9.5 HW Key
#4, 6, 8, 9, 16, 19, 20, 22

4.

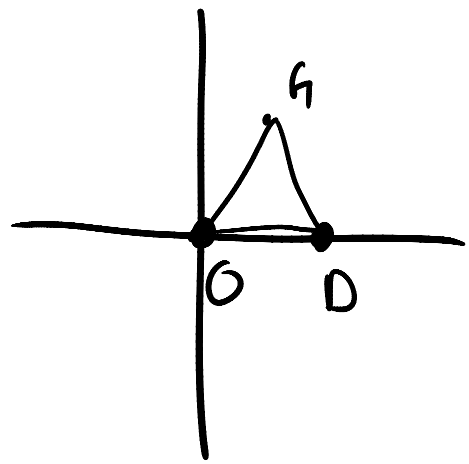
$DO = 6$

$OG = \sqrt{(3\sqrt{3}-0)^2 + (3-0)^2}$

$= \sqrt{27 + 9}$

$= \sqrt{36}$

$= 6$



$DG = \sqrt{(6-3)^2 + (0-3\sqrt{3})^2}$

$= \sqrt{3^2 + (-3\sqrt{3})^2}$

$= \sqrt{9 + 27}$

$= \sqrt{36} = 6$

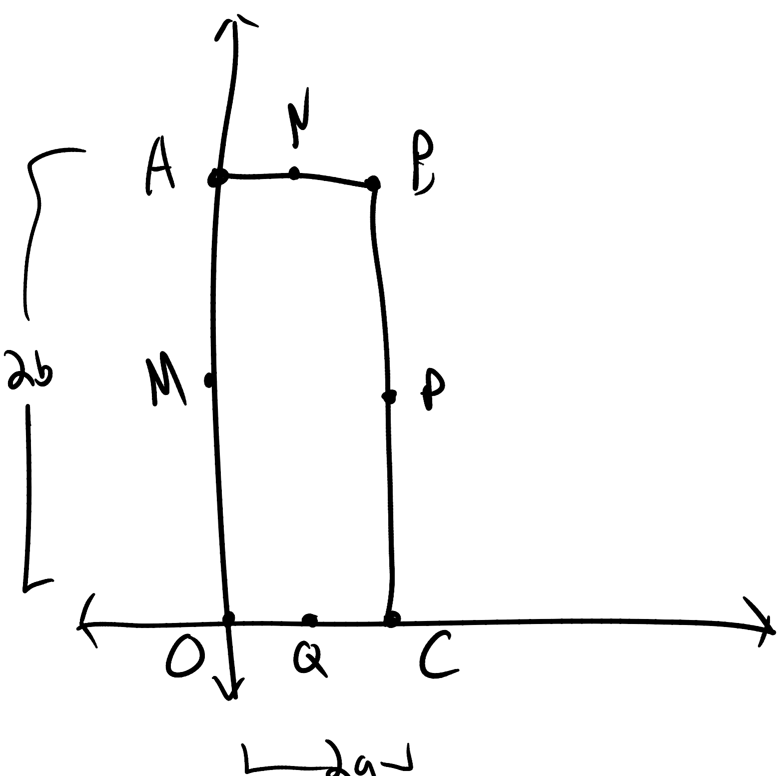
8. a)

$A = (0, 2b)$

$B = (2a, 2b)$

$C = (2a, 0)$

$O = (0, 0)$



b) $M = (0, b)$

$N = (a, 2b)$

$P = (2a, b)$

$Q = (a, 0)$

8c) slope of $\overline{MN}$ $\dfrac{2b-b}{a-0} = \dfrac{b}{a}$

slope of $\overline{QP}$ $\dfrac{(b-0)}{(2a-a)} = \dfrac{b}{a}$

▱ (opp sides have same slope ⇒ parallel)

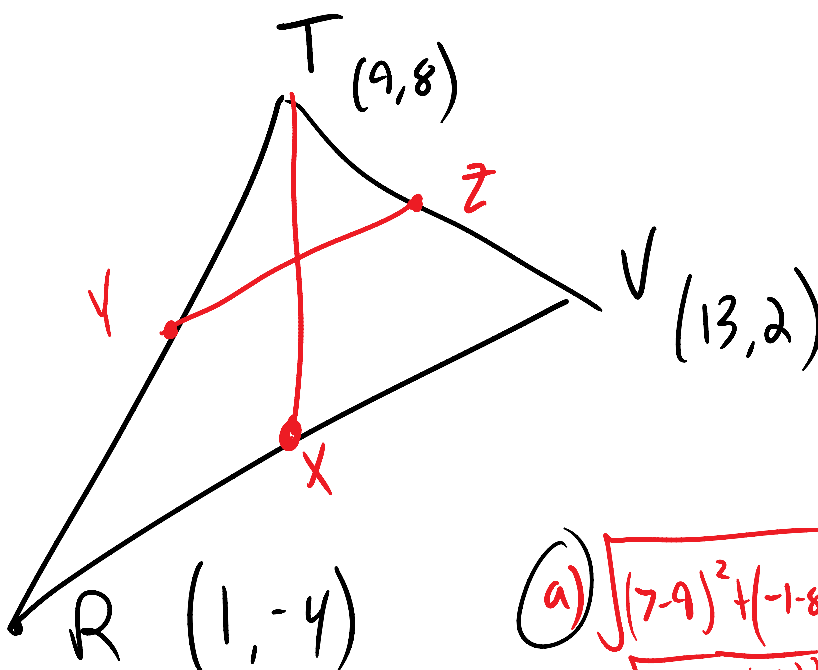
slope of $\overline{MQ}$ $\dfrac{(0-b)}{(a-0)} = \dfrac{-b}{a}$

slope of $\overline{NP}$ $\dfrac{(b-2b)}{(2a-a)} = \dfrac{-b}{a}$

d) all have lengths $\sqrt{b^2+a^2}$

all sides $\cong$ ⇒ rhombus!

6.



$X = \left(\dfrac{1+13}{2}, \dfrac{-4+2}{2}\right)$

$X = (7, -1)$

$Y = (5, 2)$

$Z = (11, 5)$

a) $\sqrt{(7-9)^2+(-1-8)^2}$

$= \sqrt{(-2)^2+(-9)^2}$

$= \sqrt{4+81}$

$= \sqrt{85}$

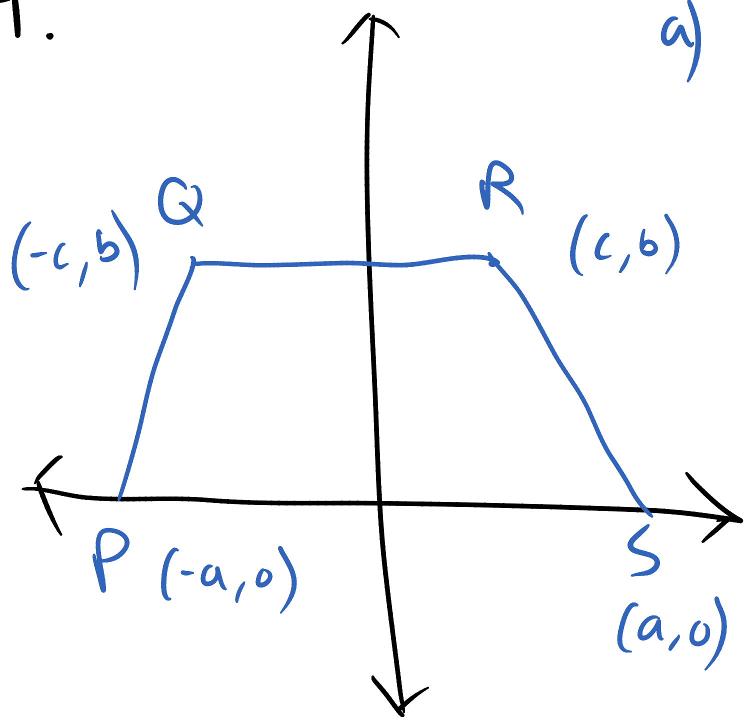
b) $YZ = \sqrt{(5-2)^2+(11-5)^2}$

$= \sqrt{9 + 36}$

$= \sqrt{45}$

$= 3\sqrt{5}$

9.



a) $PQ = \sqrt{(-a+c)^2 + (0-b)^2}$

$= \sqrt{(-a+c)^2 + (-b)^2}$

$= \sqrt{(c-a)^2 + b^2}$

$RS = \sqrt{(a-c)^2 + (0-b)^2}$

$= \sqrt{[-(c-a)]^2 + b^2}$

$=!$

b) $PR = \sqrt{(c+a)^2 + b^2}$

$QS = \sqrt{(a+c)^2 + (-b)^2}$

$= \sqrt{(c+a)^2 + b^2}$

$=!$

16. A $(-1,-3)$
B $(2, 1)$
C $(3, -2)$
D $(-2, 0)$

$AB = \sqrt{(2+1)^2 + (1+3)^2} = 5$

$BC = \sqrt{(3-2)^2 + (-2-1)^2} = \sqrt{10}$

$CD = \sqrt{(-2-3)^2 + (0+2)^2} = \sqrt{29}$

$DA = \sqrt{(-2-1)^2 + (0+3)^2} = \sqrt{9+9} = 3\sqrt{2}$

No two consecutive sides $\cong$

19. Show that $(1,2)$ $(4,6)$ and $(10,14)$ are collinear
$\quad\;\; A \qquad B \qquad\quad C$

a) distance formula

$$AB = \sqrt{(4-1)^2 + (6-2)^2}$$
$$= 5$$
$$BC = \sqrt{(10-4)^2 + (14-6)^2}$$
$$= \sqrt{36 + 64}$$
$$= 10$$
$$AC = \sqrt{(10-1)^2 + (14-2)^2}$$
$$= \sqrt{81 + 144}$$
$$= \sqrt{225} \quad = 15$$

$AC = AB + BC$! They are collinear

b) slope $\overline{AB} = \frac{6-2}{4-1} = \frac{4}{3}$

slope $\overline{BC} = \frac{14-6}{10-4} = \frac{8}{6} = \frac{4}{3}$

same slope!
$\therefore$ collinear

20. The point $(5,y)$ is equidistant from $(1,4)$ and $(10,-3)$. Find y.

Distance $(5,y)$ to $(1,4)$ = Distance $(5,y)$ to $(10,-3)$

$$\sqrt{(1-5)^2+(4-y)^2} = \sqrt{(10-5)^2+(-3-y)^2}$$

$$(1-5)^2+(4-y)^2 = (10-5)^2+(-3-y)^2$$

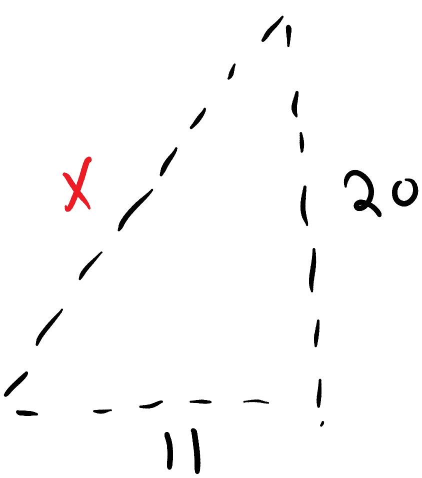
$$16+(y^2-8y+16) = 25+(y^2+6y+9)$$

$$y^2-8y+32 = y^2+6y+34$$

$$-2 = 14y$$

$$y = -1/7$$

22



$$11^2+20^2=x^2$$

$$121+400=x^2$$

$$521=x^2$$

$$x=\sqrt{521}$$

$$\sqrt{521}+20 = \approx 43m$$