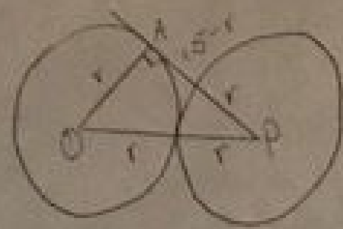
Chapter 10

343.

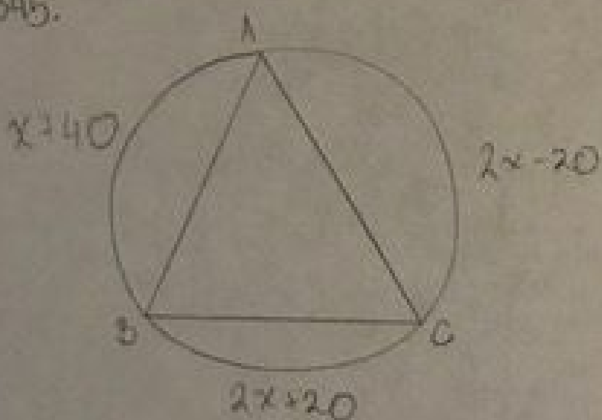


$$(15)^2+(r)^2=(2r)^2$$
$$225+r^2=4r^2$$
$$225=3r^2$$
$$75=r^2$$
$$\sqrt{25\cdot 3}=\sqrt{75}=r$$
$$\boxed{5\sqrt{3}=r}$$

344.

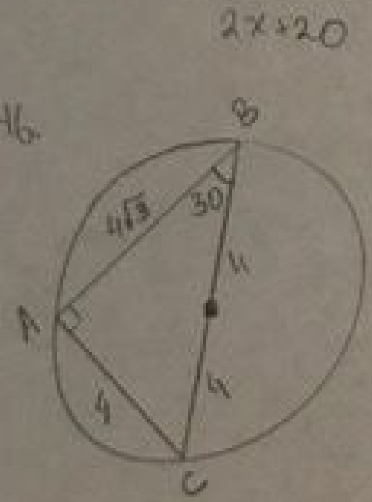
$$AC=\sqrt{4^2+6^2}$$
$$=\sqrt{16+36}$$
$$=\sqrt{52}$$
$$\boxed{AC^2=52}$$

345.



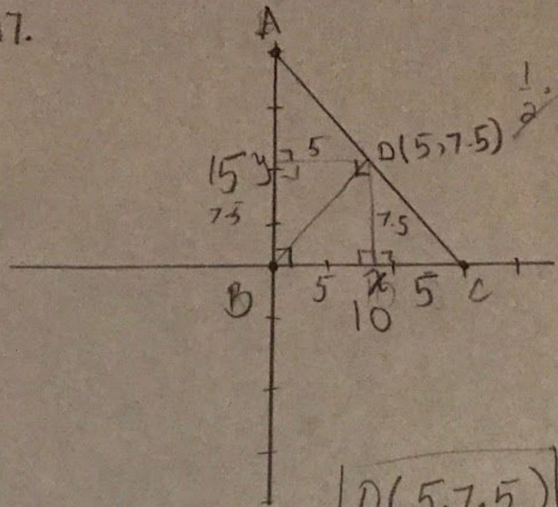
$$x+40+2x+2x=360$$
$$5x=320$$
$$\boxed{x=64}$$

346.



$$\frac{1}{2}\cdot 4\cdot 4\sqrt{3}=\boxed{8\sqrt{3}}$$

347.



$\frac{1}{\cancel{2}} \cdot \overset{5}{\cancel{10}} \cdot 15 = 75$

$\frac{1}{2} \cdot 10 \cdot DX = \frac{1}{2} \cdot 15 \cdot DY = \frac{75}{2}$

$10DX = 15DY = 75$

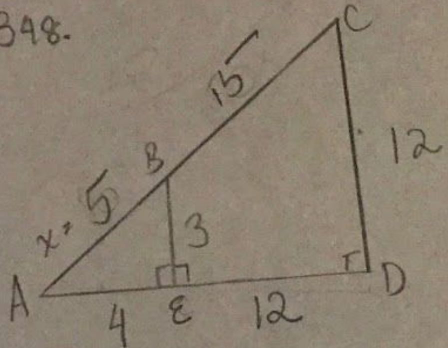
$2DX = 3DY = 15$

$DY = 5$

$DX = 7.5$

$\boxed{D(5, 7.5)}$

348.



$\triangle ABE \sim \triangle ACD$ by AA~

$\frac{CD}{BE} = \cancel{\frac{AB}{AC}} \Rightarrow \cancel{\frac{12}{3} = \frac{x}{20}}$

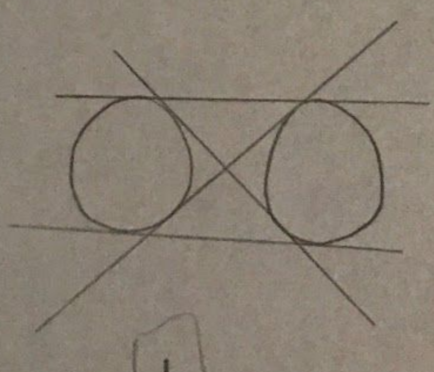
$\frac{AC}{AB}$ $\quad \cancel{240 = 3x}$

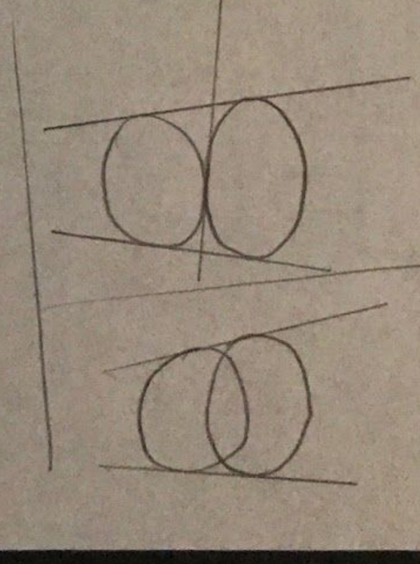
$\cancel{80 = x}$

$\Rightarrow \frac{12}{3} = \frac{20}{x} \Rightarrow 12x = 3 \cdot 20 \Rightarrow 4x = 20 \Rightarrow x = 5$

$\frac{1}{\cancel{2}} \cdot \overset{8}{\cancel{16}} \cdot 12 - \left(\frac{1}{\cancel{2}} \cdot 3 \cdot \overset{2}{\cancel{4}}\right) = 96 - 8 = \boxed{88}$

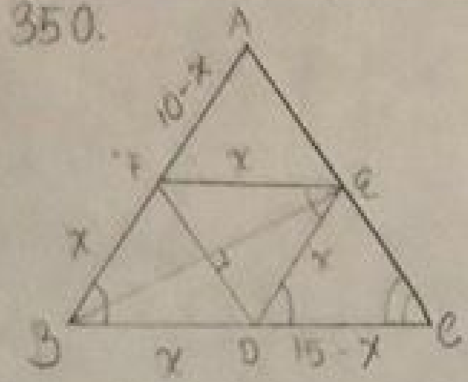
349.





$\boxed{4}$

350.



$\triangle CDE \sim \triangle CBA$ by AA~

$\frac{CD}{CB} = \frac{DE}{BA}$

$\frac{15-x}{15} = \frac{x}{10}$

$10(15-x) = 15x$

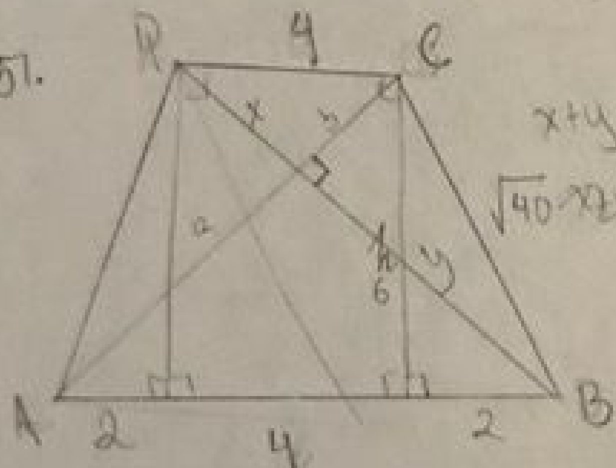
$2(15-x) = 3x$

$30 - 2x = 3x$

$30 = 5x$

$\boxed{6 = x}$

351.



$x + y = a + b$

$\sqrt{40}$ $x^2 + b^2 = 16$

$a^2 + y^2 = 8^2$

$x^2 + y^2 + a^2 + b^2 = 80$

$(x+y)(a+b)$

$a x \quad 2(b^2 + y^2) = 80$

$b^2 + y^2 = 40$

$\frac{1}{2} \cdot b \cdot y + \frac{1}{2} \cdot b \cdot x + \frac{1}{2} \cdot a \cdot y + \frac{1}{2} \cdot a \cdot x$

$= \frac{1}{2} \cdot (a+b)(x+y)$

$= \frac{1}{2}(x+y)^2$

$= \left(\cancel{\frac{1}{2}} \cdot 2 \cdot y\right) 2 + 4y$

$= \frac{1}{2} \cdot x^2 + 2xy + y^2 = 2y + 4y$

$x^2 + 2xy + y^2 = 4y + 8y$

$x^2 + 2xy + y^2 - 12y = 0$

$x^2 - 12y$

$\frac{1}{2} b(x+y) + \frac{1}{2} a(x+y)$

$2\left(\frac{1}{2} \cdot 2 \cdot h\right) + 4h = \frac{1}{2}(x+y)^2 = 6h$

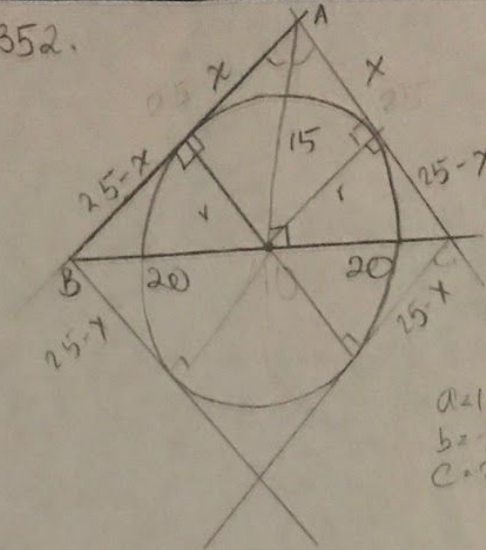
$2h + 4h = \frac{1}{2}(x+y)^2$

$a^2 + x^2 = b^2 + y^2$

$\sqrt{(\sqrt{40})^2 - 4} = \sqrt{36} = 6$

$= \boxed{36}$

352.



$(25-x)^2+r^2=20^2$

$25^2-2(25\cdot x)+x^2+r^2=400$

$625-50x+x^2+r^2=400$

$x^2+r^2=50x-225$

$r^2=x^2-50x-225$

$r^2=$

a=1
b=-50
c=225

$\frac{50\pm\sqrt{2500-4(-2500)}}{2}$ $\frac{50\pm\sqrt{12500}}{2}$

$\frac{50\pm\sqrt{2500+10000}}{2}$

12500
100 125
5 20 5^3
5 4

$\frac{1}{2}\cdot20\cdot15=\frac{1}{2}\cdot r\cdot25$

~~25-20-x0~~
5 - 4 - 3

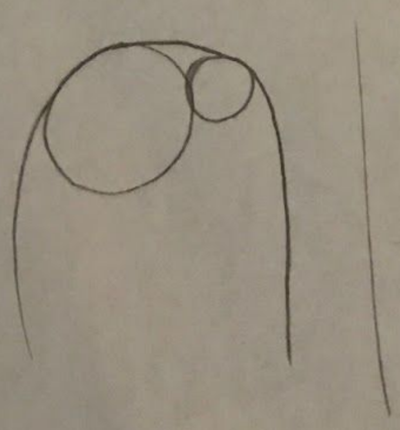
$20\cdot15=25r$

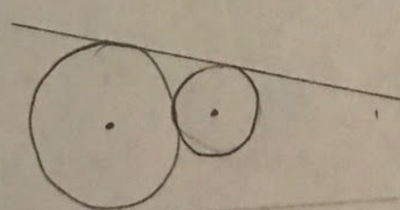
$300=25r$

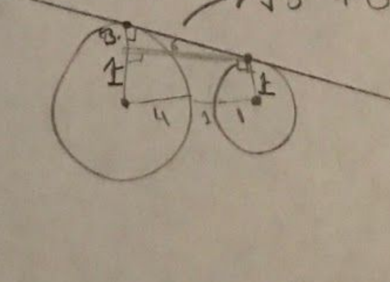
$12=r$ $\rightarrow \pi r^2\cdot A_O \Rightarrow \frac{\pi r^2}{2}=A_S \Rightarrow \frac{\pi(12)^2}{2}=\frac{144\pi}{2}$

$\Rightarrow \boxed{72\pi}$

353.







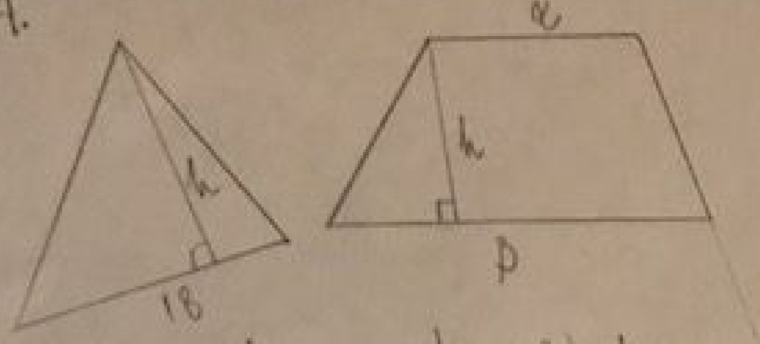
$\sqrt{3^2+6^2}=\sqrt{9+36}$

$=\sqrt{45}$

$=\sqrt{9}\sqrt{5}$

$=\boxed{3\sqrt{5}}$

354.

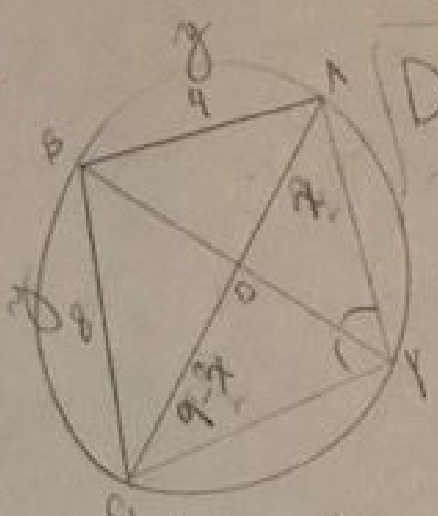


$$\frac{1}{2}\cdot 18\cdot h = \frac{1}{2}(\alpha+\beta)\cdot h$$

$$18h = (\alpha+\beta)h$$

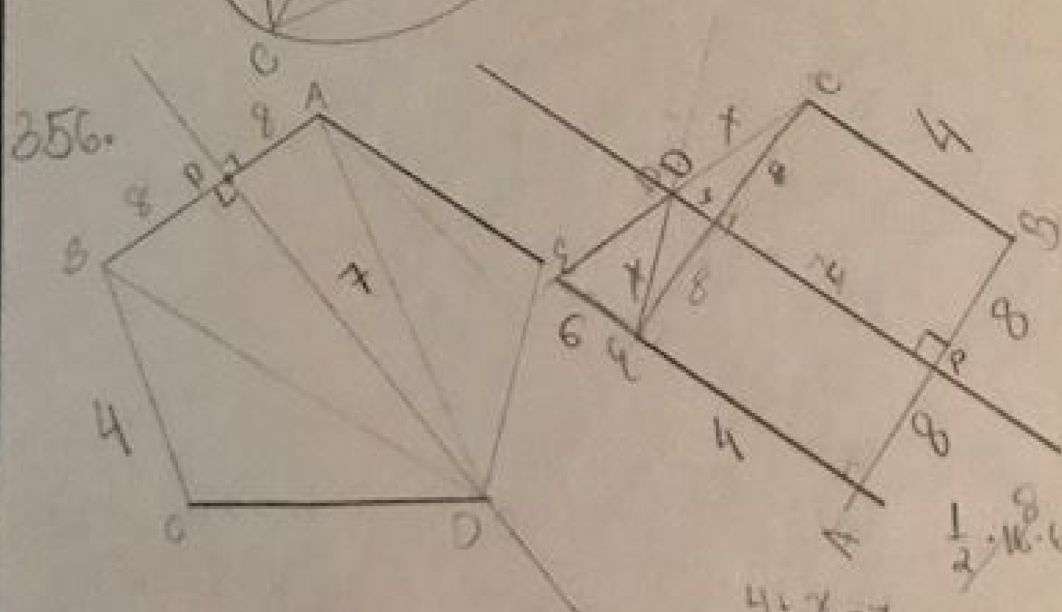
$$\boxed{18 = \alpha+\beta}$$

355.



$$\boxed{DC = \frac{9}{2}}$$

356.



$$\frac{1}{2}\cdot 16\cdot 6 + 16\cdot 4$$

$$48 + 64$$

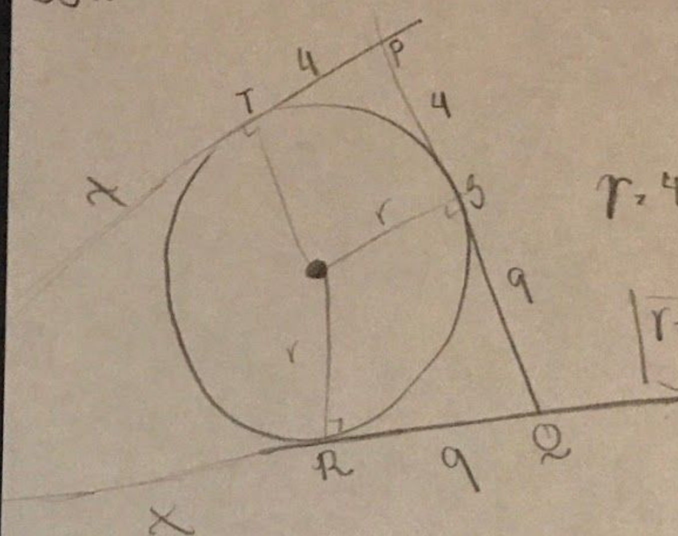
$$\boxed{112}$$

$$\frac{4+x}{2} = 7$$

$$4+x = 14$$

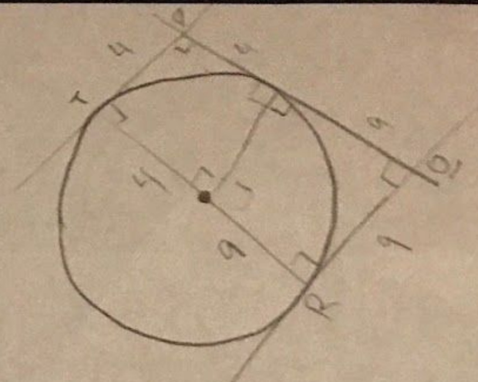
$$x = 10$$

357.

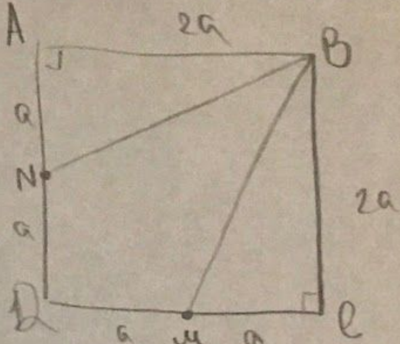


$$r = \frac{4+9}{2}$$

$$\boxed{r = \frac{13}{2}}$$



358.



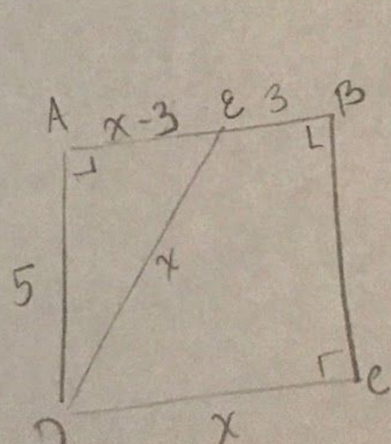
$$\frac{BMDN_P}{ABCD_P} = \frac{a+a+\sqrt{(a^2)+(2a)^2}+\sqrt{a^2+(2a)^2}}{4(2a)}$$

$$= \frac{2a+2(\sqrt{5a^2})}{8a} = \frac{2a+2(a\sqrt{5})}{8a}$$

$$= \frac{2a+2a\sqrt{5}}{8a} = \frac{2+2\sqrt{5}}{8}$$

$$= \boxed{\frac{1+\sqrt{5}}{4}}$$

359.



$$25+(x-3)^2 = x$$

$$25 = x-(x^2-6x+9)$$

$$25 = x-x^2+6x-9$$

$$0 = -x^2+7x-34$$

$$0 = x^2-7x+34$$

$$\cancel{\frac{7 \pm \sqrt{49-4(34)}}{2}}$$

$$\cancel{7}$$

359. $25+(x-3)^2=x^2$

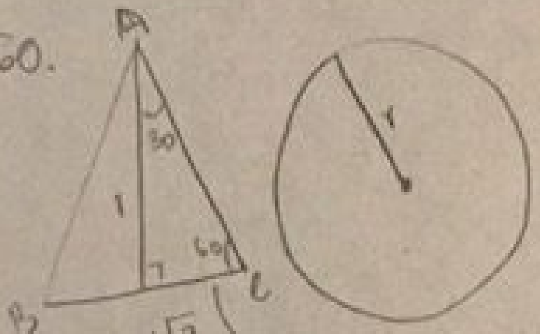
$25+x^2-6x+9=x^2$

$25-6x+9=0$

$-6x=-34$

$x=\frac{34}{6}=\boxed{\frac{17}{3}}$

360.



30-60-90

$x - x\sqrt{3} - 2x$

$r=x\sqrt{3}$ $\quad \rightarrow \frac{r}{\sqrt{3}}$

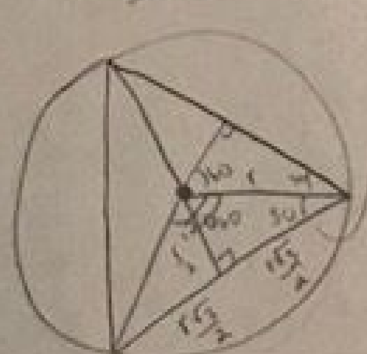
$\frac{r}{\sqrt{3}}=x$

$s=2x=\frac{2r}{\sqrt{3}} \Rightarrow [\Delta ABC]=\frac{s^2\sqrt{3}}{4}\cancel{=\frac{\left(\frac{2r}{\sqrt{3}}\right)^2\sqrt{3}}{4}=\frac{\frac{4r^2}{3}\sqrt{3}}{4}}$

$\cancel{\frac{\frac{4r^2\sqrt{3}}{3}}{4}=\frac{4r^2\sqrt{3}}{12}=\frac{r^2\sqrt{3}}{3}}$

$\frac{r}{\sqrt{x}}+\frac{r}{\sqrt{x}}+\frac{2r}{\sqrt{x}}+\frac{2r}{\sqrt{x}}$

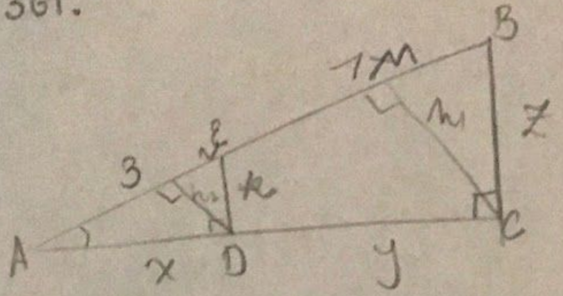
$=\frac{6r}{\sqrt{3}}=\Delta ABC_P$



$\rightarrow 3\left(\frac{r\sqrt{3}}{2}\right)=\frac{3r\sqrt{3}}{2}$

$$\frac{\frac{6r}{\sqrt{3}}\cdot 2\sqrt{3}}{\frac{3r\sqrt{3}}{2}\cdot 2\sqrt{3}}=\frac{6r\cdot 2}{9r}=\frac{12r}{9r}=\boxed{\frac{4}{3}}$$

361.



$$\frac{[\Delta ADE]}{[BCDE]} = \frac{[\Delta ADE]}{[\Delta ABC]-[\Delta ADE]}$$

$\Delta AED \sim \Delta ABC$ by $\angle A \sim$

$$\frac{\cancel{3}[\Delta ADE]\,\cancel{h_2}}{[\Delta ACB]} = \frac{3\cancel{m_1}h_1}{10\cancel{m_2}h_2}$$

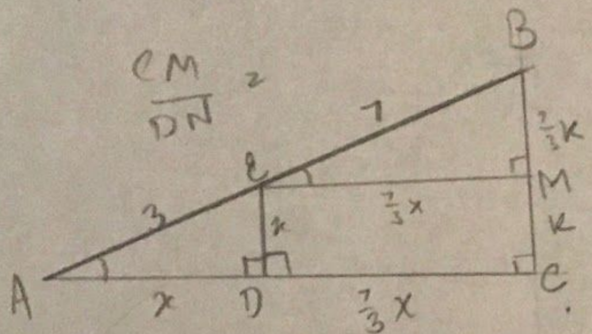
$$\frac{1}{2}\cdot 10\cdot h_1 - \left(\frac{1}{2}\cdot 3\cdot h_2\right)$$

$$5h_1 - \frac{3}{2}h_2$$

$$5h_1 - \frac{3}{2}\left(\frac{10}{3}h_1\right)$$

$\Delta CMA \sim \Delta DNA$

$$\frac{CM}{DN} =$$



$\Delta ADE \sim \Delta EBM$ by AA$\sim$

$\therefore [\Delta ADE] = \frac{1}{2}\cdot xk$

$[\Delta ABC]-[\Delta ADE] = \frac{1}{2}\cdot xk$

$-\left(\frac{1}{2}\cdot\frac{10}{3}x\cdot\frac{10}{3}k\right)$

$= \frac{1}{2}xk - \frac{100}{18}xk$

$= xk\left(\frac{1}{2} - \right.$

18 18
6 5
6 90

$[\Delta ADE] = \frac{1}{2}xk$

$$[\Delta ABC]-[\Delta ADE] = \left(\frac{1}{2}\cdot\frac{10}{3}x\cdot\frac{10}{3}k\right) - \left(\frac{1}{2}xk\right)$$

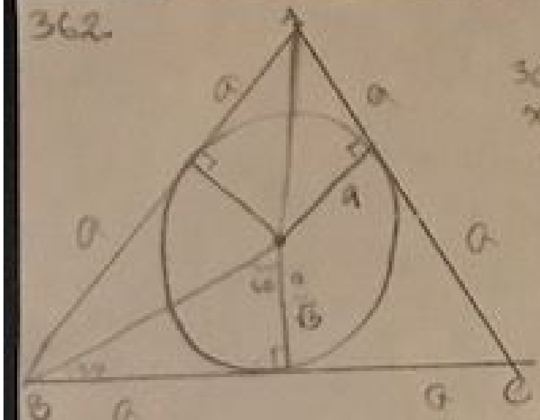
$$= \left(\frac{100}{18}xk\right) - \left(\frac{1}{2}xk\right)$$

$$= \left(\frac{100}{18}xk\right) - \left(\frac{9}{18}xk\right)$$

$$= \frac{91}{18}xk$$

$$\therefore \frac{[\Delta ADE]}{[BCDE]} = \frac{[\Delta ADE]}{[\Delta ABC]-[\Delta ADE]} = \frac{\frac{1}{2}xk}{\frac{91}{18}xk} = \frac{\frac{1}{2}\cdot 18}{\frac{91}{\cancel{18}}\cdot\cancel{18}} = \boxed{\frac{9}{91}}$$

362.



30-60-90

$x - x\sqrt{3} - 2x$

$x\sqrt{3} = a$

$x = \frac{a}{\sqrt{3}}$

$\frac{a}{\sqrt{3}} = 9$

$a = 9\sqrt{3}$

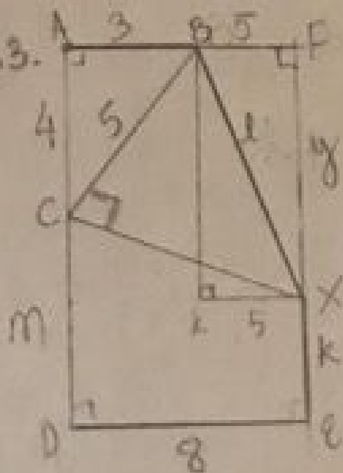
$[\Delta ABC] = \frac{s^2\sqrt{3}}{4}$

$[\Delta ABC] = \frac{(9\sqrt{3})^2\sqrt{3}}{4}$

$[\Delta ABC] = \frac{81 \cdot 3\sqrt{3}}{4}$

$\boxed{[\Delta ABC] = \frac{243\sqrt{3}}{4}}$

363.



A(0,0)

B(3,0)

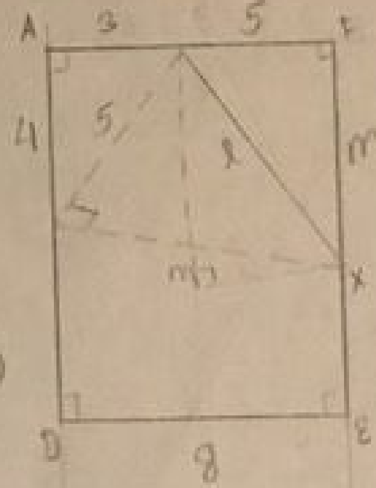
F(8,0)

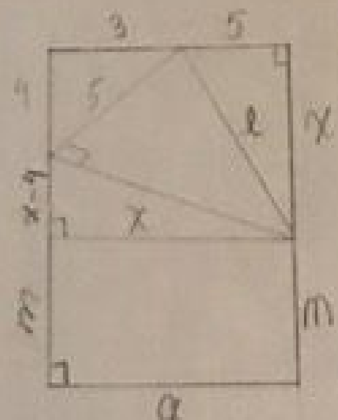
C(0,-4)

D(0,-(4+m))

E(8,-(4+m))

X(8,-(4+k))





$(x+m) \cdot 8 = \left(\frac{8+x}{2}\right)x + \left(\frac{8+x}{2}\right)$

$\therefore x = 8$

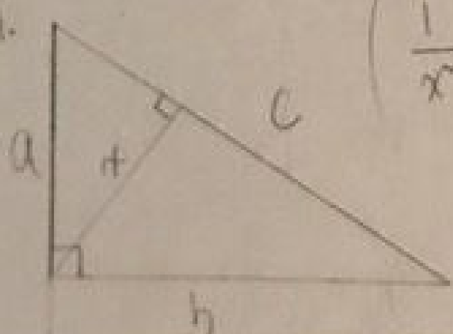
$5^2 + 8^2 = l^2$

$25 + 64 = l^2$

$89 = l^2$

$\boxed{l = \sqrt{89}}$

364.



$\left(\frac{1}{x^2} = \frac{1}{a^2} + \frac{1}{b^2}\right) a^2 b^2 x^2$

$a^2b^2 = a^2x^2 + b^2x^2$

$a^2b^2 = x^2(a^2+b^2)$

$a^2b^2 = x^2c^2$

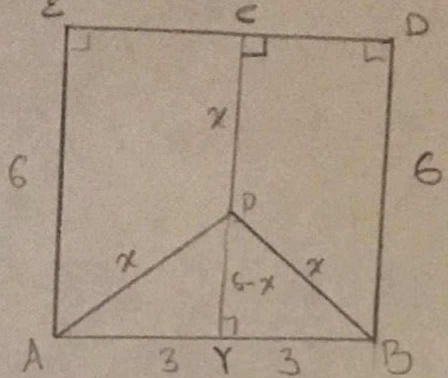
$ab = xc$

$\frac{1}{2}ab = \frac{1}{2}xc$

$\therefore$

$\boxed{\frac{1}{x^2} = \frac{1}{a^2} + \frac{1}{b^2}}$

365.



$(3)^2+(6-x)^2=x^2$ $\quad (6-x)(6-x)$

$36-12x+x^2$

$9+36-12x+x^2=x^2$

$45-12x=0$

$45=12x$

$15=4x$

$\frac{15}{4}=x$

$[\triangle APB]=\frac{1}{2}\cdot PY\cdot AB$

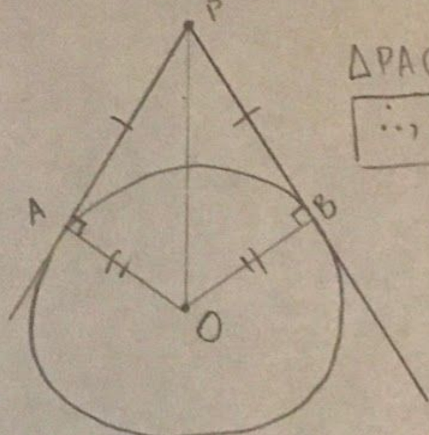
$=\frac{1}{2}\cdot 6\cdot\left(6-\frac{15}{4}\right)$

$=3\left(6-\frac{15}{4}\right)$

$=18-\frac{45}{4}$

$\frac{45}{27}$ $=\frac{72}{4}-\frac{45}{4}=\boxed{\frac{27}{4}}$

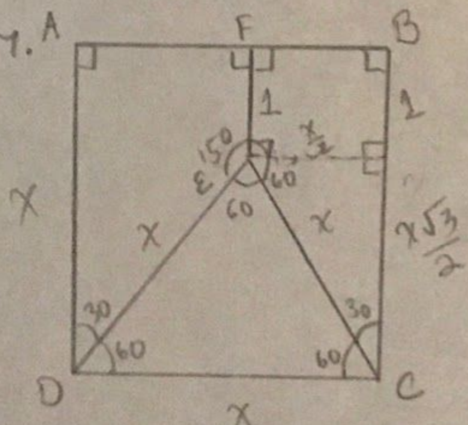
366.



$\triangle PAO\cong\triangle PBO$ by HL ≅ thm.

$\boxed{\therefore \angle POB\cong\angle POA=\frac{1}{2}\angle AOB \text{ by CPCTC}}$

367.



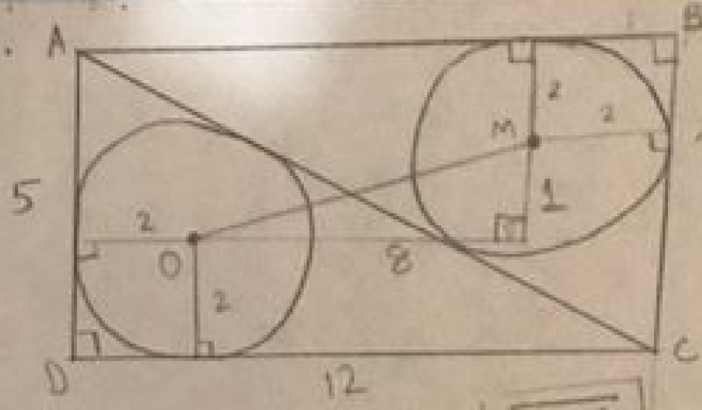
$360-(90+90+30)=360-210=150$

$\frac{x}{2}=1\Rightarrow x=2$

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

$DC=BC=\boxed{2+\sqrt{3}}$

368.



$[\Delta ACD] = \frac{1}{2} \cdot \cancel{12}^{6} \cdot 5 = 30$

$A = rs$
$30 = 15r$
$2 = r$

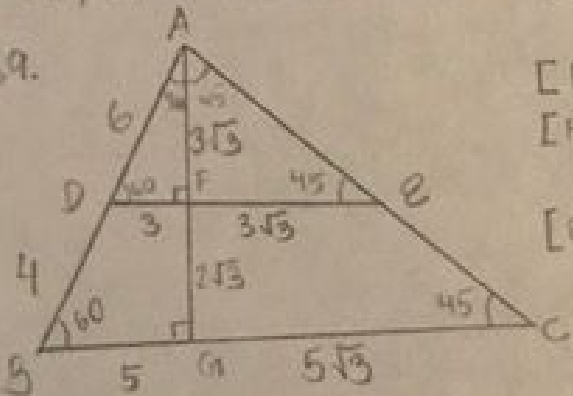
$s = \frac{5+12+13}{2}$
$s = \frac{30}{2} = 15$

$12 - 4 = 8$
$5 - 4 = 1$

$\therefore OM^2 = 8^2 + 1^2 \Rightarrow OM = \boxed{\sqrt{65}}$

$\begin{array}{r} 75 \\ -27 \\ \hline 48 \end{array}$

369.



$[FECG] = [\Delta AGC] - [\Delta AFE]$

$[FECG] = \left(\frac{1}{2} \cdot 5\sqrt{3} \cdot 5\sqrt{3}\right) - \left(\frac{1}{2} \cdot 3\sqrt{3} \cdot 3\sqrt{3}\right)$

$[FECG] = \left(\frac{1}{2} \cdot (5\sqrt{3})^2\right) - \left(\frac{1}{2}(3\sqrt{3})^2\right)$

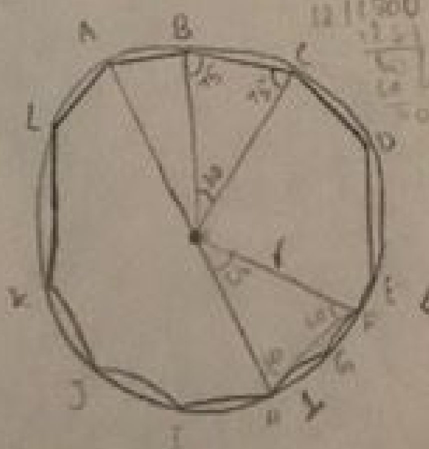
$[FECG] = \left(\frac{1}{2} \cdot 25 \cdot 3\right) - \left(\frac{1}{2} \cdot 9 \cdot 3\right)$

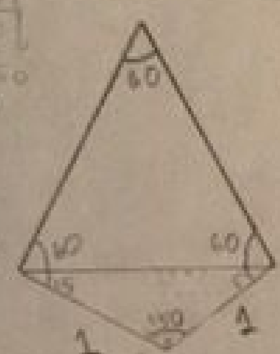
$[FECG] = \left(\frac{1}{2} \cdot 75\right) - \left(\frac{1}{2} \cdot 27\right)$

$[FECG] = \frac{1}{2}(75 - 27) = \frac{1}{2}(48) = \boxed{24}$

370.

$12\overline{)1800}$ = 150





$\frac{180(12-2)}{12} = \frac{180 \cdot 10}{12} = \frac{1800}{12}$

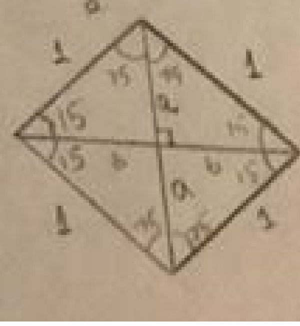
$= 150$

$\frac{360}{12} = 30$

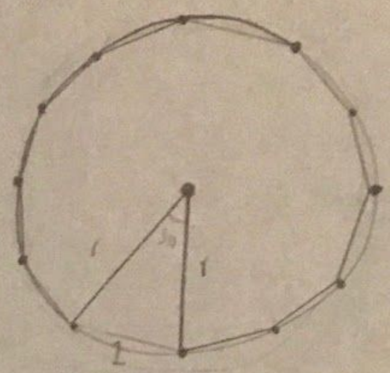
$\frac{180-30}{2} = \frac{150}{2} = 75$

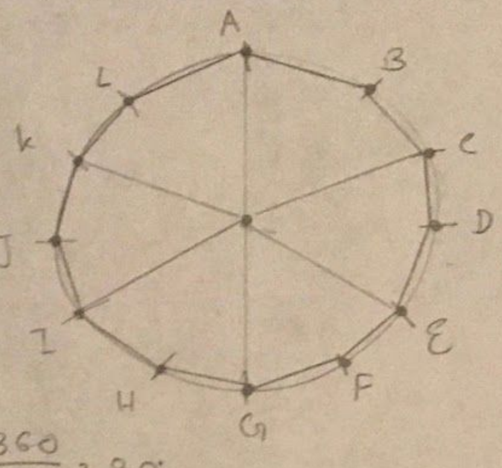
1. Find area of dodec.
2. Sum of equ. + sum of $\triangle$
3. $\frac{n s r}{2}$ = area

$[AB \ldots L] = 6\left(\frac{r^2\sqrt{3}}{4}\right) + \pi r^2$



370.





$$\frac{nlr}{2} = [AB\ldots L] \qquad \frac{360}{12} = 30^\circ$$

$$nlr = 2[AB\ldots L]$$

$$r = \frac{2[AB\ldots L]}{nl} = \frac{2[AB\ldots L]}{12} = \frac{[AB\ldots L]}{6}$$

$$12\left(\sqrt{s(s-a)(s-b)(s-c)}\right) \Rightarrow s = \frac{r+r+1}{2} = \frac{2r+1}{2}$$

$$12\left(\sqrt{\frac{2r+1}{2}\left(\frac{2r+1}{2}-r\right)^2\left(\frac{2r+1}{2}-1\right)}\right) = \frac{12 \cdot 1 \cdot r}{2}$$

$$24\sqrt{\frac{2r+1}{2}\left(\frac{2r+1}{2}-r\right)^2\left(\frac{2r+1}{2}-1\right)} = 12r$$

$$2\sqrt{\frac{2r+1}{2}\left(\frac{2r+1}{2}-r\right)^2\left(\frac{2r+1}{2}-1\right)} = r$$

$$2\sqrt{\frac{2r+1}{2}\left(\frac{2r+1}{2}-\frac{2r}{2}\right)\left(\frac{2r+1}{2}-\frac{2}{2}\right)} = r$$

$$\left(2\sqrt{\frac{2r+1}{2}\left(\frac{1}{2}\right)\left(\frac{2r-1}{2}\right)} = r\right)^2$$

$$4\left(\frac{2r+1 \cdot 2 \cdot 2r-1}{2^3}\right) = r^2$$

$$4\left(\frac{(2r+1)(2r-1)\cdot 2}{8}\right) = r^2 \qquad 2\left(\frac{1}{\sqrt{2}}\right) = d$$

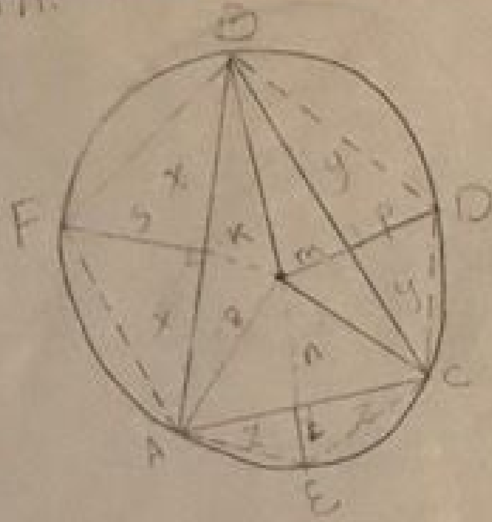
$$\frac{4r^2-1}{2} = r^2 \qquad \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = d$$

$$4r^2 - 1 = 2r^2 \qquad \boxed{\sqrt{2} = D}$$

$$-1 = -2r^2$$

$$1 = 2r^2 \Rightarrow \frac{1}{2} = r^2 \Rightarrow \sqrt{\frac{1}{2}} = r$$

371.



$AB + BC + AC = 2(x+y+x) = 35$

$[AECDBF] = [\Delta ABC] + [\Delta FAB]$

$+ [\Delta BDC] + [\Delta ACE]$

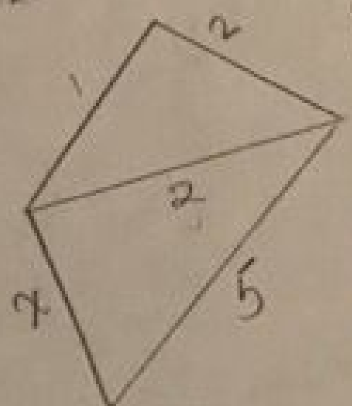
$= \frac{1}{2} \cdot AB \cdot k + \frac{1}{2} \cdot AC \cdot n + \frac{1}{2} \cdot BC \cdot m$

$+ \frac{1}{2} \cdot AB \cdot s + \frac{1}{2} \cdot AC \cdot t + \frac{1}{2} \cdot BC \cdot p$

$\frac{1}{2} AB(k+s) + \frac{1}{2} AC(n+t) + \frac{1}{2} BC(m+p)$

$= \frac{1}{2} AB \cdot 8 + \frac{1}{2} AC \cdot 8 + \frac{1}{2} BC \cdot 8 = 4(35) = \boxed{140}$

372.



$|2-1| < y < 2+1$

$1 < y < 3$

$y = 2$

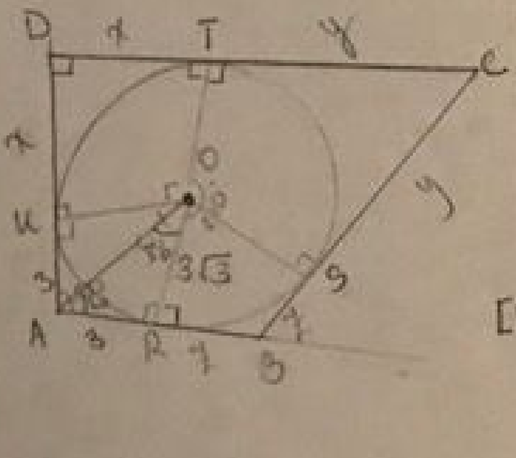
$|5-2| < x < 5+2$

$3 < x < 7$

$x = 4, 5, 6$

$\boxed{15}$

373



$360 - (60 + 90 + 90)$

$= 360 - (60 + 180)$

$= 360 - 240$

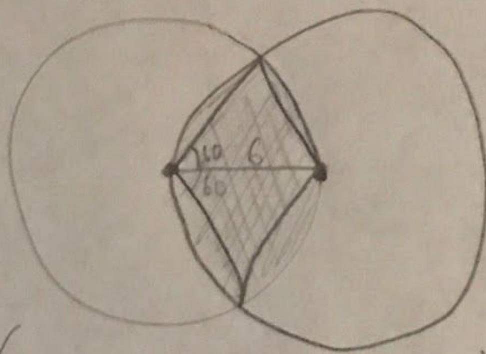
$= 120$

360
210
150
-90
60

$[\odot O] = \pi r^2 = (3\sqrt{3})^2 \pi$

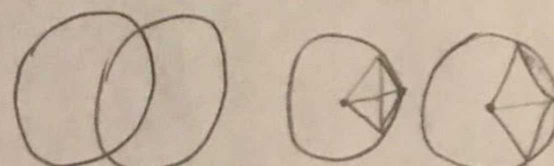
$= \boxed{27\pi}$

374.



$$2\left(\frac{s^2\sqrt{3}}{4}\right) = \frac{s^2\sqrt{3}}{2} = \frac{36\sqrt{3}}{2}$$
$$= 18\sqrt{3}$$

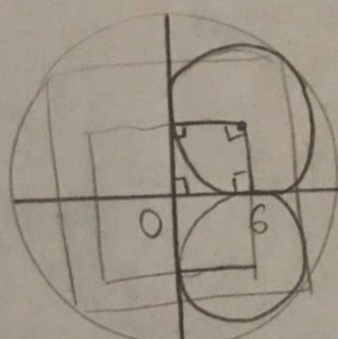
$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{12}\cancel{2} \\ 18 \\ \hline 54 \end{array}$$

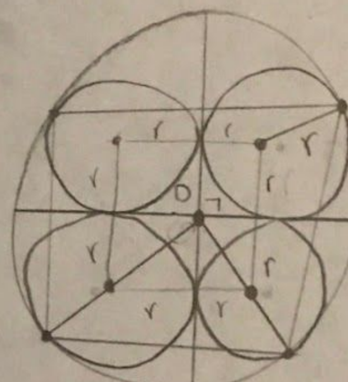


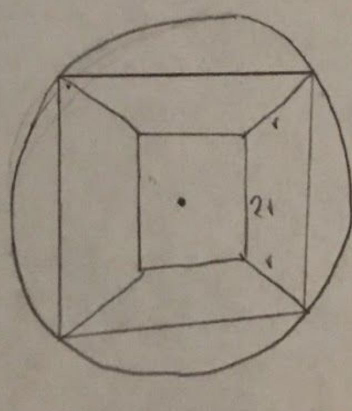
$$\left(\left(\frac{120}{360}\cdot \pi r^2\right) - \left(18\sqrt{3}\right)\right)4 + 18\sqrt{3} = \left(\left(\frac{\pi \cdot 36}{3}\right) - 18\sqrt{3}\right)4$$

$$= \left(12\pi - 18\sqrt{3}\right)4 + 18\sqrt{3} = 48\pi - 72\sqrt{3} + 18\sqrt{3}$$
$$= \boxed{48\pi - 54\sqrt{3}}$$

375.

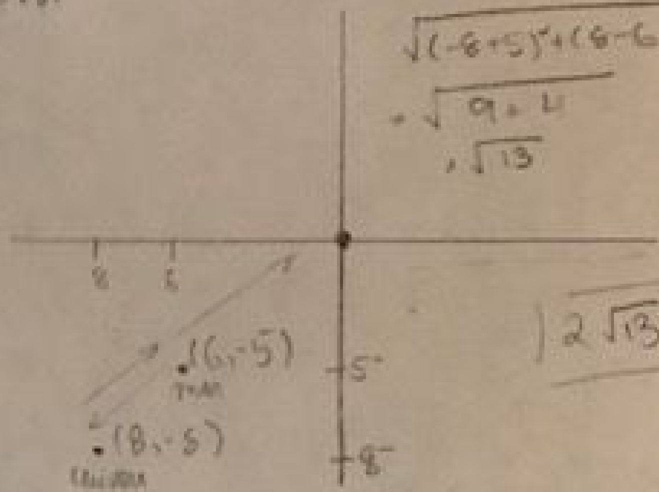






$$2r\sqrt{2} + r + r = 2r\sqrt{2} + 2r = 12$$
$$r(2\sqrt{2}+2) = 12$$
$$r = \frac{12}{2\sqrt{2}+2} = \boxed{\frac{6}{1+\sqrt{2}}}$$

376.



$\sqrt{(-8+5)^2+(8-6)^2}$

$=\sqrt{9+4}$

$=\sqrt{13}$

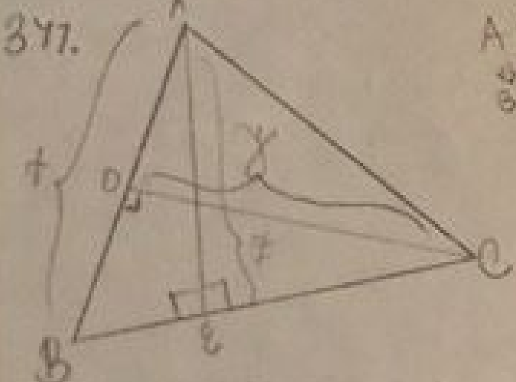
$\sqrt{(6)^2+(-5)^2}$

$\sqrt{36+25}$

$\sqrt{61}$

$\boxed{2\sqrt{13}+\sqrt{61}}$

377.



AE, AB, CD are known

$\Downarrow$

BE is also known; BC is also known,

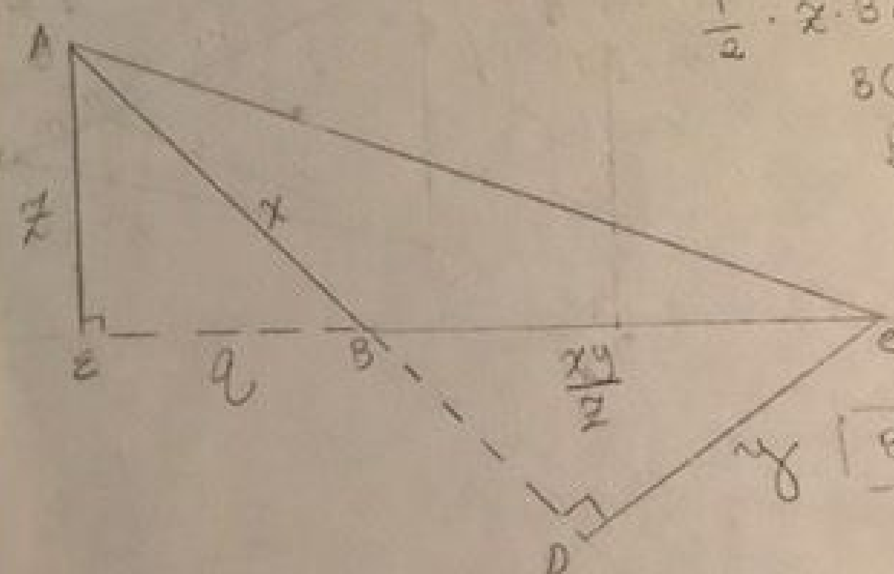
BC is also known

$\frac{1}{2}\cdot AB\cdot CD=\frac{1}{2}\cdot BC\cdot AE$

$DB^2=CB^2-CD^2$

$\boxed{DB=\sqrt{CB^2-CD^2}}$ if $\angle A$ & $\angle B$ are acute

ii) $\angle B$ is obtuse



$\frac{1}{2}\cdot z\cdot BC=\frac{1}{2}\cdot x\cdot y$

$BC\cdot z=x\cdot y$

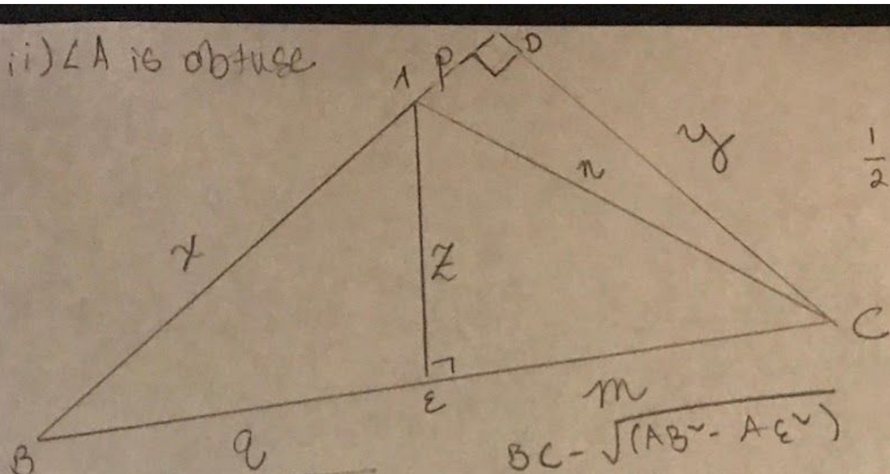
$BC=\frac{xy}{z}$

$BD^2=BC^2-DC^2$

$BD=\sqrt{\left(\frac{xy}{z}\right)^2-(y)^2}$

$\boxed{BD=\sqrt{\left(\frac{x^2y^2}{z^2}-y^2\right)}}$

ii) $\angle A$ is obtuse



$$\frac{1}{2}\cdot y\cdot x = \frac{1}{2}\cdot Z\cdot BC$$

$$\sqrt{Z^2+(BC-\sqrt{(AB^2-A\varepsilon^2)})^2}$$

$$\sqrt{Z^2+(BC-\varepsilon)^2} = n$$

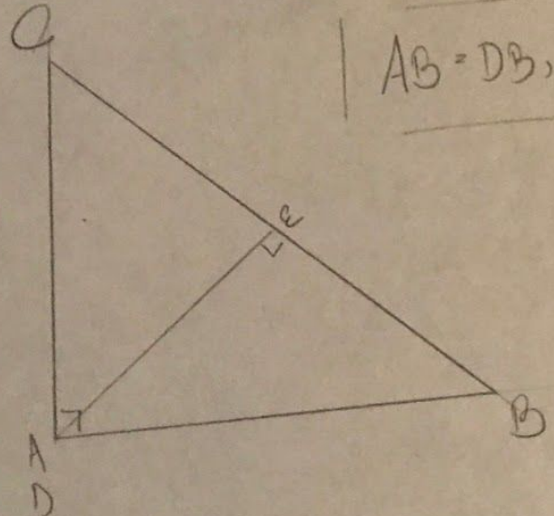
$$\sqrt{n^2-y^2} = AD$$

$$\sqrt{AB^2-A\varepsilon^2} = q$$

$$BC-\sqrt{(AB^2-A\varepsilon^2)}$$
$$= BC-\varepsilon$$

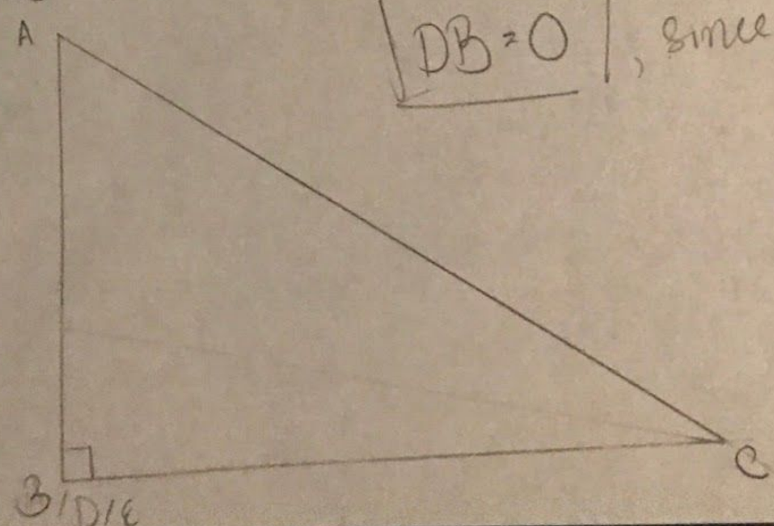
$$\boxed{DB = P+x}$$

iii) $\angle A = 90°$



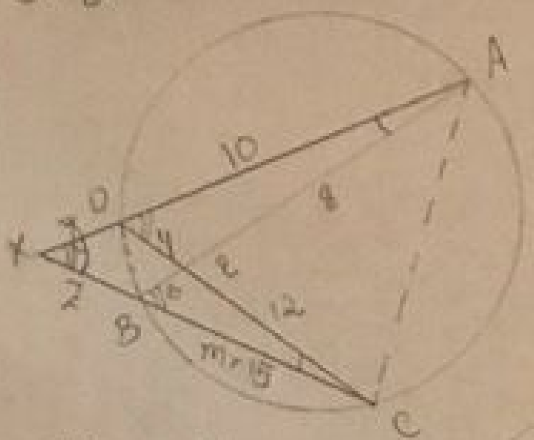
$\boxed{AB = DB, \therefore DB \text{ is known as a given}}$

iv) $\angle B = 90°$



$\boxed{DB = 0}$, since $B = D = E$

378.



$\Delta XDC \sim \Delta XBA$

$AE \cdot EB = DE \cdot EC$

$8 \cdot 6 = 12 \cdot x$

$48 = 12x$

$4 = x$

$AD = 10$
$DE = 4$
$CE = 12$
$BE = 6$
$AE = 8$

$\frac{XB}{XD} = \frac{AB}{DC}$

$z \cdot 16 = y \cdot 14$

$16z = 14y$

$\Delta BEC \sim \Delta DEA$

$\frac{BC}{DA} = \frac{EC}{DE}$

$\frac{m}{10} = \frac{6}{4}$

$8z = 7y$

$z = \frac{7}{8}y$

$XD \cdot XA = XB \cdot XC$

$y \cdot (10+y) = z(z+m)$

$4m = 60 \Rightarrow m = 15$

$10y + y^2 = z^2 + 15z$

$10y + y^2 = \left(\frac{7}{8}y\right)^2 + 15\left(\frac{7}{8}y\right)$

$$\Rightarrow \frac{y^2 + 10y = \frac{49}{64}y^2 + \frac{105}{8}y}{y}$$

$$\Rightarrow y + 10 = \frac{49}{64}y + \frac{105}{8}$$

$$\frac{64-49}{64}y = \frac{105-80}{8} \Rightarrow y = \frac{\frac{105-80}{8}}{\frac{64-49}{64}} = \frac{\frac{25}{8}\cdot 64}{\cancel{\frac{15}{64}\cdot 64}} = \frac{200}{15} = \frac{40}{3}$$

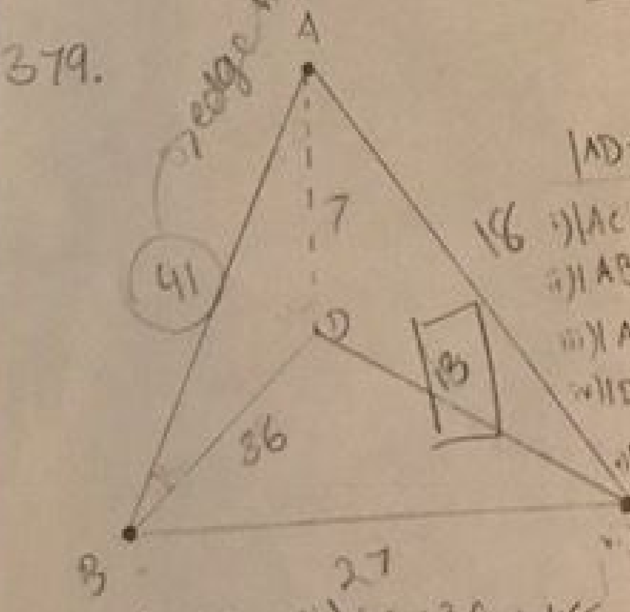
$105 - 80 = 25$

$$Ax = AD + DX = 10 + \frac{40}{3} = \boxed{\frac{70}{3}}$$

$\frac{13}{?} = 1.0$

7, 13, 18, 27, 36

379.



$|AD - DB| < 41 < AD + DB$

i) $|AC - DC| < AD < AC + DC$

ii) $|AB - BD| < AD < AB + BD$

iii) $|AB - AD| < BD < AB + AD$

iv) $|DC - BC| < BD < BC + DC$

v) $|AC - AD| < DC < AC + AD$

vi) $|BC - BD| < DC < BC + BD$

(AD, DB)?

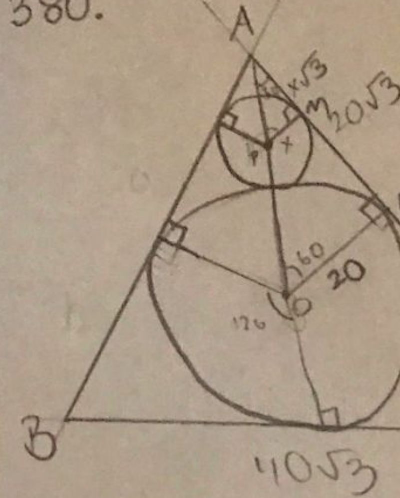
(7, 13) · 6
(7, 18) · 11
(7, 27) · 20
(13, 18) · 5
(13, 27) · 4

(7, 36) · 29
(13, 36) · 23
(27, 36) · 9
(18, 27) · 9
(18, 36) · 18

i) $6 < 7 < 43$ iii) $34 < 36 < 48$ v) $11 < 13 < 25$

ii) $5 < 7 < 77$ iv) $14 < 36 < 40$ vi) $9 < 13 < 63$

380.



A = rs

$$\frac{s^2\sqrt{3}}{4} = 20\cdot\frac{3s}{2}$$

$$\frac{\frac{s^2\sqrt{3}}{4}\cdot 4}{\frac{3s}{2}\cdot 4} \Rightarrow \frac{s^2\sqrt{3}}{6s} \Rightarrow \frac{s\sqrt{3}}{6} = 20$$

$$s\sqrt{3} = 120$$

$$s = \frac{120}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{120\sqrt{3}}{3} = 40\sqrt{3}$$

$\triangle APM \sim \triangle AON$ by AA~

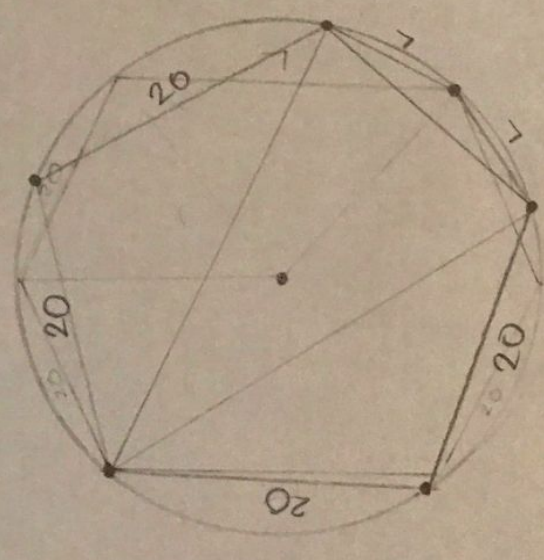
$$\frac{AP}{AO} = \frac{PM}{ON} \Rightarrow \frac{2x}{40} = \frac{x}{20}$$

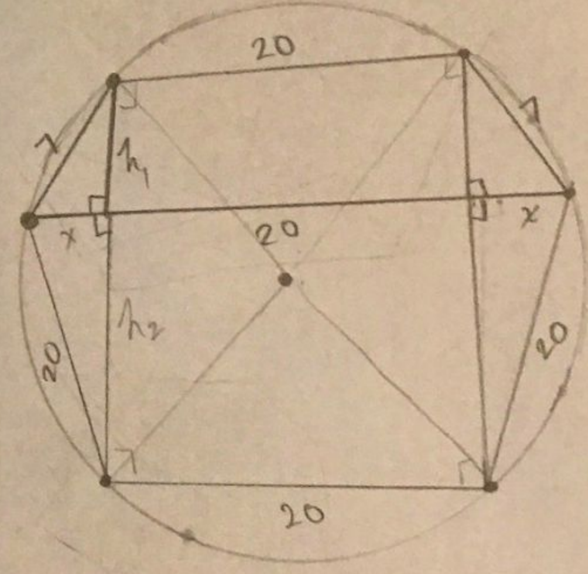
$$\Rightarrow 40x = 40x$$

$$x = 1$$

$$\boxed{x = 1}$$

381.





$$\frac{1}{2}(20+20+2x)h = \frac{1}{2}\cdot h\ldots$$

$$\frac{1}{2}(40+2x)h = \left(\frac{1}{2}\cdot hx\right)2 + 20h$$

$$\frac{1}{2}(40h+2xh) = xh + 20h$$

$$20h + xh =$$

$$\frac{1}{2}(40+2x)h = \frac{1}{2}($$

$$\frac{1}{2}(20+2x)h = \left(\frac{1}{2}\cdot h\cdot x\right)2 + 20h$$

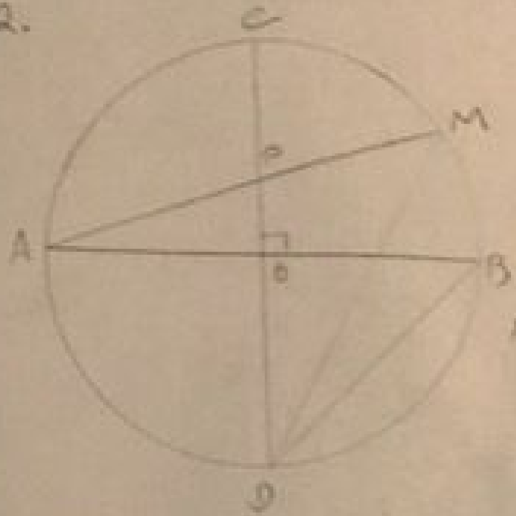
$$h(10+x) = hx + 20h$$

$$10h + hx = hx + 20h$$

$$\frac{1}{2}(20h+2xh) = hx + 20h$$

$$10h + xh = xh + 20h$$

382.



$AP \cdot AM = AP(AP+PM)$ ~~$i) AO \cdot OB$~~

$AP \cdot AM \overset{?}{=} AO^2$

$AP^2 + AP \cdot PM$

$\boxed{ii) AO \cdot AB = AO \cdot AO^2 = AO^3}$

$iii) CP \cdot CD = CP(CP+PD)$

$iv) CP \cdot PD = OP^2 + CP \cdot PD$

~~$v) CO \cdot OP = (CP+OP)OP$~~

$= OP^2 + OP \cdot CP$

$AO^2 + OP^2 + CP \cdot PD$

$AO^2 + OP^2 + CP \cdot PD = AO^3$

$OP^2 + CP \cdot PD = AO^3 - AO^2$

$OP^2 + CP \cdot PD = AO^2(AO-1)$

$OP^2 + CP(OP+OD)$

$OP^2 + OP \cdot CP + OD \cdot CP$

$OP(OP+CP) + CP \cdot OD \Rightarrow OP \cdot CO + OD \cdot CP$

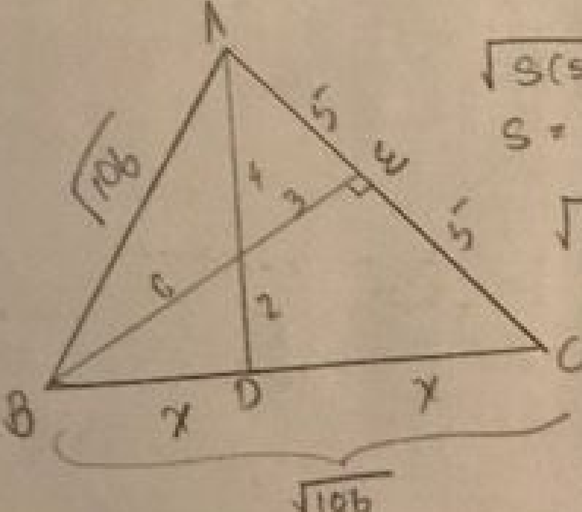
$AO \cdot OB = CO \cdot OD = OD(CP+OP) = OD \cdot CP + OP \cdot OD$

$AP \cdot PM = CP \cdot PD = CP(OD+OP) = OD \cdot CP + OP \cdot CP$

$AO \cdot AB = AO(AO+OB) = AO^2 + AO \cdot OB = AO^2 + OD \cdot CP + OP \cdot OD$

$= OD \cdot CP + OP \cdot CP$

383.



$\sqrt{s(s-a)(s-b)(s-c)} = [\triangle ABC]$

$s = \frac{2\sqrt{106}+10}{2} = \sqrt{106}+5$

$\sqrt{(\sqrt{106}+5)(\sqrt{106}+5-10)(\sqrt{106}+5-\sqrt{106})(\sqrt{106}+5-\sqrt{106})}$

$= \sqrt{(\sqrt{106}+5)(\sqrt{106}-5)(5)^2}$

$= \sqrt{((\sqrt{106})^2 - 5^2) \cdot 25}$

$= \sqrt{(106-25) \cdot 25}$

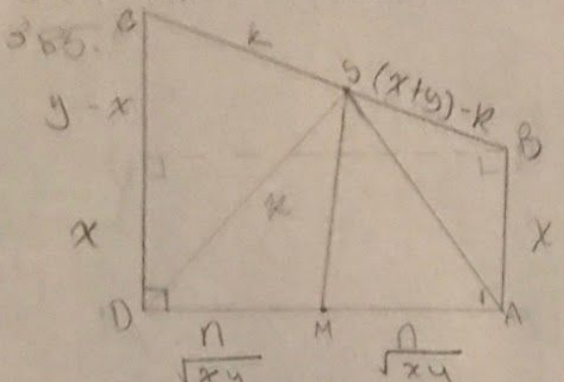
$= \sqrt{81 \cdot 25}$

$= \sqrt{2025}$

$= \boxed{45}$

384. Shown in blackboard

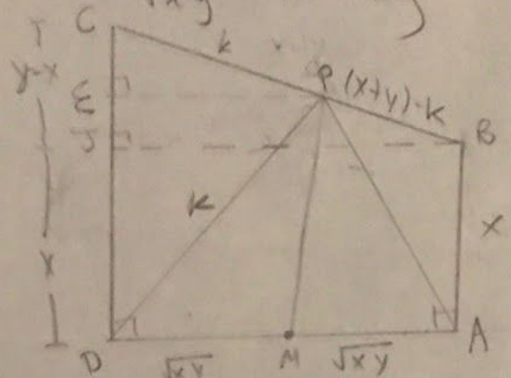
385.



$$(y-x)^2 + (2n)^2 = (x+y)^2$$
$$y^2 - 2xy + x^2 + 4n^2 = x^2 + 2xy + y^2$$
$$4n^2 = 4xy$$
$$n^2 = xy$$

Show $SM = n$, or

$$SD^2 + SA^2 = 4xy = 4n^2$$
$$(2\sqrt{xy})^2 = 4xy$$



$$(k)^2 - \left(\frac{y}{2}\right)^2 = PE^2$$
$$k^2 - \frac{y^2}{4} = PE^2$$

$CP = k$ $\quad JB = 2\sqrt{xy}$

$CB = x+y$ $\quad PE = \sqrt{k^2 - \frac{y^2}{4}}$

$CJ = \frac{y}{2}$ $\quad \left(y - x = \frac{y}{2}\right)2$

$$2y - 2x = y$$
$$-2x = -y$$
$$2x = y$$

$\Delta CEP \sim \Delta CJB$ by AA~

$$\frac{CE}{CJ} = \frac{PE}{BJ} \Rightarrow CE \cdot 2\sqrt{xy} = \left(\sqrt{k^2 - \frac{y^2}{4}}\right)\left(\frac{y}{2}\right)$$

$$CE = \frac{\left(\sqrt{\frac{4k^2 - y^2}{4}}\right)\left(\frac{y}{2}\right)}{2\sqrt{xy}} = \frac{\left(\frac{\sqrt{4k^2 - (2x)^2}}{2} \cdot \frac{y}{2}\right)}{2\sqrt{x \cdot 2x}} = \frac{\frac{y\sqrt{4k^2 - 4x^2}}{4} \cdot 4}{2\sqrt{2x^2} \cdot 4}$$

$$CE = \frac{y\sqrt{4k^2 - 4x^2}}{8x\sqrt{2}}$$

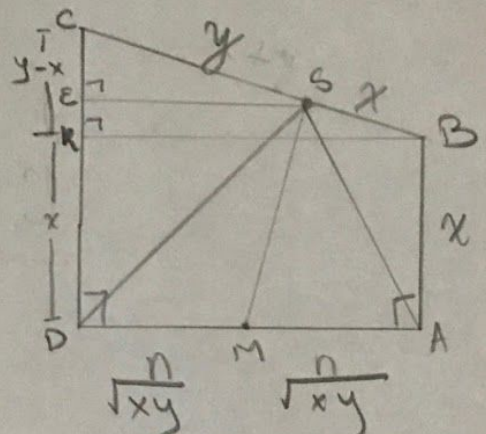
$$\frac{CP}{CB} = \frac{PE}{BJ} \Rightarrow \frac{k}{x+y} = \frac{PE}{2x\sqrt{2}}$$
$$2xk\sqrt{2} = (x+y)PE$$
$$2xk\sqrt{2} = (x+2x)PE$$
$$2xk\sqrt{2} = 3xPE$$
$$2k\sqrt{2} = 3 \cdot \sqrt{\frac{4(k^2 - x^2)}{1}}$$
$$\left(2k\sqrt{2} = 3 \cdot 2\sqrt{k^2 - x^2}\right)^2$$
$$4k^2 \cdot 2 = 6(k^2 - x^2)$$

$$8k^2 = 6k^2 - 6x^2$$
$$2k^2 = -6x^2$$
$$k^2 = -3x^2$$

NOT PLAUSIBLE

$$(2k\sqrt{2})^2 = (3\sqrt{4k^2 - 4x^2})^2$$
$$4k^2 \cdot 2 = 9(4k^2 - 4x^2)$$
$$8k^2 = 36k^2 - 36x^2$$
$$-28k^2 = -36x^2$$
$$28k^2 = 36x^2$$
$$k\sqrt{28} = 6x$$
$$2k\sqrt{7} = 6x$$

385.



$CK^2 + BK^2 = BC^2$

$(y-x)^2 + (2n)^2 = (y+x)^2$

$(2n)^2 = (y+x)^2 - (y-x)^2$

$4n^2 = y^2+2yx+x^2-(y^2-2yx+x^2)$

$4n^2 = \cancel{y^2}+2yx+\cancel{x^2}-\cancel{y^2}+2yx-\cancel{x^2}$

$4n^2 = 4yx$

$n^2 = xy \Rightarrow n = \sqrt{xy}$

$SE^2 + CE^2 = CS^2$

$SE^2 = CS^2 - CE^2$

$SE^2 = y^2 - (y-x)^2$

$SE = \sqrt{y^2-(y^2-2yx+x^2)}$

$SE = \sqrt{\cancel{y^2}-\cancel{y^2}+2yx-x^2}$

$SE = \sqrt{2yx-x^2}$

$\triangle CES \sim \triangle CKB$ by AA~

$\frac{CS}{CB} = \frac{ES}{KB} \Rightarrow CS \cdot KB = CB \cdot ES$

$y(2\sqrt{xy}) = (y+x)(\sqrt{2yx-x^2})$

$(2y\sqrt{xy} = x+y(\sqrt{2yx-x^2}))^2$

$(2y)^2 \cdot (\sqrt{xy})^2 = (x+y)^2 \cdot (\sqrt{2yx-x^2})^2 \Rightarrow 4y^2 \cdot xy = (x^2+2xy+y^2)(2yx-x^2)$

$4y^3x = 2yx \cdot x^2 - x^4 + 2xy \cdot 2xy - x^2 \cdot 2xy + 2y^3x - x^2y^2$

$4y^3x = 2yx^3 - x^4 + 4x^2y^2 - 2x^3y + 2y^3x - x^2y^2$

$4xy^3 = \cancel{2x^3y} - x^4 + 4x^2y^2 - \cancel{2x^3y} + \cancel{2xy^3} - x^2y^2$

$-2xy^3 \qquad \cancel{-2xy^3}$

$2xy^3 = 3x^2y^2 - x^4$

$2y^3 = 3xy^2 - x^3$

$2y^3 - 3xy^2 = -x^3$

$3xy^2 - 2y^3 = x^3$

$y^2(3x-2y) = x^3$

$2y^3 = x(3y^2-x^2)$

$\cancel{2y^3 = x(3y+x)(3y-x)}$

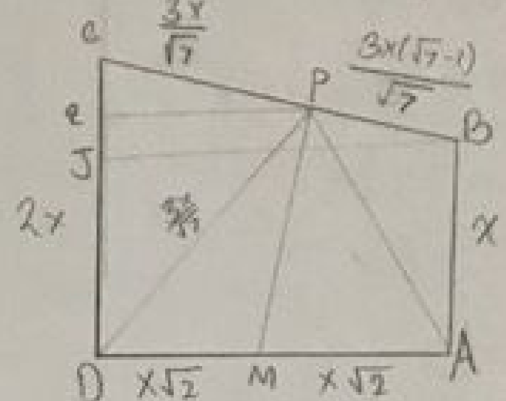
$-x^4 + 3x^2y^2 - 2xy^3 = 0$

$x^4 - 3x^2y^2 + 2xy^3 = 0$

$\frac{CE}{CK} = \frac{CS}{CB} \Rightarrow CE \cdot CB = CS \cdot CK$

$CE = \frac{CS \cdot CK}{CB} = \frac{y \cdot (y-x)}{y+x} = \frac{y^2-yx}{y+x}$

385.



$y = 2x$ $\quad x+y = x+2x = 3x$

$k = \cancel{\frac{3x}{\sqrt{x}}}$ $\quad 3x - \frac{3x}{\sqrt{7}} \Rightarrow \frac{3x\sqrt{7}-3x}{\sqrt{7}}$

$\sqrt{xy} = \sqrt{x\cdot 2x} = \sqrt{2x^2} = x\sqrt{2}$

$k = \frac{3x}{\sqrt{7}}$ checks $\quad \frac{3x(\sqrt{7}-1)}{\sqrt{7}}$

$\frac{CP}{CB} = \frac{PE}{BJ}$

$\frac{3x}{\sqrt{7}} \cdot 2x\sqrt{2} = \left(\sqrt{\left(\frac{3x}{\sqrt{7}}\right)^2 - \frac{(2x)^2}{4}}\right)(3x) \Leftarrow CP\cdot BJ = PE\cdot CB \Rightarrow k\cdot 2\sqrt{xy} = \sqrt{k^2 - \frac{y^2}{4}}\cdot \overbrace{\quad}^{x+y}$

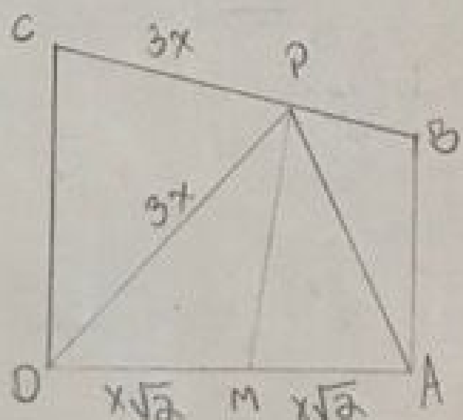
$\frac{6x^2\sqrt{2}}{\sqrt{7}} = \left(\sqrt{\frac{9x^2}{7} - \frac{4x^2}{4}}\right)(3x) \Rightarrow \frac{6x^2\sqrt{2}}{\sqrt{7}} = \left(\sqrt{\frac{36x^2}{28} - \frac{28x^2}{28}}\right)(3x)$

$\Rightarrow \frac{6x^2\sqrt{2}}{\sqrt{7}} = \left(\sqrt{\frac{8x^2}{28}}\right)3x \Rightarrow \frac{6x^2\sqrt{2}}{\sqrt{7}} \cdot \left(\sqrt{\frac{4x^2}{14}}\right)3x \Rightarrow \frac{6x^2\sqrt{2}}{\sqrt{7}} = \frac{2x}{\sqrt{7}\sqrt{2}}$

$\frac{6x^2\sqrt{2}}{\sqrt{7}} = \sqrt{k^2 - x^2} \Rightarrow 6x^2\sqrt{2} = \sqrt{7(k^2-x^2)}$

$2xk\sqrt{2} = 3x\cdot\sqrt{k^2-x^2} \Rightarrow (2k\sqrt{2} = 3\sqrt{k^2-x^2})^2 \Rightarrow 4k^2\cdot 2 = 9(k^2-x^2) \Rightarrow 8k^2 = 9k^2 - 9x^2 \Rightarrow -k^2 = -9x^2 \Rightarrow k^2 = 9x^2$

$\Rightarrow k = 3x;$



$y = 2x \quad CP\cdot BJ = PE\cdot BC$

$k = 3x \quad k\cdot 2\sqrt{xy} = \sqrt{k^2 - \frac{y^2}{4}}\cdot 3x$

$k\cdot 2(x\sqrt{2}) = \sqrt{k^2 - \frac{4x^2}{4}}\cdot 3x$

$2kx\sqrt{2} = \sqrt{k^2-x^2}\cdot 3x$

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

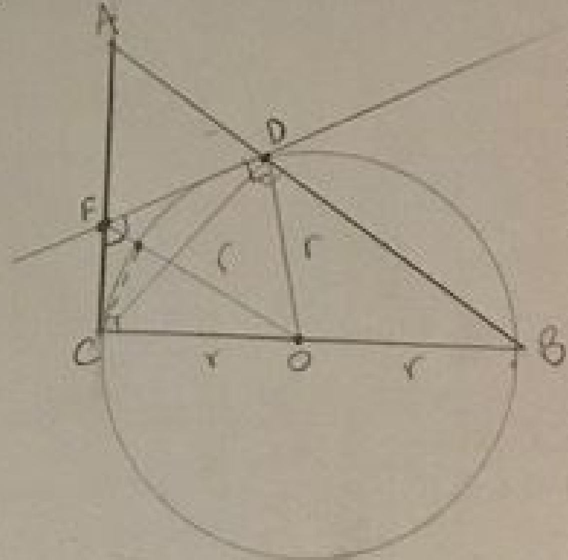
$4k^2\cdot 2 = 9(k^2-x^2)$

$8k^2 = 9k^2 - 9x^2$

$-k^2 = -9x^2$

$k^2 = 9x^2 \Rightarrow k = 3x$

386.



$\angle COF \cong m$

$\Delta FOC \cong \Delta FOD$ by HL $\cong$ post

$\therefore$, $COF \cong \angle DOF$ by CPCTC

$\angle CBD = \frac{1}{2}\overset{\frown}{CD} \Rightarrow \frac{1}{2}\cdot 2\angle COF = \frac{1}{2}\cdot 2m$

$= m$

$\therefore$, $\angle COF \cong \angle DBC$

$\therefore$, $\Delta FOC \sim \Delta ABC$ by AA~

$\angle ACB \cong \angle ACB$

$\angle COF \cong \angle DBC$

$$\frac{OC}{BC} = \frac{FC}{AC} \Rightarrow \frac{r}{2r} = \frac{FC}{AC}$$

i) $\frac{FC}{AC} = \frac{1}{2} \Rightarrow$ $\boxed{\therefore, \overline{DF} \text{ bisects } \overline{AC}.}$

ii) $DF = FC = AF$

$\boxed{\therefore, FC = AF}$

iii) $\Delta ABC \sim \Delta DBC$, $\therefore$, $\boxed{\angle A \cong \angle BCD}$

iv) $m\angle CFD = \frac{\overset{\frown}{DBC} - \overset{\frown}{DFC}}{2}$

$m\angle A = \frac{\overset{\frown}{BC}}{2}$

$m\angle CFD = \frac{\overset{\frown}{DB} + \overset{\frown}{BC} - \overset{\frown}{DFC}}{2}$

$\frac{\overset{\frown}{DB} - \overset{\frown}{DFC} + \overset{\frown}{BC}}{2} = 2\left(\frac{\overset{\frown}{BC}}{2}\right)$

$\frac{\overset{\frown}{DB} - \overset{\frown}{DFC} + \overset{\frown}{BC}}{2} = \overset{\frown}{BC}$

$\overset{\frown}{DB} - \overset{\frown}{DFC} = \overset{\frown}{BC}$

iv) $\Delta COF \cong \Delta FOD$ by HL $\cong$

$\therefore$, $\angle CFO \cong \angle OFD$ by CPCTC

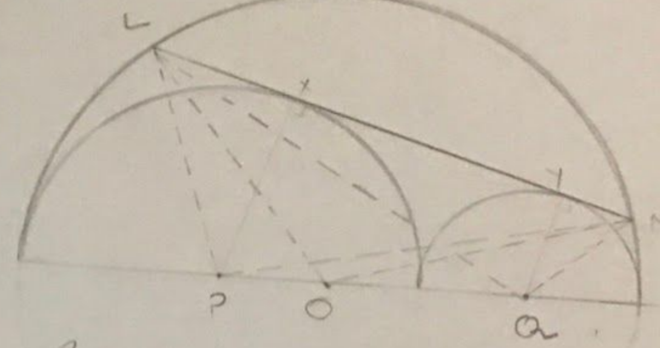
$\Delta FOC \sim \Delta ABC$ by AA~

$\therefore$, $\angle CFO \cong \angle A$

$\therefore$, $2\angle CFO = \angle CFD$

$\boxed{\therefore, \angle CFD = 2m\angle A}$

387.

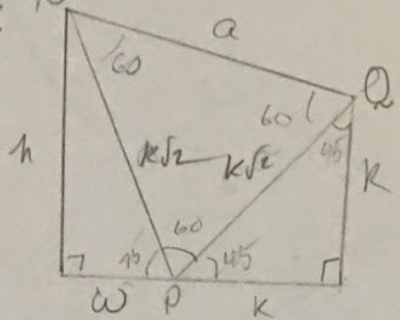


$\frac{1}{2} \cdot LM \cdot PX$

$\frac{1}{2} \cdot LM \cdot QY$

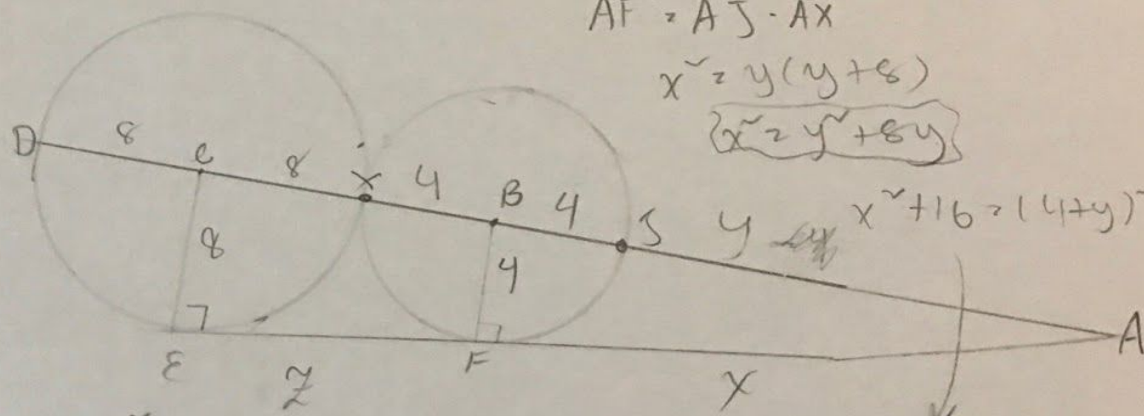
$\frac{1}{2} \cdot LM \cdot OJ$

388.



$\boxed{w = \sqrt{h^2 - 2k^2}}$

389



$AF^2 = AJ \cdot AX$

$x^2 = y(y+8)$

$x^2 = y^2 + 8y$

$x^2 + 16 = (4+y)^2$

$x^2 = y(y+8) \Rightarrow x^2 = y^2 + 8y$

$x^2 + 16 = y^2$

$x^2 = x^2 + 16 + 4y$

$-16 = 4y$

$x^2 + 16 = 16 + 8y + y^2$

$\cancel{x^2 = 8y + 0}$

$y^2 + 8y = 0$

$AE^2 = AX \cdot AD$

$(x+z)^2 = (y+8)(y+24)$

$x^2 + 2xz + z^2 = y^2 + 32y + 192$

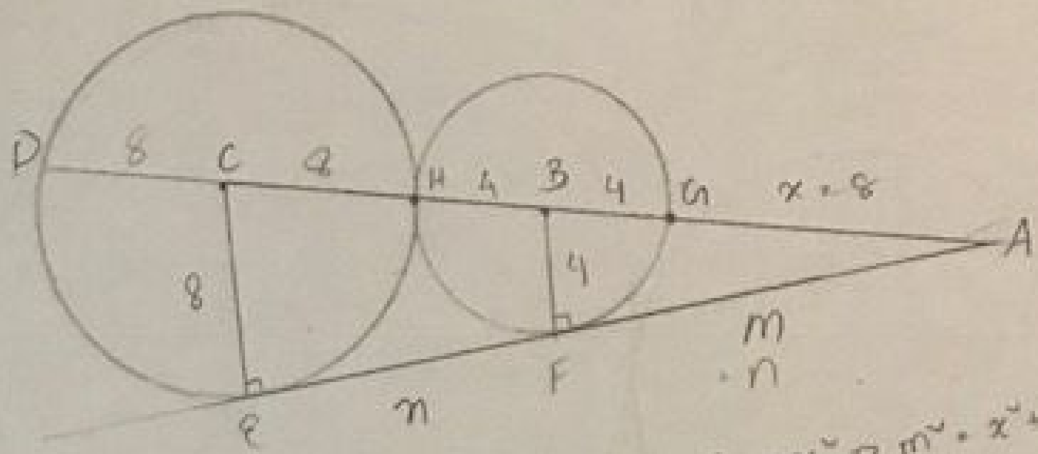
$y^2 + 8y + z(2x+z) = y^2 + 32y + 192$

$z(2x+z) = 24y + 192$

$2\sqrt{y^2+8y} \cdot z + z^2 = 24y + 192$

$\begin{array}{r} 24 \\ 8 \\ \hline 192 \end{array}$

389.



$4^2 + m^2 = (4+x)^2 \Rightarrow 16 + m^2 = 16 + 8x + x^2 \Rightarrow m^2 = x^2 + 8x$

$8^2 + (m+n)^2 = (16+x)^2 \Rightarrow 64 + m^2 + 2mn + n^2 = 256 + 32x + x^2$

$AF^2 = AG \cdot AH \Rightarrow m^2 = x(x+8) \Rightarrow m^2 = x^2 + 8x$

$AE^2 = AH \cdot AD \Rightarrow (m+n)^2 = (24+x)(x+8) \Rightarrow m^2 + 2mn + n^2 = x^2 + 32x + 192$

$\frac{AF^2}{AG} = AH ; \frac{AE^2}{AD} = AH \Rightarrow \frac{AF^2}{AG} = \frac{AE^2}{AD} \Rightarrow$

$(x^2 + 8x)(24+x) = x($

$AF^2 \cdot AD = AE^2 \cdot AG$

$m^2 \cdot (24+x) = (m+n)^2 \cdot x$

$m^2 (24+x) = x(m^2 + 2mn + n^2)$

$24m^2 + m^2 x = m^2 x + 2mnx + n^2 x$

$24m^2 = 2mnx + n^2 x$

$24m^2 = n(2mx + nx)$

$\Delta AFB \sim \Delta AEC$ by AA~

$\frac{AF}{AE} = \frac{FB}{EC} \Rightarrow \frac{m}{m+n} = \frac{4}{8} \Rightarrow 8m = 4m + 4n$

$4m = 4n$

$m = n$

$\frac{AB}{AC} = \frac{AF}{AE} \Rightarrow \frac{4+x}{16+x} = \frac{m}{2m} \Rightarrow 2m(4+x) = m(16+x)$

$8m + 2mx = 16m + mx$

$mx = 8m$

$x = 8$

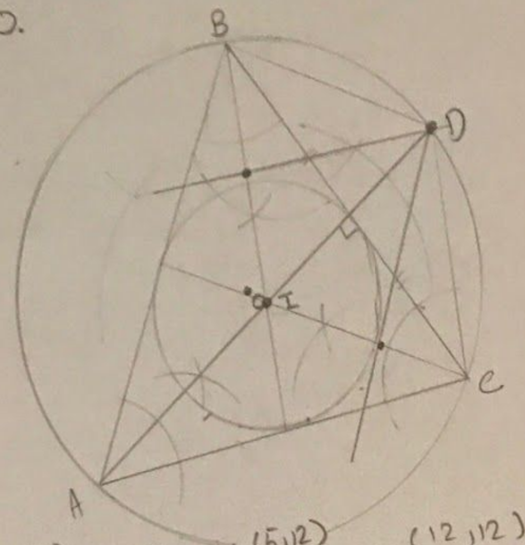
$(2n)^2 + 8^2 = (24)^2$

$4n^2 = 576 - 64$

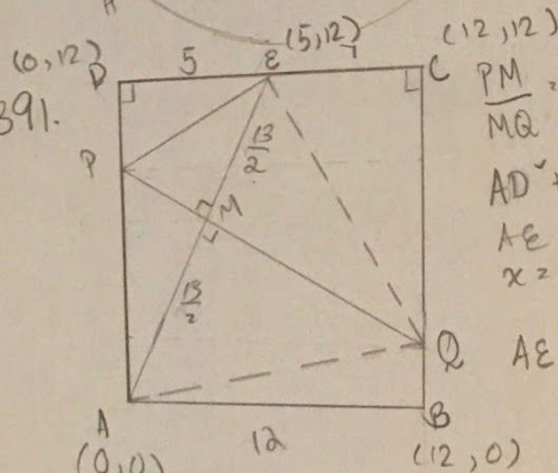
$4n^2 = 512$

$n^2 = 128 \Rightarrow n = \sqrt{128} = \sqrt{2^6}\sqrt{2} = (8\sqrt{2})2 = \boxed{16\sqrt{2}}$

390.



391.



$\frac{PM}{MQ} = ?$

$AD^2 + DE^2 = 12^2 + 5^2 = AE^2$

$AE = 13$

$x = \frac{13}{2} = 7.5$

$AE_m \Rightarrow \left(\frac{0+5}{2}, \frac{12+0}{2}\right) = \left(\frac{5}{2}, 6\right)$

$M\left(\frac{5}{2}, 6\right)$

$24 \cdot 6 = 144$, $24 \cdot 5 = 110$

$85 \cdot 85 = 425 + 6800 = 7225$

$19 \cdot 19 = 171 + 190 = 361$

$AE_m \Rightarrow \frac{12-0}{5-0} = \frac{12}{5}x \Rightarrow \frac{12}{\cancel{5}} \cdot \frac{\cancel{5}}{2} \Rightarrow PQ = AE_{\perp} = -\frac{5}{12}x \Rightarrow -\frac{5}{12} \cdot \frac{5}{2}$

$= -\frac{25}{24} + \frac{169}{24} \Rightarrow -\frac{5}{12}x + \frac{169}{24} \Rightarrow P\left(0, \frac{169}{24}\right) \Rightarrow Q\left(12, \frac{59}{24}\right)$

$$\frac{PM}{MQ} = \frac{\sqrt{\left(\frac{169}{24}-6\right)^2 + \left(0-\frac{5}{2}\right)^2}}{\sqrt{\left(\frac{59}{24}-6\right)^2 + \left(12-\frac{5}{2}\right)^2}} = \frac{\sqrt{\left(\frac{25}{24}\right)^2 + \frac{25}{4}}}{\sqrt{\left(\frac{85}{24}\right)^2 + \left(\frac{19}{2}\right)^2}} = \frac{\sqrt{\frac{625}{576} + \frac{25}{4}}}{\sqrt{\frac{7225}{576} + \frac{361}{4}}}$$

$144 \cdot 25 = 720 + 2880 = 3600$

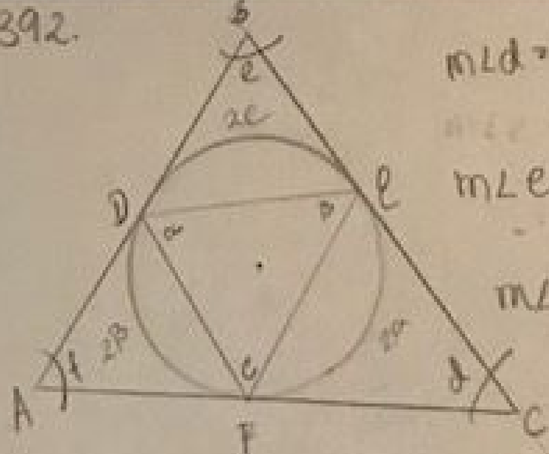
$361 \cdot 144 = 1444 + 14440 + 36100 = 51984$

$$= \frac{\sqrt{\frac{4225}{576}}}{\sqrt{\frac{52560}{576}}}$$

$51984 + 576 = 52560$

$$= \frac{\frac{\sqrt{4225}}{24}}{\frac{\sqrt{52560}}{24}} = \boxed{\frac{\sqrt{4225}}{\sqrt{52560}}}$$

392.



$$m\angle d = \frac{(2\beta + 2e) - 2a}{2} \Rightarrow 2m\angle d = (2\beta + 2e) - 2a$$
$$2m\angle d - (2\beta + 2e) = -2a$$

$$m\angle e = \frac{(2\beta + 2a) - 2e}{2} \Rightarrow 2m\angle c = (2\beta + 2a) - 2e$$
$$2m\angle c - (2\beta + 2a) = -2e$$

$$m\angle f = \frac{(2a + 2e) - 2\beta}{2} \Rightarrow 2m\angle f = (2a + 2e) - 2\beta$$
$$2m\angle f - (2a + 2e) = -2\beta$$

$$(2\beta + 2e) - 2m\angle d = 2a \Rightarrow a = \beta + e - m\angle d$$
$$(2\beta + 2a) - 2m\angle e = 2e \Rightarrow c = \beta + a - m\angle e$$
$$(2a + 2e) - 2m\angle f = 2\beta \Rightarrow \beta = a + c - m\angle f$$

$$a + \beta = 2e + \beta + a - m\angle d - m\angle f$$
$$2e = m\angle d + m\angle f$$
$$e = \frac{m\angle d + m\angle f}{2}$$

$$a + e = 2b + a + c - m\angle d - m\angle e$$
$$2b = m\angle d + m\angle e$$
$$b = \frac{m\angle d + m\angle e}{2}$$

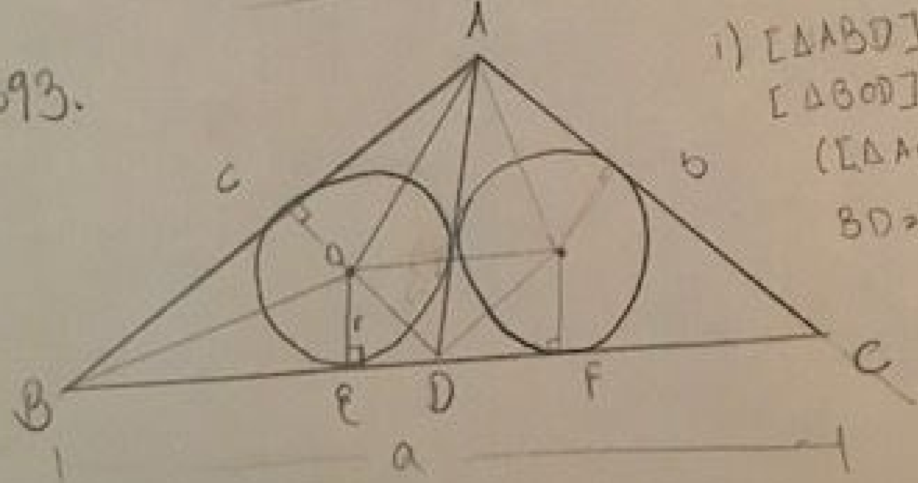
$$\beta + c = 2a + \beta + c - m\angle e - m\angle f$$
$$2a = m\angle e + m\angle f$$
$$a = \frac{m\angle e + m\angle f}{2}$$

$$m\angle d + m\angle f < 180$$
$$m\angle d + m\angle e < 180$$
$$m\angle e + m\angle f < 180$$

$$a < \frac{180}{2}$$
$$b < \frac{180}{2}$$
$$e < \frac{180}{2}$$

$\therefore$, ΔDEF is acute

393.

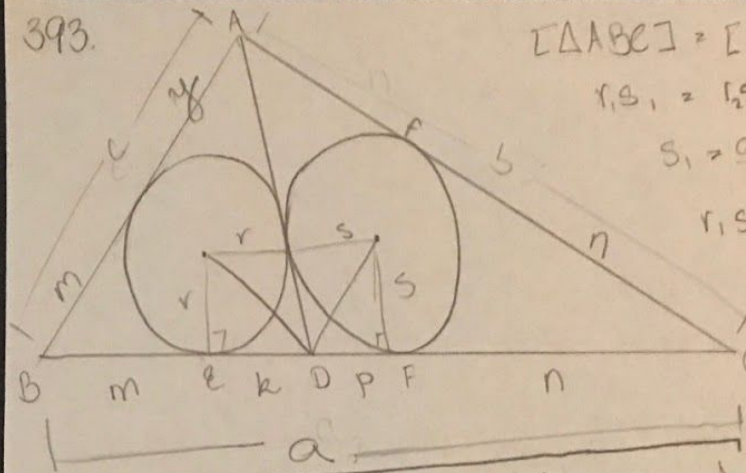


1) $[\Delta ABD] = rs$

$[\Delta BOD] = [\Delta ABC] - ([\Delta AOB] + [\Delta AOD])$

$$BD = \frac{[\Delta ABC] - ([\Delta AOB] + [\Delta AOD])}{r}$$

393.



$$[\Delta ABC] = [\Delta ADC] + [\Delta ADB]$$

$$r_1 s_1 = r_2 s_2 + r_3 s_3$$

$$s_1 = \frac{a+b+c}{2}$$

$$r_1 s_1 = \sqrt{\left(\frac{a+b+c}{2}\right)\left(\frac{a+b+c}{2}-a\right)\left(\frac{a+b+c}{2}-b\right)\left(\frac{a+b+c}{2}-c\right)}$$

let $AD = q$

$$s_2 = \frac{b+n+p+q}{2}$$

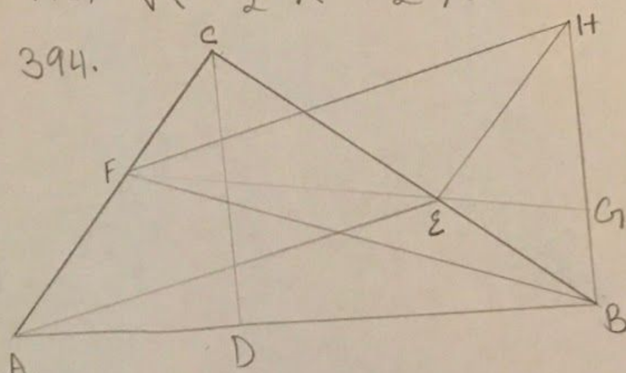
$$s_3 = \frac{c+m+k+q}{2}$$

$$r_2 s_2 = \sqrt{\left(\frac{b+n+p+q}{2}\right)\left(\frac{b+n+p+q}{2}-b\right)\left(\frac{b+n+p+q}{2}-q\right)\left(\frac{b+n+p+q}{2}-(n+p)\right)}$$

$$r_3 s_3 = \sqrt{\left(\frac{c+m+k+q}{2}\right)\left(\frac{c+m+k+q}{2}-c\right)\left(\frac{c+m+k+q}{2}-(m+k)\right)\left(\frac{c+m+k+q}{2}-q\right)}$$

$$r_1 s_1 = \sqrt{\left(\frac{a+b+c}{2}\right)\left(\frac{b+c-a}{2}\right)\left(\frac{b+a-c}{2}\right)\left(\frac{a+c-b}{2}\right)}$$

394.



$EC = EB$ $\quad FH = AE$

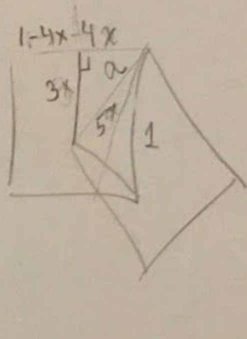
$AF = CF$ $\quad FH \parallel AE$

$AD = BD$

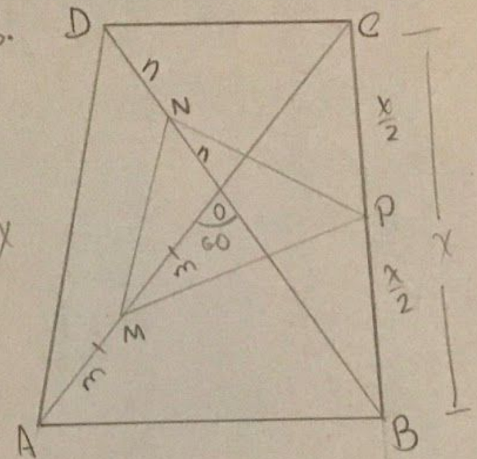
$AEHF$ is a $\parallel$ogram, b/c $FH \parallel AE$ & $FH \cong AE$.

$BH = DC$

395.

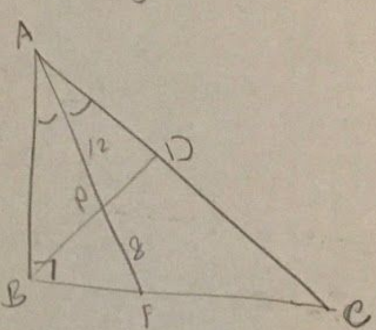


396.

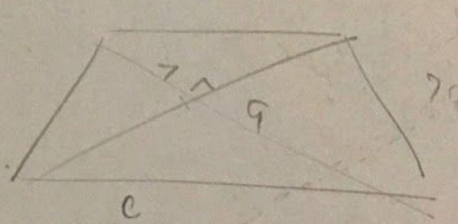


397. $\frac{10}{2} = \frac{x}{5} \Rightarrow x = 25??$

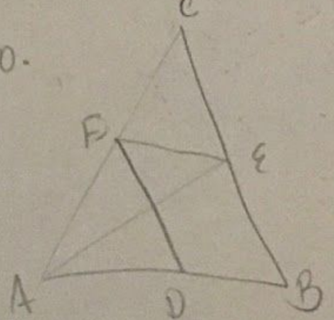
398.



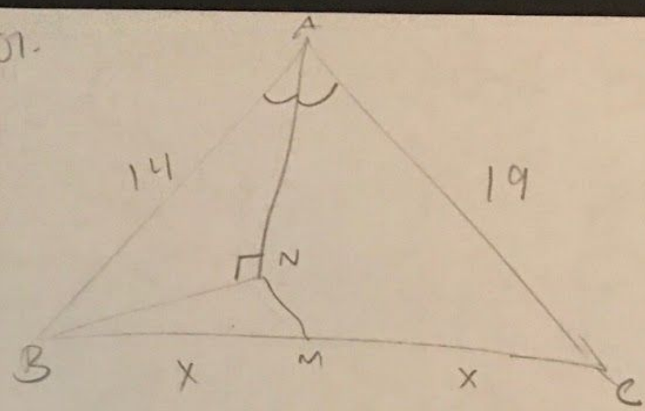
399.



400.



401.



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