Solutions

1. B

$$\frac{10\cdot 5}{2}=25$$

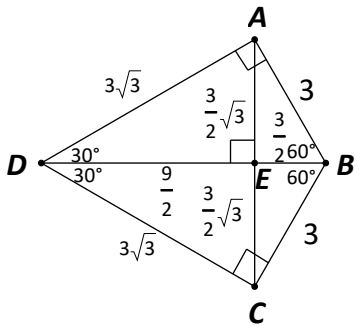
2. C

Point P is the centroid. The centroid splits the median into a 2:1 ratio.

3. B

The sides can be 2 ,3, 4 and 2, 4, 5

4. D

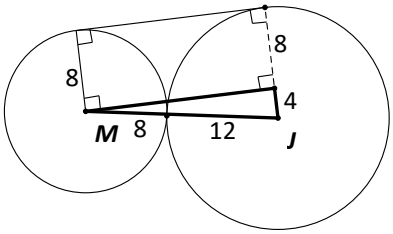


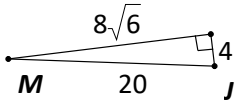
$$A = \frac{d_1\cdot d_2}{2} = \frac{6\cdot 3\sqrt{3}}{2} = 9\sqrt{3}$$

5. E

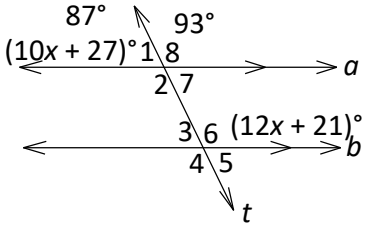
$$(n-2)\cdot 180^\circ = 4860^\circ$$
$$n=29$$

6. B



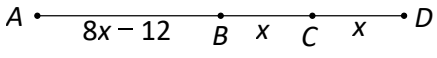


7. E



$$10x+27+12x+21=180^\circ$$
$$x=6$$
$$m\angle 8=93^\circ$$

8. C



$$8x-12=2x$$
$$x=2$$
$$AD=8$$

9. C

				I.		II.			III.
p	q	r	$p \vee q$	$(p \vee q) \wedge r$	$q \wedge r$	$p \vee (q \wedge r)$	$p \wedge r$	$p \wedge q$	$(p \wedge r) \vee (p \wedge q)$
F	T	T	T	T	T	T	F	F	F

10. C

Lines that do not intersect are either parallel or skew. If parallel, then coplanar. If skew, then noncoplanar.

11. C

$A = \sqrt{s(s-a)(s-b)(s-c)}$, where $s =$ semiperimeter

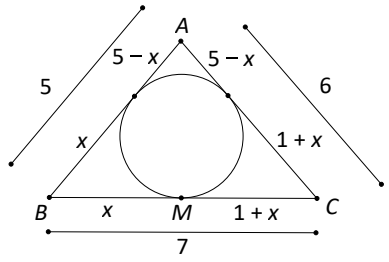
$A = \sqrt{10(1)(5)(4)} = 10\sqrt{2}$

$A = \frac{bh}{2}$

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

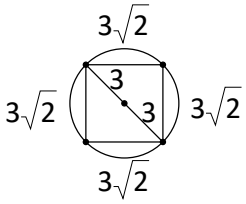
$h = 4\sqrt{2}$

12. B



$x + 1 + x = 7$
$x = 3$

13. C



Perimeter = $12\sqrt{2}$

14. A

The negation of "all" is "some are not."

15. B

$\frac{1}{2}h(4x) = x^2 \quad 2xh = x^2 \quad x(x-2h) = 0 \quad x = 0 \quad x = 2h \quad h = \frac{x}{2}$

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

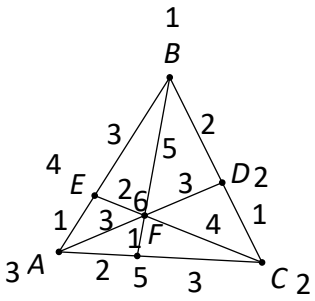
16. A

$$\frac{6\cdot 9\cdot \sin 60^\circ}{2}=\frac{6\cdot 9\cdot \frac{\sqrt{3}}{2}}{2}=\frac{27\sqrt{3}}{2}$$

17. D

$$\frac{36\pi-16\pi}{36\pi}=\frac{20}{36}=\frac{5}{9}$$

18. C



$$\frac{EF}{FC}+\frac{AF}{FD}=\frac{2}{4}+\frac{3}{3}=\frac{3}{2}$$

19. A

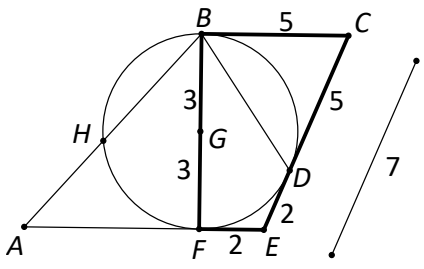
$$\frac{72^\circ\cdot \pi\cdot r^2}{360^\circ}=20\pi$$

$$r=10$$

20. A

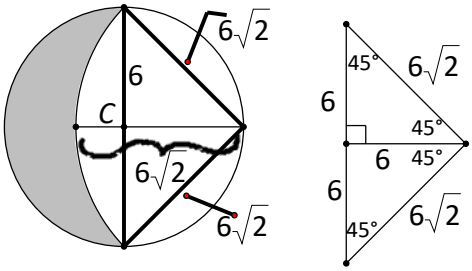
The Euler line goes through the circumcenter and the orthocenter. In a right triangle, the circumcenter is the midpoint of the hypotenuse $\left(\frac{5}{2},2\right)$ and the orthocenter is the vertex of the right angle (1, 5). Using $m=\frac{5-2}{1-\frac{5}{2}}=-2$ and the point (1, 5), the intercept is (0, 7).

21. C



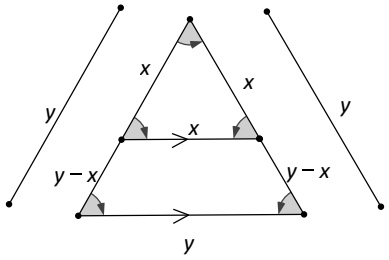
Perimeter = 20

22. A



$$\frac{1}{2}\pi 36-\left(\frac{90°\pi(6\sqrt{2})^2}{360°}-\frac{12\cdot 6}{2}\right)=18\pi-\left(18\pi-36\right)=36$$

23. D



$3x=3y-x$

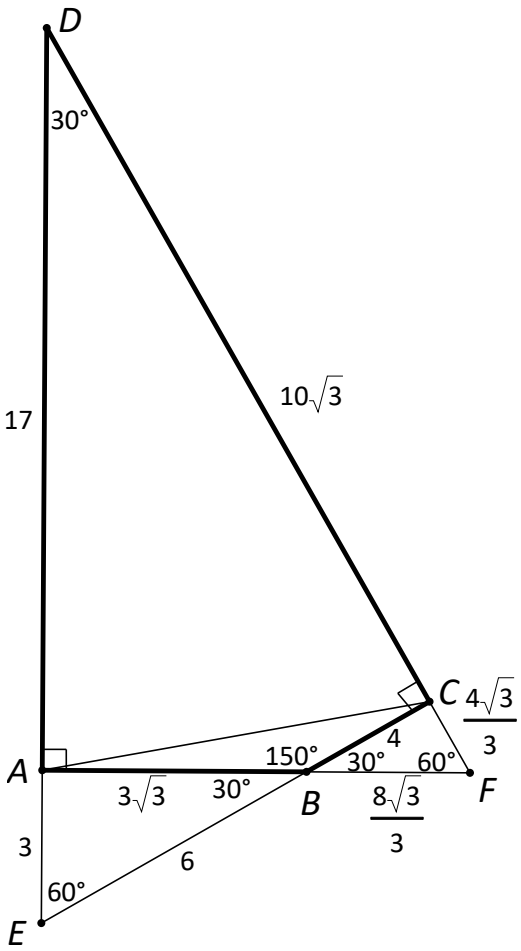
$4x=3y$

$\frac{x}{y}=\frac{3}{4}$

Ratio of areas of small triangle to large triangle: $\frac{9}{16}$

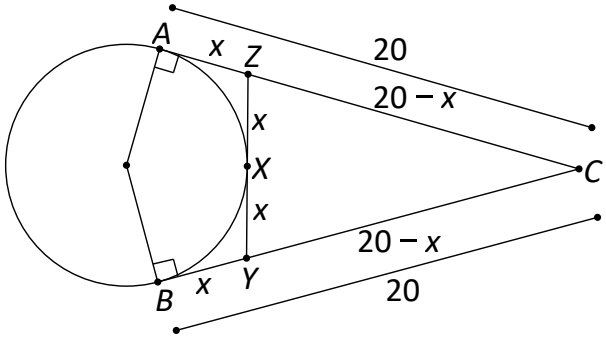
Ratio of areas of trapezoid to small triangle: $\frac{7}{9}$

24. C



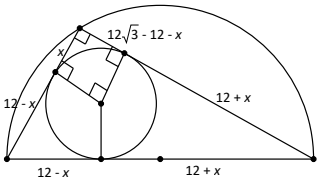
Extend $\overline{AB}$ and $\overline{BC}$ to create 2 $30°-60°-90°$ triangles. The area of ΔECD is $\frac{10\cdot 10\sqrt{3}}{2}=50\sqrt{3}$. The area of ΔABE is $\frac{3\cdot 3\sqrt{3}}{2}=\frac{9\sqrt{3}}{2}$. The area of quadrilateral *ABCD* = $50\sqrt{3}-\frac{9\sqrt{3}}{2}=\frac{91\sqrt{3}}{2}$.

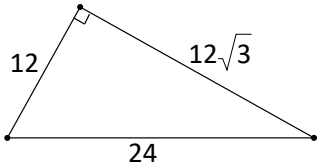
25. C



$(20-x)+(20-x)+2x=40$

26. A





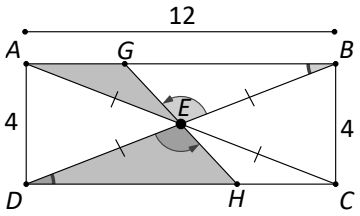
$x=12\sqrt{3}-12-x$

$x=6\sqrt{3}-6$

27. D

$(x,y)\to(-y,x)$

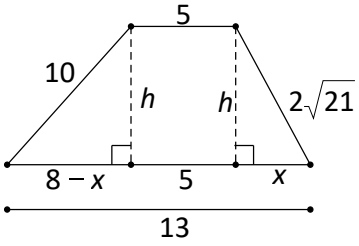
28. C



$\Delta BEG\cong\Delta DEH$ by ASA

$\frac{12\cdot 2}{2}=12$

29. C



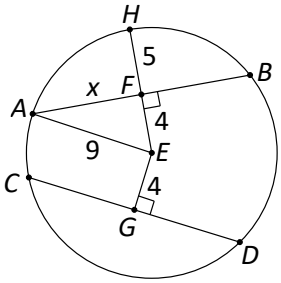
$(8-x)^2+h^2=10^2$

$x^2+h^2=(2\sqrt{21})^2$

$x=3$

$h=5\sqrt{3}$

30. B



$x^2+4^2=9^2$

$x=\sqrt{65}$

$AB=2\sqrt{65}$