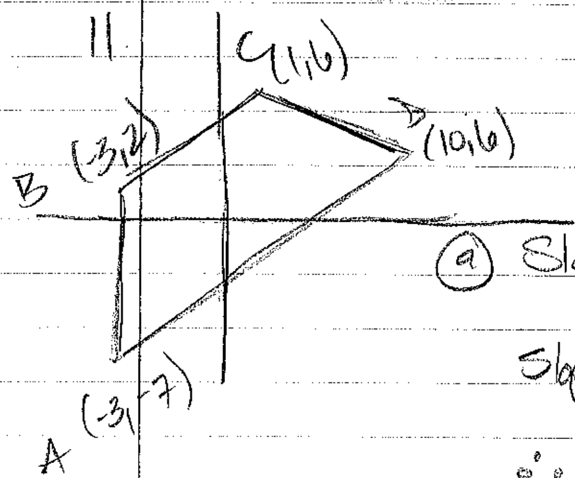
Review

p.265 # 11, 17, 20, 22

11.



Isosceles Trapezoid

Prove: ⓐ 1 pair parallel
ⓑ other pair $\cong$

ⓐ Slope of $\overline{BC} = \frac{6-2}{1--3} = \frac{4}{4} = \boxed{1}$

Slope of $\overline{AD} = \frac{6--7}{10--3} = \frac{13}{13} = \boxed{1}$

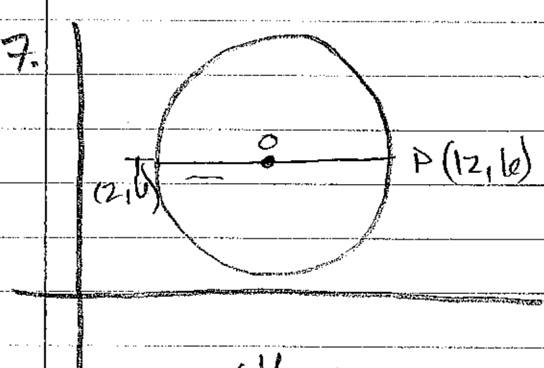
$\therefore \overline{BC} \parallel \overline{AD}$ b/c slopes equal 1

ⓑ Distance of $\overline{AB} = \sqrt{(-7-2)^2 + (-3+3)^2}$
$= \sqrt{81 + 0} = \boxed{9}$

Distance of $\overline{CD} = \sqrt{(6-6)^2 + (10-1)^2}$
$\sqrt{0 + 81} = \boxed{9}$

$\therefore \overline{AB} \cong \overline{CD}$
b/c both have measure of $\boxed{9}$

17.



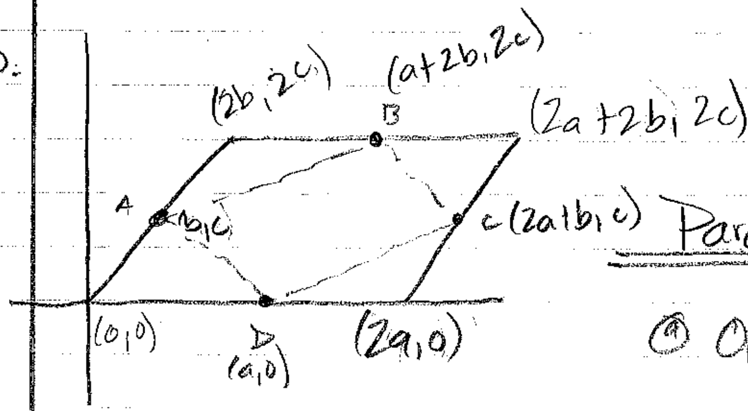
$A = \pi r^2$

$r = \frac{1}{2} d$
where
$d = 10$ (b/c $12 - 2 = 10$)

thus

$A = \pi (5)^2 \approx 78.540$ units sq.

20.



Parallelogram

ⓐ Opposites parallel
or
Opposites $\cong$

$A = (b, c)$

$B = \left(\frac{2a+2b+2b}{2}, 2c\right)$

$= \left(\frac{2a+4b}{2}, 2c\right)$

$= (a+2b, 2c)$

$C = \left(\frac{2a+2b+2a}{2}, \frac{2c}{2}\right)$

$= \left(\frac{4a+2b}{2}, c\right) = (2a+b, c)$

$D = (a, 0)$

Prove $\overline{AB}$ parallel to $\overline{DC}$:

Slope of $\overline{AB} = \frac{2c-c}{a+2b-b} = \boxed{\frac{c}{a+b}}$ ✓

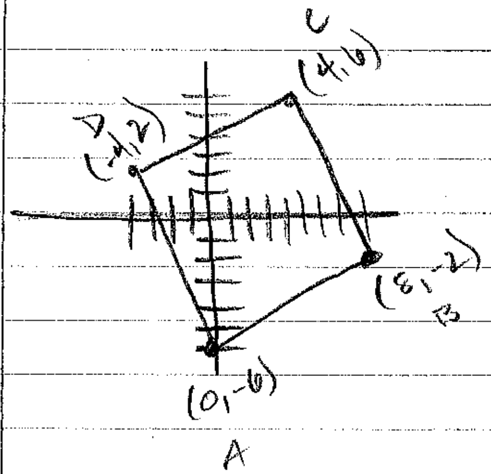
Slope of $\overline{DC} = \frac{c-0}{2a+b-a} = \boxed{\frac{c}{a+b}}$ ✓

Prove $\overline{AD}$ parallel to $\overline{BC}$:

Slope of $\overline{AD} = \frac{c-0}{b-a} = \boxed{\frac{c}{b-a}}$ ✓

Slope of $\overline{BC} = \frac{2c-c}{(a+2b)-(2a+b)} = \frac{c}{-a+b}$ or $\boxed{\frac{c}{b-a}}$ ✓

$\therefore$ ABCD is a parallelogram b/c both pairs of opposite sides are parallel

22. 

Distances

distance of $\overline{DC} = \sqrt{(6-2)^2 + (4+4)^2}$
$= \sqrt{16+64} = \boxed{\sqrt{80}}$

distance of $\overline{AB} = \sqrt{(-6+2)^2 + (0+8)^2}$
$\sqrt{16+64} = \boxed{\sqrt{80}}$

$\overline{DA} = \sqrt{(2+6)^2 + (-4+0)^2} =$
$= \sqrt{64+16} = \boxed{\sqrt{80}}$

- All sides $\cong$ ($\sqrt{80}$)
- Opp slopes $\cong$ ($\frac{1}{2}$ + -2)
- Consecutive slopes opp. reciprocal ($\frac{1}{2}$ + -2)

$\overline{CB} = \sqrt{(6+2)^2 + (4-8)^2} = \boxed{\sqrt{80}}$

Slopes

$DC = \frac{6-2}{4+4} = \frac{4}{8} = \boxed{\frac{1}{2}}$

$AB = \frac{-2+6}{8-0} = \frac{4}{8} = \boxed{\frac{1}{2}}$

$DA = \frac{2+6}{-4-0} = \frac{8}{-4} = \boxed{-2}$

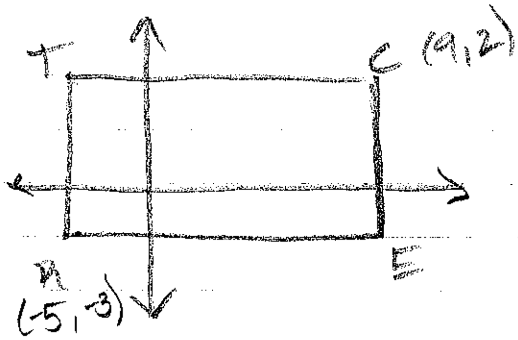
$CB = \frac{6+2}{4-8} = \frac{8}{-4} = \boxed{-2}$

$\therefore$ **SQUARE**

p431 # 17, 30, 31

17. distance of $\overline{AB} = \sqrt{(4-1)^2 + (15-11)^2}$

(1,11) (4,15) $= \sqrt{9+16} = \sqrt{25} = \boxed{5}$

30. 

Given: RECT is rectangle
$\overline{TC} \parallel$ x-axis
$\overline{RE} \parallel$ x-axis

a. b/c RECT is rectangle $\overline{CE} \perp$ to $\overline{RE}$
thus $\boxed{E(9,-3)}$

b. $A = l \cdot w = 14 \cdot 5 = \boxed{70}$

c. $d = \sqrt{(2+3)^2 + (9+5)^2}$

$= \sqrt{25 + 196} = \sqrt{221} \approx \boxed{14.9}$

31. Rectangle:
- Opposite slopes parallel
- consecutive slopes opposite reciprocal

Slopes

$QU = \frac{11+4}{4+1} = \frac{15}{5} = \boxed{3}$

$AD = \frac{12+3}{1+4} = \frac{15}{5} = \boxed{3}$

$QD = \frac{-4+3}{-1+4} = \boxed{\frac{-1}{3}}$

$AU = \frac{12-11}{1-4} = \boxed{\frac{1}{-3}}$

$\therefore$ QUAD is a rectangle b/c opposite slopes parallel + consecutive slopes opposite reciprocal

p. 644 #4, 5, 7, 10, 14-17, 28

4. (a) (10, 0) (b) (2, 6) (c) (-4, 4)

5. (a) $PQ = \sqrt{(4-10)^2 + (-2-6)^2}$ (b) $\left(\frac{4+10}{2}, \frac{-2+6}{2}\right)$

$= \sqrt{100} = \boxed{10}$ $(7, 2)$

(c) $m = \frac{6+2}{10-4} = \frac{8}{6} = \boxed{\frac{4}{3}}$

7. (a) $B \cdot H = 10 \cdot 5 = \boxed{50}$

(b) $\frac{1}{2} B \cdot H = \frac{1}{2}(9)(6) = \boxed{27}$

(c) $\frac{1}{2}\pi r^2 = \frac{1}{2}\pi(6)^2 = \boxed{18\pi}$

10. (a) $x + 2y = 10$ (b) $y = 2x + 3$

$y = \frac{-x + 10}{2}$

$y = -\frac{1}{2}x + 5$

Perpendicular

14. $m = -\frac{1}{2}$ thus $-\frac{1}{2} = \frac{k^2 - 0}{-4-4}$

$-\frac{1}{2} = \frac{k^2}{-8}$ so $k^2 = 4$ or $\boxed{k = \pm 2}$

15. $2 = \frac{-6 + x}{2}$ $3 = \frac{1 + y}{2}$

$4 = -6 + x$ $6 = 1 + y$ $(10, 5)$

$\boxed{x = 10}$ $\boxed{y = 5}$

16. $\frac{1}{4}$ of way is midpt of midpt ...

mid $= \left(\frac{-5+7}{2}, \frac{0+8}{2}\right) = (1, 4)$

mid of mid $= \left(\frac{-5+1}{2}, \frac{0+4}{2}\right) = \boxed{(-2, 2)}$

17. (a) mid of $\overline{AB} = (7, 4)$

length of median from C to AB $= \sqrt{(9-7)^2+(8-4)^2}$

$= \sqrt{4+16} = \sqrt{20}$

$= \boxed{2\sqrt{5}}$

(b) from $(9,8)$ to $(7,4)$

$m = \frac{8-4}{9-7} = \frac{4}{2} = \boxed{2}$

$8 = 2(9) + b$

$8 = 18 + b$

$\boxed{b = -10}$

equation: $\boxed{y = 2x - 10}$

(c) mid of $\overline{AB} = (7,4)$

slope of $\overline{AB} = \frac{5-3}{12-2} = \frac{2}{10} = \frac{1}{5}$

Our line has slope $m = \boxed{-5}$ & goes through $(7,4)$

$4 = -5(7) + b$

$b = 39$

thus

equation: $y = -5x + 39$

or

$y - 4 = -5(x - 7)$

point slope form

$y - y_1 = m(x - x_1)$

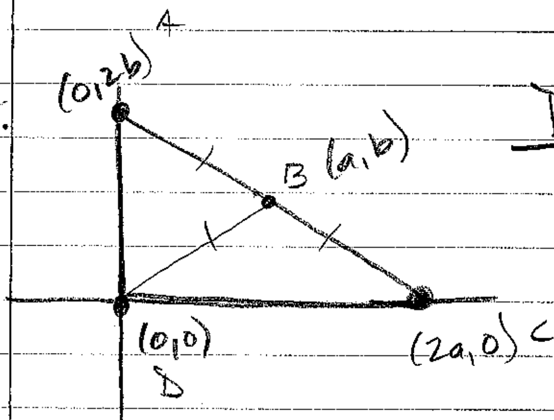
(d) slope $= -5$ going through $C(9,8)$

$y - 8 = -5(x - 9)$

(e) Slope = $\frac{1}{5}$ going through point $C(9,8)$

$y-8 = \frac{1}{5}(x-9)$

26.



Prove
$\overline{AB} \cong \overline{BC} \cong \overline{BD}$

$B = \left(\frac{0+2a}{2}, \frac{2b+0}{2}\right) = (a,b)$

$\overline{AB} = \sqrt{(0-a)^2 + (2b-b)^2} = \sqrt{a^2+b^2}$

$\overline{BC} = \sqrt{(a-2a)^2 + (b-0)^2} = \sqrt{a^2+b^2}$

$\overline{BD} = \sqrt{(a-0)^2 + (b-0)^2} = \sqrt{a^2+b^2}$

$\therefore$ B is equidistant from vertices (A, D, C)
b/c all 3 lengths measure : $\sqrt{a^2+b^2}$