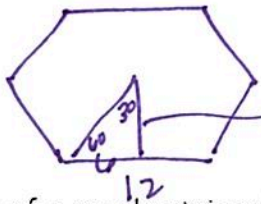


Unless stated otherwise, leave answers in exact form.

1. Find the area of a regular hexagon with side length 12.



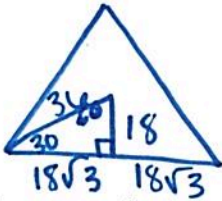
$$P = 12 \cdot 6 = 72$$

$$6\sqrt{3} = a$$

$$A = \frac{72(6\sqrt{3})}{2}$$

$$= 216\sqrt{3}$$

2. Find the area of a regular triangle with apothem 18.



$$S = 36\sqrt{3} \quad P = 108\sqrt{3}$$

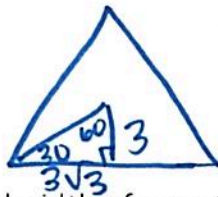
$$A = \frac{1}{2}(18)(108\sqrt{3}) = \boxed{972\sqrt{3}}$$

$$\text{or } A = \frac{(36\sqrt{3})^2\sqrt{3}}{4}$$

$$\frac{3,888\sqrt{3}}{4}$$

$$\boxed{972\sqrt{3}}$$

3. Find the area of an equilateral triangle with apothem of 3.



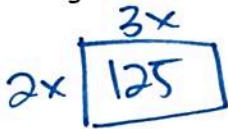
$$P = (6\sqrt{3})3 = 18\sqrt{3}$$

$$a = 3$$

$$\frac{1}{2}(18\sqrt{3})(3)$$

$$A = 27\sqrt{3}$$

4. The length and width of a rectangle are in a ratio of 2:3. The area is ~~125~~ 384. Find the length and width.



$$2x(3x) = \del{125} 384$$

$$6x^2 = \del{125} 384$$

$$x^2 = 64 \quad x = 8$$

$$384$$

$$L = 16$$

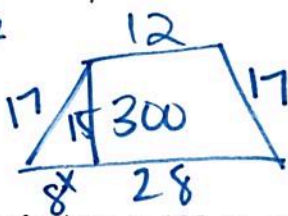
$$W = 24$$

5. An isosceles trapezoid has bases 12 and 28. The area is 300. Find the perimeter of the trapezoid.

$$8^2 + 15^2 = c^2$$

$$289 = c^2$$

$$17 = c$$



$$\frac{(12+28)h}{2} = 300$$

$$40h = 600$$

$$h = 15$$

$$\boxed{P = 74}$$

6. The area of a kite is 400 sq cm. Find the length of the diagonals if one is twice as long as the other.

$$400 = x(2x)$$

$$400 = 2x^2$$

$$200 = x^2$$

$$x = \sqrt{200}$$

$$\uparrow$$

$$2 \cdot 100$$

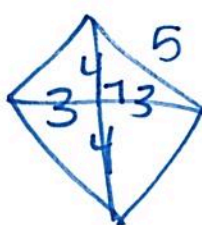
$$\uparrow$$

$$10 \cdot 10$$

$$2\sqrt{10} = d$$

$$4\sqrt{10} = d_2$$

7. Find the area of a rhombus with one diagonal 8 and side 5.

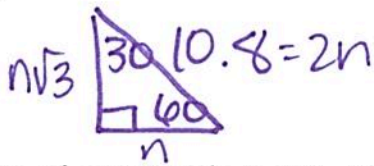


PT triple

$$A = \frac{8 \cdot 6}{2}$$

$$= 24$$

8. The hypotenuse of a 30-60-90 triangle is 10.8 ft. Find the perimeter of the triangle to the nearest tenth.



$$2n = 10.8$$

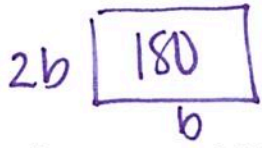
$$n = 5.4$$

$$5.4 + 5.4\sqrt{3} + 10.8$$

$$16.2 + 5.4\sqrt{3}$$

9. The area of a rectangle is 180. The height is twice the base. Find the perimeter.

$$P = 18\sqrt{10}$$



$$2b(b) = 180$$

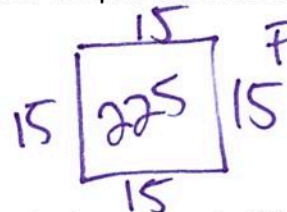
$$2b^2 = 180$$

$$b^2 = 90$$

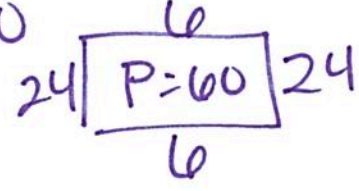
$$b = \sqrt{90} = 3\sqrt{10}$$

$$2b = 6\sqrt{10}$$

10. The area of a square is 225 sq. ft. Find the area of a rectangle with the same perimeter whose base is 6 ft.



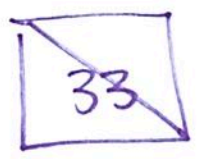
$$P = 60$$



$$A = 6 \cdot 24$$

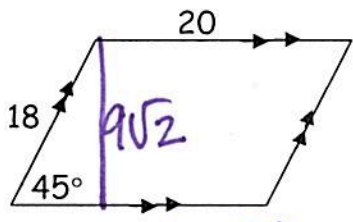
$$= 144$$

11. The diagonal of a square is 33 cm. Find the area of the square.



$$A = \frac{d \cdot d}{2} = \frac{1089}{2} = 544.5$$

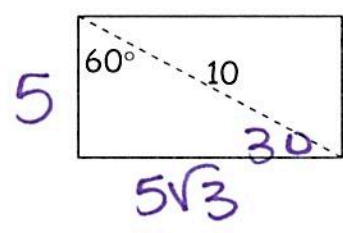
12. Find the area.



$$20(9\sqrt{2})$$

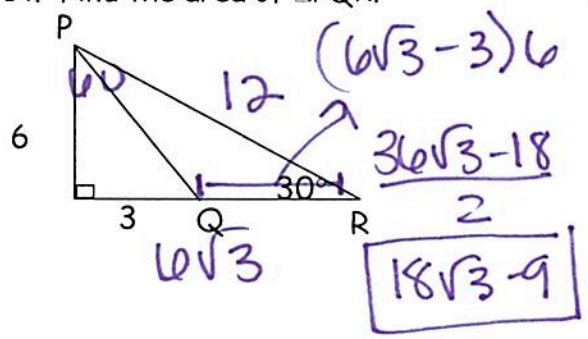
$$180\sqrt{2}$$

13. Find the area of the rectangle.



$$25\sqrt{3} = A$$

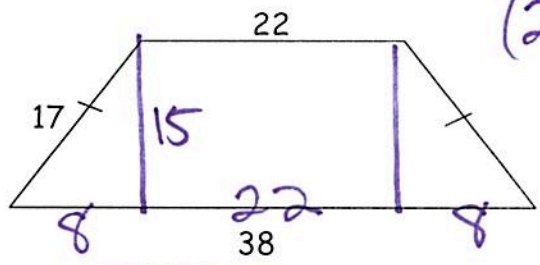
14. Find the area of $\triangle PQR$.



$$\frac{(6\sqrt{3} - 3) \cdot 6}{2}$$

$$= 18\sqrt{3} - 9$$

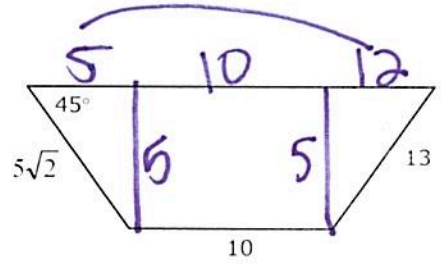
15. Find the area of the trapezoid.



$$\frac{(22 + 38) \cdot 15}{2}$$

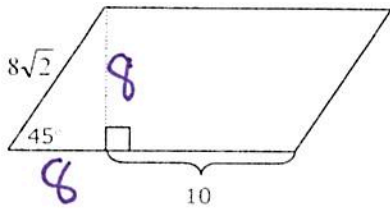
$$= 450$$

16. Find the area of the trapezoid.



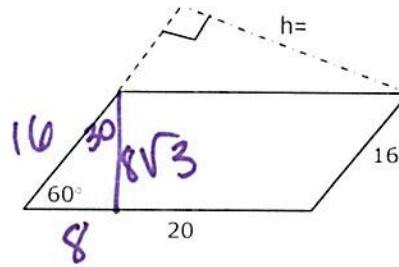
$$\frac{(10 + 27) \cdot 5}{2} = 92.5$$

17. Find the area of the parallelogram.



$$A = 80$$

18. Find the area of the parallelogram. Then find the missing height.



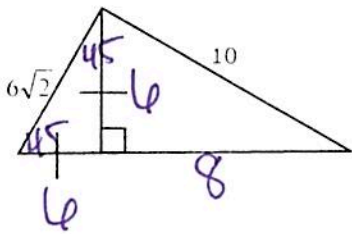
$$20(8\sqrt{3}) = A$$

$$160\sqrt{3} = A$$

$$\frac{160\sqrt{3}}{16} = \frac{16h}{16}$$

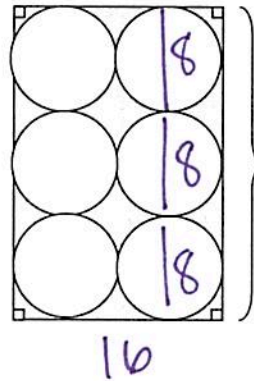
$$h = 10\sqrt{3}$$

19. The area of the triangle.



$$\frac{(6+8)(4)}{2} = 42$$

20. Find the area of the shaded region.

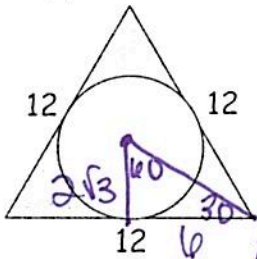


$$6(\pi 4^2)$$

$$96\pi$$

$$384 - 96\pi$$

21. Find the area of the shaded region.

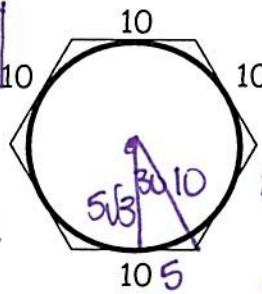


$$\frac{12^2 \sqrt{3}}{4} = 36\sqrt{3}$$

$$36\sqrt{3} - 12\pi$$

$$A_{\Delta} = 36\sqrt{3}$$

22. Find the area of the shaded region.
(outer shape is a regular hexagon)



$$6 \left(\frac{10^2 \sqrt{3}}{4} \right)$$

$$A_{\text{hex}} = 150\sqrt{3}$$

$$A_{\text{circle}} = \pi (5\sqrt{3})^2$$

$$= 25 \cdot 3\pi = 75\pi$$

$$150\sqrt{3} - 75\pi$$

23. Find the area of the shaded region.

(both are regular hexagons)

$$\sqrt{3} \cdot 6 = n\sqrt{3} \cdot \sqrt{3}$$

$$\frac{6\sqrt{3}}{3} = \frac{n \cdot 3}{3}$$

$$n = 2\sqrt{3} = 4 \cdot 3\pi = 12\pi$$

$$\text{Big hex} = 48\sqrt{3} (12)^{1/2} = 288\sqrt{3}$$

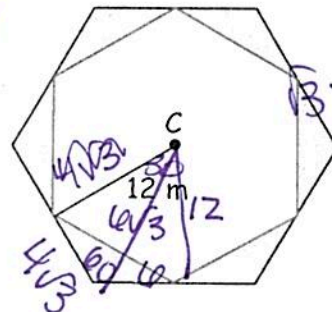
$$P = 8\sqrt{3}(6) = 48\sqrt{3}$$

$$\text{Small hex} = 72(6\sqrt{3})^{1/2} = 216\sqrt{3}$$

$$P = 72$$

$$a = 6\sqrt{3}$$

$$F = 72\sqrt{3}$$



$$12 = n\sqrt{3} \cdot \sqrt{3}$$

$$\frac{12\sqrt{3}}{3} = \frac{3n}{3}$$

$$4\sqrt{3} = n$$

