERTICES AT $A(0,6)$, $B(3,2)$ AND $C(11,8)$. $\angle ABC$ IS A RIGHT ANGLE. WHAT IS THE AREA OF $\triangle ABC$?



$$\sqrt{(3-0)^2 + (2-6)^2} = \sqrt{9 + 16} = 5$$

$$A = \frac{1}{2}(5)(10) = 25$$

$$\sqrt{(11-3)^2 + (8-2)^2} = \sqrt{64 + 36} = 10$$