REVIEW PACKET #4 FOR CUMULATIVE EXAM Name:_**KEY**__

1. Use graphs a & b below to answer parts a & b. Not standard

a. What rigid motion(s) could be used to show that ΔABC is congruent to ΔDFE?

(1) A reflection about $x=1$. $A'(-1,4)$ $B'(1,1)$ $C'(-2,1)$.

(2) Then a translation $(x,y) \to (x-1, y-5)$

* See text p.115

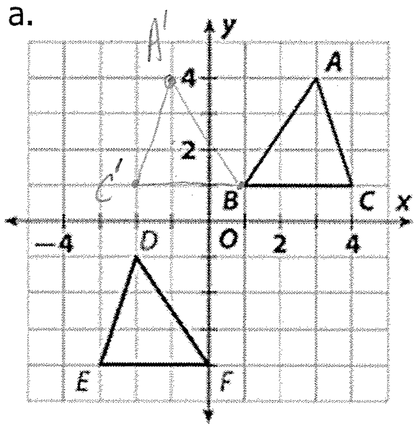
* Be sure to write coordinate notation if standard

b. What rigid motion(s) could be used to show that ABCDEFGH is congruent to MNPQRSTV?

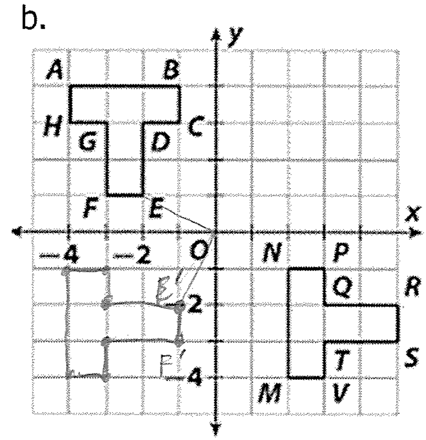
(1) A 90° rotation counterclockwise about the origin $(x,y) \to (-y,x)$

(2) A translation $(x,y) \to (x+6, y+0)$.

a.



b.



2. In ΔPRT $PS = 12.0$ cm, $UV = 2.7$ cm, and $ST = 7.3$ cm.

a. What is the measure of $\overline{RV}$? 5.4

b. What is the measure of $\overline{RS}$? = 7.3

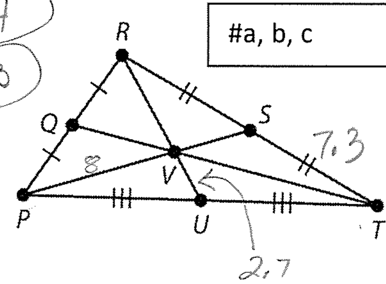
c. What is the measure of $\overline{PV}$? 8

c) $\frac{2}{3} PS = PV$

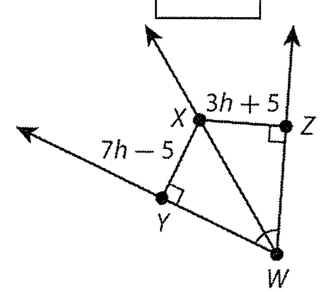
$\frac{2}{3}(12) = PV$

$\hookrightarrow PV = 8$

#a, b, c



Q#3



3. For what value of h will $\overrightarrow{WX}$ *be an angle bisector?*

$7h - 5 = 3h + 5$

$4h = 10$

$h = \frac{10}{4} = \frac{5}{2}$

$\boxed{h = \frac{5}{2}}$

4. The line 3x + 2y = 18 undergoes the transformation $R_{0,-90}$ (Counter-clockwise rotation centered at the origin). Find the image of the transformation.

original		rotation	
(6,0)	$\rightarrow$	(0,6)	$\leftarrow$ y-intercept
(0,9)	$\rightarrow$	(-9,0)	

$m_{rotation} = \frac{6-0}{0+9} = \frac{6}{9} = \frac{2}{3}$

$\boxed{y = \frac{2}{3}x + 6}$

* Review rules p 67 p 80 p 58

5. The line 2x + 6y = 18 undergoes a glide reflection. The glide (translation) is such that (x,y) → (x + 3, y – 7). Then the line is reflected over line y=x. Find the image of the translation.

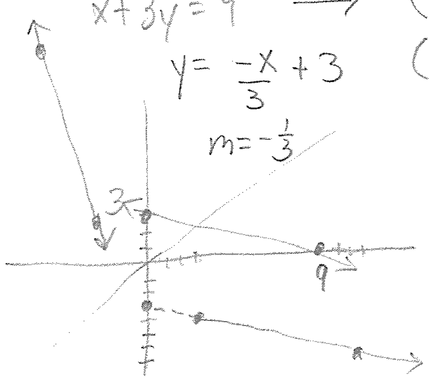
$2x + 6y = 18$

$x + 3y = 9$

$y = \frac{-x}{3} + 3$

$m = -\frac{1}{3}$

x & y intercepts		after translation		after reflection
(0, 3)	$\rightarrow$	(3, -4)	$\rightarrow$	(-4, 3)
(9, 0)	$\rightarrow$	(12, -7)	$\rightarrow$	(-7, 12)



after translation

$\boxed{y = -\frac{1}{3}x - 3}$

$m = \frac{12-3}{-7+4} = \frac{9}{-3} = -3$

$3 = -3(-4) + b$

$-9 = b$

$\boxed{y = -3x - 9}$

6. A rectangle has all the properties of a parallelogram plus two other properties. Write those two properties.

(1) There is one right ∠.

(2) Diagonals are ≅.

7. A rhombus has all the properties of a parallelogram plus three other properties. Write those three properties.

(1) All sides are ≅.

(2) Diagonals are ⊥.

(3) Diagonals bisect the ∠s they are drawn from.

8. A square had all the properties of a parallelogram, a rectangle and a rhombus.

9. Name all ways of proving a quadrilateral is a parallelogram.

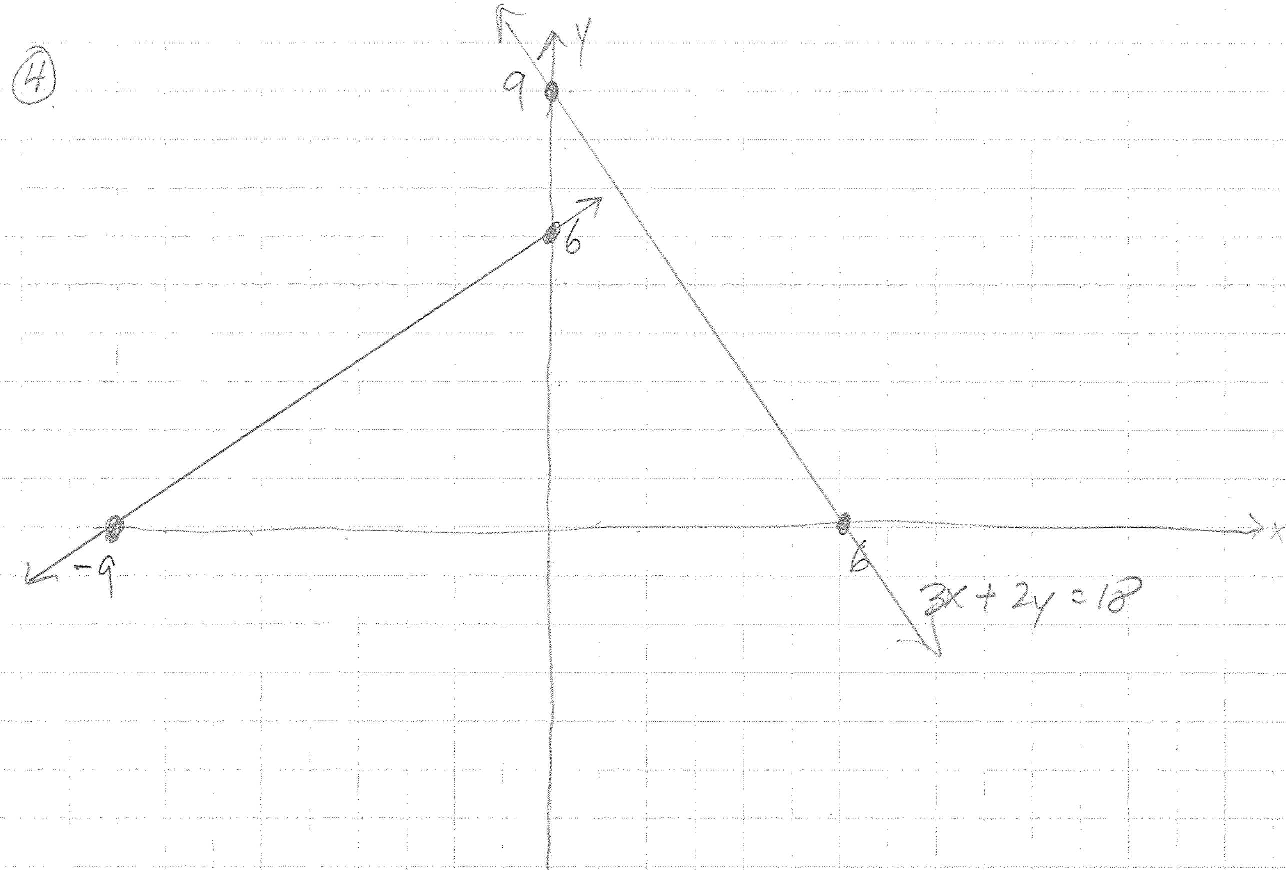
(1) Show 2 pairs opp sides ∥.

(2) Show 2 pairs opp sides ≅.

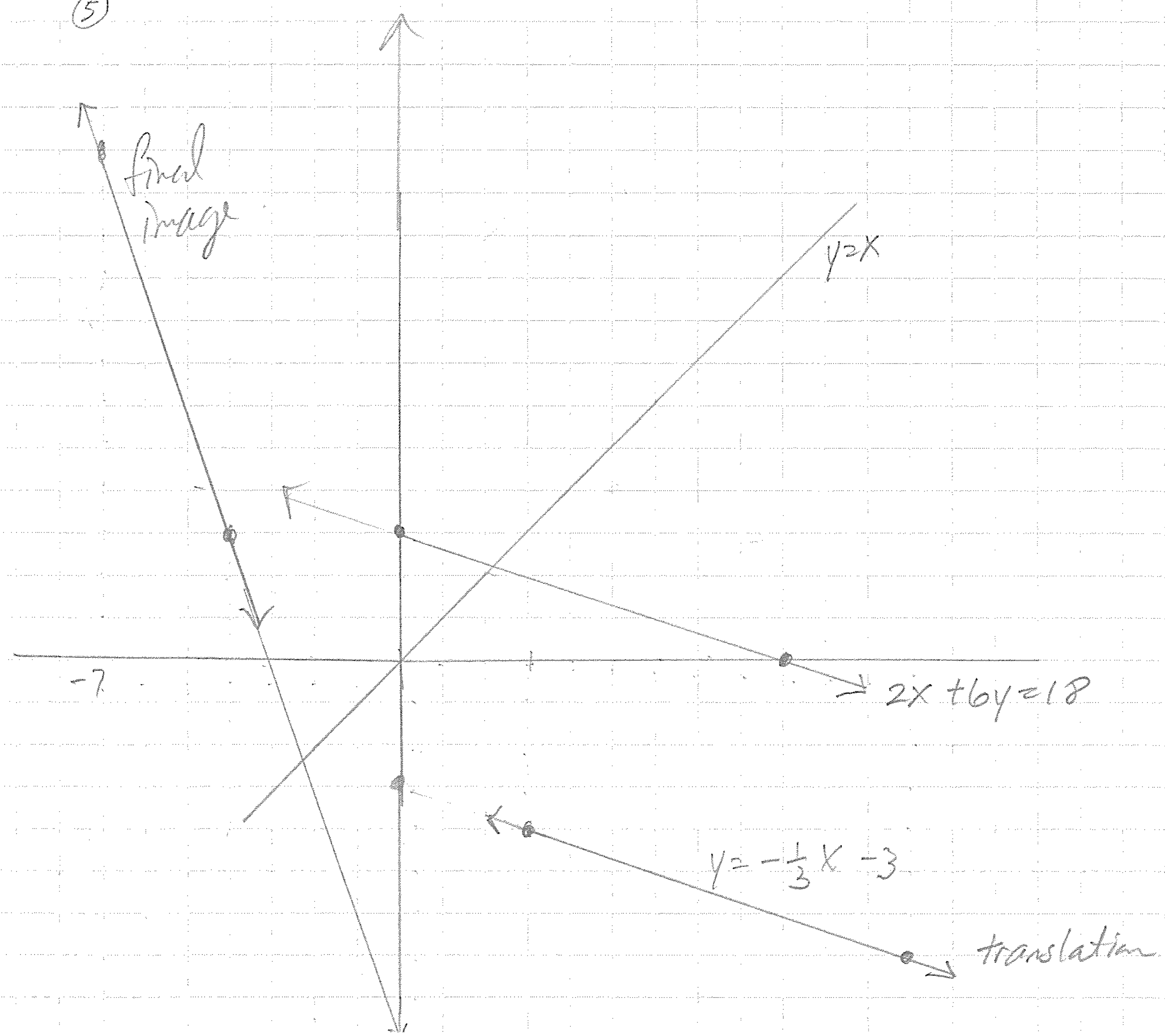
(3) Show diagonals bisect each other.

(4) Show 2 pairs opp ∠s ≅.

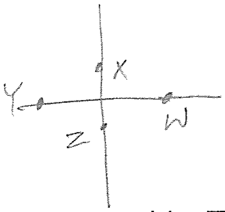
④



⑤



10. W (4, 0), X (0,3), Y (- 4, 0) and Z (0, - 3). What is the most specific name for quadrilateral WXYZ? Support with algebraic work, not just with a graph.



$XW = \sqrt{4^2+(-3)^2} = 5$

$WZ = \sqrt{4^2+3^2} = 5$

$YZ = \sqrt{(-4)^2+3^2} = 5$

$YX = \sqrt{4^2+3^2} = 5$

$XZ = \sqrt{0+6^2} = 6$

$YW = \sqrt{8^2+0} = 8$

Diagonals are $\not\cong$.

All 4 sides $\cong$.

$m_{\overline{XZ}} = \frac{3+3}{0-0}$ = undefined

$m_{\overline{YW}} = \frac{0-0}{4+4} = 0$

$\overline{XZ} \perp \overline{YW}$

$\boxed{\text{This is a rhombus.}}$

11. The length of one base of a trapezoid is 3 times the length of the other base. If the median is 12 cm, find the length of the bases.

Let x = one base

$3x$ = other base

$12 = \frac{1}{2}(x+3x)$

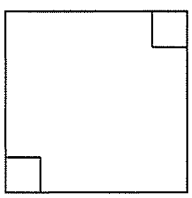
$24 = 4x$

$6 = x$

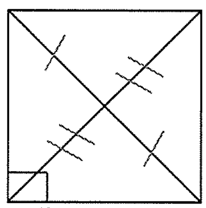
$\boxed{\text{Bases are 6 \& 18.}}$

12. Which of these are parallelograms, rectangles, and rhombuses?

a.

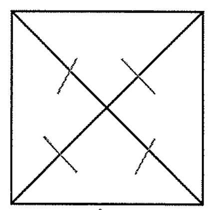


b.



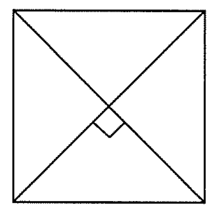
$\boxed{P}$ & rectangle

c.

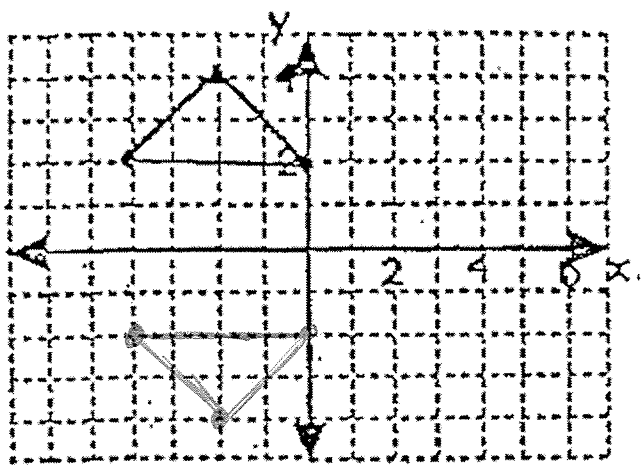


$\boxed{P}$ & rectangle

d.



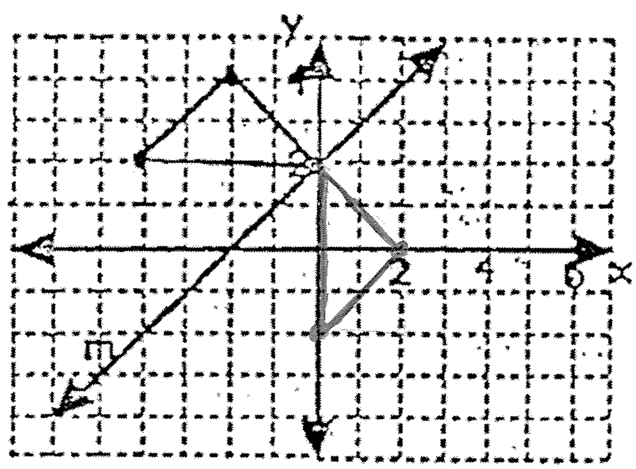
13. Draw the triangle after a reflection on the x-axis.



State the vertices of image:

(0, -2) (-4, -2) (-2, -4)

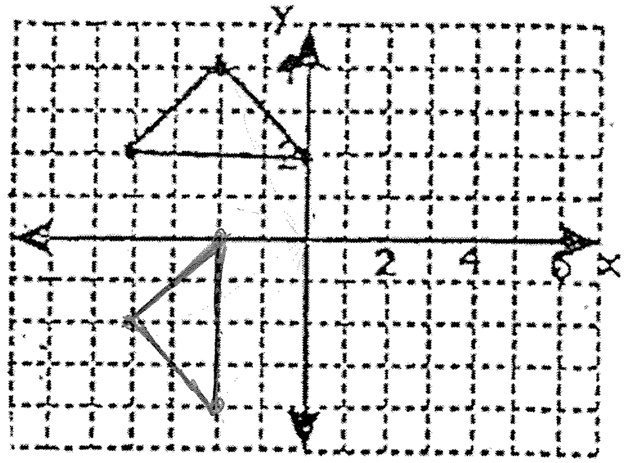
14. Draw the triangle after a reflection in line m.



State the vertices of image:

(0, 2) (2, 0) (0, -2)

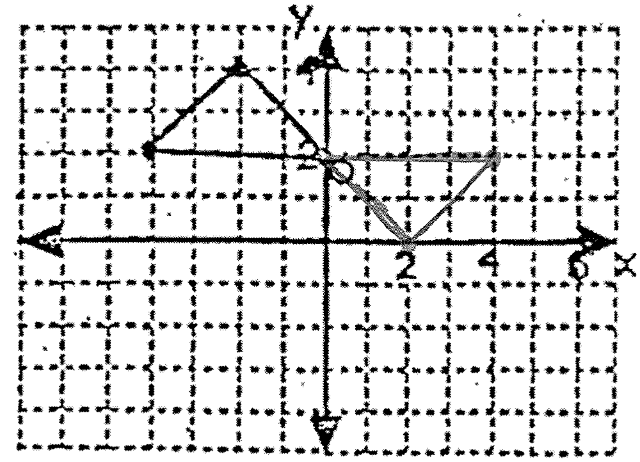
15. Draw the triangle after a counterclockwise rotation of 90° about the origin.



Vertices of image

(-2,0) (-4, -2) (-2, -4)

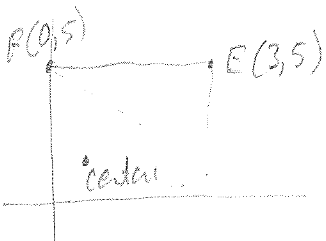
16. Draw the triangle after a 180° rotation around the point O.



Vertices of image

(0,2) (2,0) (4,2)

17. ΔDEF has vertices D (3, 1), E (3, 5), and F (0, 5). State the vertices of the image of ΔDEF after a dilation with a scale factor of 3 and with the center of dilation at (1,1).



distances:

center → D $d = \sqrt{2^2 + 0} = 2$

Vertices

D'(7,1)

E'(7,13)

F'(-2,13)

18. ΔWXY has vertices W (4, 0), X (4,8), and Y(-2, 8). Dilate the triangle using a factor of $\frac{1}{4}$ and the origin as the center.

Vertices

W'(1,0)

X'(1,2)

Y'($-\frac{1}{2}$, 2)

19. A builder moves excess dirt at (9, 16) and then maneuvers through the job site along the vectors < -6, 0>, < 2, 5 >, <8, 10> to get to the spot to unload the dirt.

a. find the coordinates of the unloading point. $\boxed{= (13, 31)}$

9, 16	3, 16	5, 21
-6, 0	2, 5	8, 10
3, 16	5, 21	13, 31

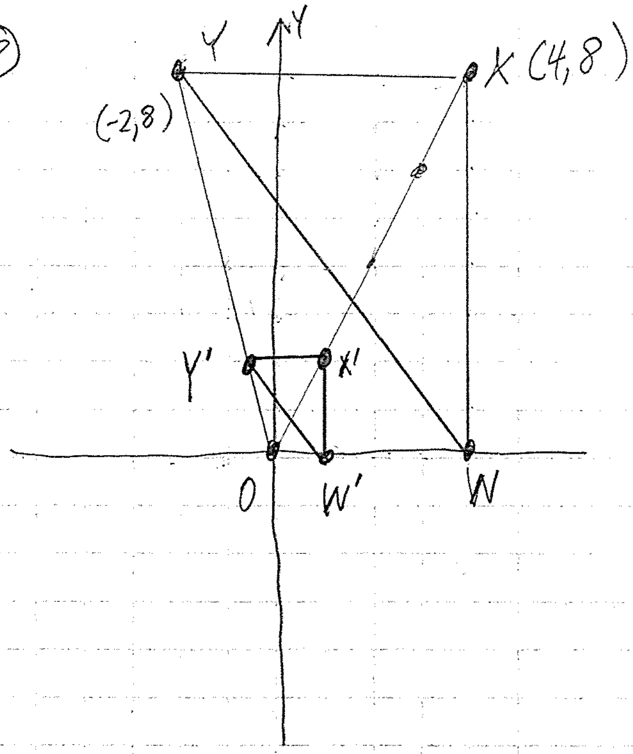
b. Find a single vector from the loading point to the unloading point.

9 → 13   16 → 31

+4   +15

$\boxed{\overrightarrow{4, 15} \text{ or } \langle 4, 15 \rangle}$

18



$$d_{OW} = \sqrt{4^2+0} = 4 \qquad 4 \times \frac{1}{4} = 1$$

$$d_{OX} = \sqrt{4^2+8^2} = 4\sqrt{5} \qquad 4\sqrt{5} \times \frac{1}{4} = \sqrt{5}$$

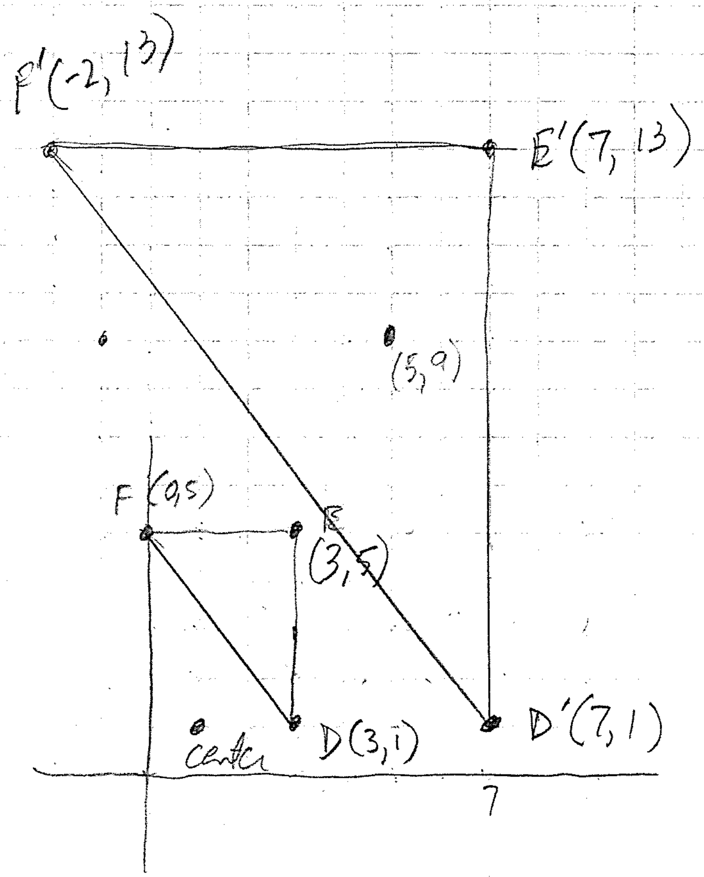
$$d_{OY} = \sqrt{4+8^2} = 2\sqrt{17} \qquad 2\sqrt{17} \times \frac{1}{4} = \frac{\sqrt{17}}{2}$$

$W'(1,0)$

$X'(1,2)$

$Y'(-\frac{1}{2}, 2)$

17

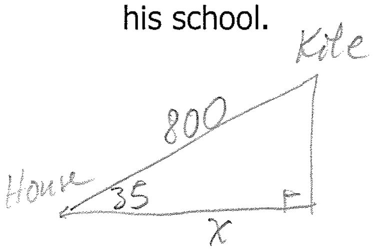


$$M_{center \to D} = \frac{0}{2} = 0$$

$$m_{center \to E} = \frac{4}{2} = \frac{2}{1}$$

$$m_{center \to F} = \frac{4}{-1}$$

20. John flew a kite over his school from his house. If he let out 800 meters of string and the kite was flying at an angle of elevation of 35° approximately how far away is his school.

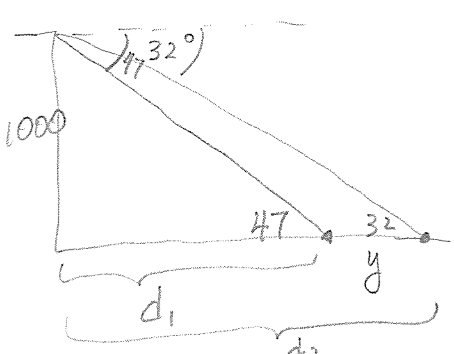


$\cos 35 = \frac{x}{800}$

$x \approx \boxed{655.3 \text{ meters}}$ away

21. An observer on a cliff 1000 meters above sea level sights two ships due east. The angles of depression to the ships are 47° and 32°. Find, to the nearest meter, the distance between the ships.

Let y = distance between ships.



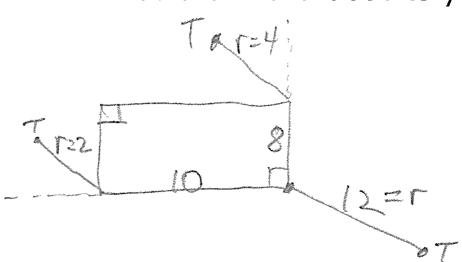
$\tan 47 = \frac{1000}{d_1}$ $\qquad$ $\tan 32 = \frac{1000}{d_2}$

$d_1 = \frac{1000}{\tan 47}$ $\qquad$ $d_2 = \frac{1000}{\tan 32}$

$d_1 = 932.515$ $\qquad$ $d_2 = 1600.334$

distance $= 667.819 \rightarrow \boxed{668 m}$

22. Calvin Butterball left his angry pet tiger, Tony, tied to a corner of his house by a 12 meter rope. The house measures 8 meters by 10 meters. Find the total area that would be hazardous to your health.

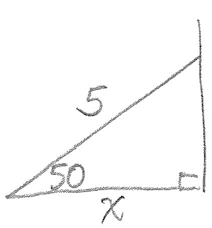


$\frac{3}{4}(\pi 12^2) + \frac{1}{4}(\pi 2^2) + \frac{1}{4}(\pi 4^2) = A$

$108\pi + \pi + 4\pi = A$

$\boxed{A = 113\pi \text{ sq m}}$

23. A ladder is leaning on the side of a house. The angle with the ground is 50°. If the ladder is 5 feet long, how far from the base of the house is the bottom of the ladder?



$\cos 50 = \frac{x}{5}$

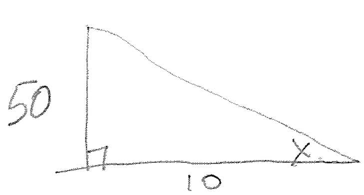
$x = 5\cos 50$

$x \approx 3.213$

$\boxed{\text{distance} \approx 3.2 \text{ ft. away}}$

24. The tree in my backyard is 50 feet tall. Its shadow is 10 feet long. Find the angle of elevation of the sun.

Let x = ∡ of elevation

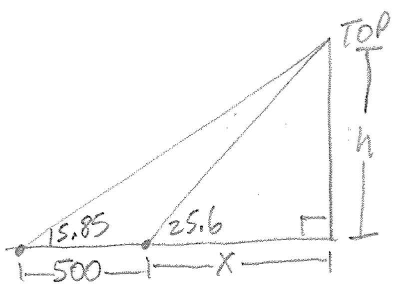


$\tan x = \frac{50}{10}$

$m\measuredangle x = 78.69$

$\boxed{\text{Angle} \approx 78.7°}$

25. Ayers Rock is the largest monolith, a type of rock formation, in the world. Kwan-Yong uses a theodolite to measure the angle of elevation from the ground to the top of Ayers Rock to be 15.85°. He walks 500 meters closer and measures the angle of elevation to be 25.6°. How high is Ayers Rock to the nearest tenth of a meter.



$$\boxed{\begin{aligned} \tan 25.6 &= \frac{h}{x} \\ \tan 15.85 &= \frac{h}{x+500} \end{aligned}}$$

$$x \tan 25.6 = (x+500) \tan 15.85$$
$$= x \tan 15.85 + 500 \tan 15.85$$
$$x \tan 25.6 - x \tan 15.85 = 500 \tan 15.85$$
$$x(\tan 25.6 - \tan 15.85) = 500 \tan 15.85$$

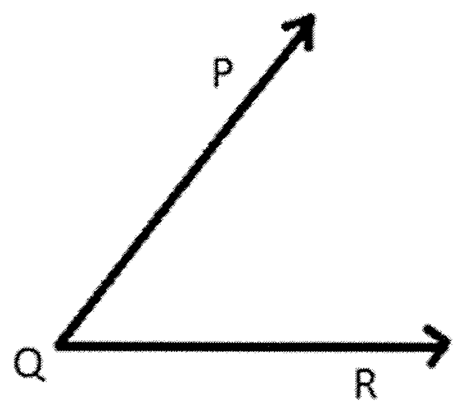
$$\rightarrow x = \frac{500 \tan 15.85}{\tan 25.6 - \tan 15.85}$$
$$x \approx 727.218$$
$$h = x \tan 25.6$$
$$h = 348.42$$

$$\boxed{\text{Rock} = 348.4\text{ m tall}}$$

26. Complete the following constructions. Write down the steps and the justification for each construction. Text p. 237 !

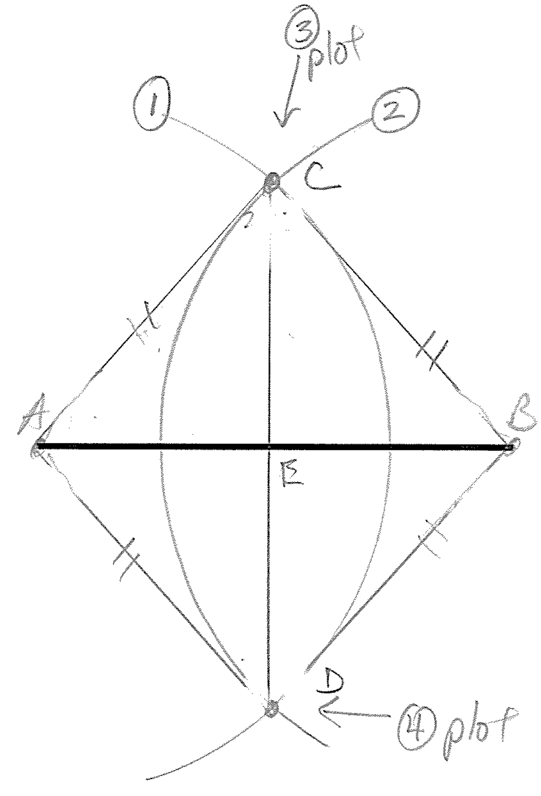
a) Angle Bisector

See p. 239, Text.

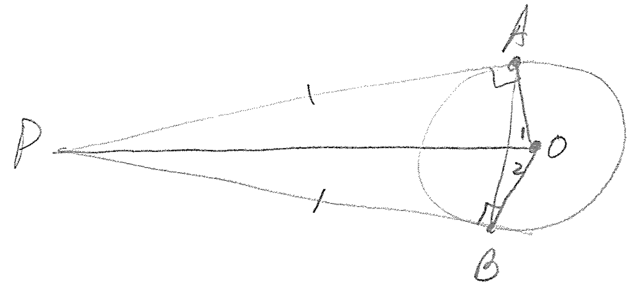


b) Perpendicular bisector

See text p. 239



24.



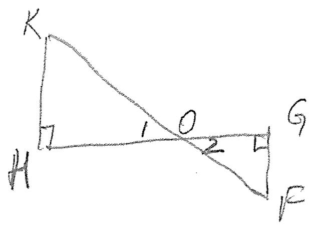
① $\overline{PA}$ & $\overline{PB}$ tangents to ⊙ from P. → ② $\overline{PA} \cong \overline{PB}$ →

→ ③ $\overline{OA} \perp \overline{PA}$, $\overline{OB} \perp \overline{PB}$ → ④ $\measuredangle PAO$ & $\measuredangle PBO$ are Rt ∡s → ⑤ $\triangle PAO$ & $\triangle PBO$ are Rt △s.

⑥ $\overline{PO} \cong \overline{PO}$

→ ⑦ $\triangle PAO \cong \triangle PBO$ → ⑧ $\measuredangle 1 \cong \measuredangle 2$

(25) Plan: show $\frac{HK}{FG} = \frac{OH}{GO}$



① $\overline{KH} \perp \overline{HG}$, $\overline{GF} \perp \overline{HG}$ → ② ∡H & ∡G are rt. ∡s. → ③ $\measuredangle H \cong \measuredangle G$

④ $\measuredangle 1 \cong \measuredangle 2$

→ ⑤ $\triangle KHO \sim \triangle FGO$

→ ⑥ $\frac{HK}{FG} = \frac{OH}{GO}$ → ⑦ $HK \cdot GO = FG \cdot OH$