

Name: Key

Class Period: _____

6B Problem Set

Find the area, perimeter or missing parts of of each figure. It might help you to draw each figure. Please show all work used to find each and make sure answers are in simplest form.

- 1) Find the area of a triangle with a base of $2\sqrt{3}$ cm and a height of $5\sqrt{6}$ cm.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(2\sqrt{3})(5\sqrt{6})$$

$$A = \frac{1}{2}(10\sqrt{18})$$

$$A = \frac{1}{2}(10 \cdot \sqrt{9 \cdot 2})$$

$$A = \frac{1}{2}(10 \cdot 3 \cdot \sqrt{2})$$

$$A = \frac{1}{2}(30\sqrt{2})$$

$$A = 15\sqrt{2} \text{ cm}^2$$

Area: $15\sqrt{2} \text{ cm}^2$

- 2) Find the area and perimeter of an isosceles trapezoid with a bases of $8\sqrt{5}$ in and $12\sqrt{5}$, a height of $6\sqrt{3}$ in and side lengths of $6\sqrt{5}$ in. (You might want to look up how to find the area of a trapezoid if you've forgotten!)



$$A = \frac{1}{2}(b_1 + b_2)h$$

$$P = 8\sqrt{5} + 12\sqrt{5} + 2(6\sqrt{5})$$

$$P = 20\sqrt{5} + 12\sqrt{5}$$

$$P = 32\sqrt{5}$$

$$A = \frac{1}{2}(8\sqrt{5} + 12\sqrt{5})(6\sqrt{3})$$

$$A = \frac{1}{2}(20\sqrt{5})(6\sqrt{3})$$

$$A = \frac{1}{2}(120\sqrt{15})$$

$$A = 60\sqrt{15} \text{ in}^2$$

Area: $60\sqrt{15} \text{ in}^2$

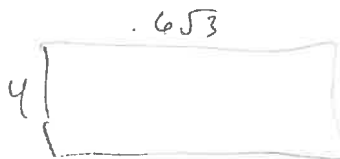
Perimeter: $32\sqrt{5} \text{ in}$

- 3) If a rectangle has an area of $24\sqrt{3}$ meters² and one side length that is $6\sqrt{3}$ meters what is the other side length and the perimeter?

$$A = 24\sqrt{3}$$

$$\frac{(6\sqrt{3})w}{6\sqrt{3}} = \frac{24\sqrt{3}}{6\sqrt{3}}$$

$$w = 4$$



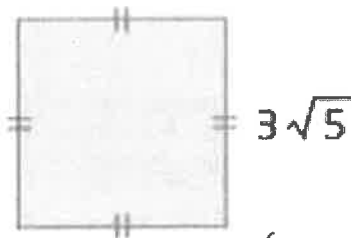
$$P = 2(6\sqrt{3}) + 8$$

$$P = 12\sqrt{3} + 8$$

Side length: 4 meters Perimeter: $12\sqrt{3} + 8$ meters

Find the area and perimeter of each figure.

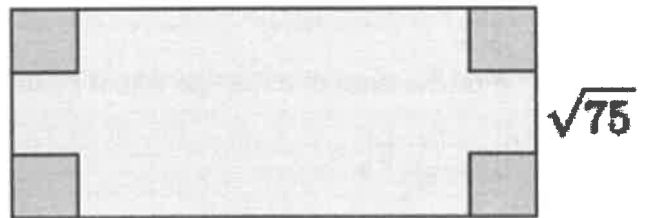
4)



$$\begin{aligned} A &= (3\sqrt{5})^2 \\ A &= 9 \cdot 5 \\ A &= 45 \text{ units}^2 \end{aligned} \quad \left\{ \begin{aligned} P &= 4(3\sqrt{5}) \\ P &= 12\sqrt{5} \end{aligned} \right. \text{ units}$$

Area: 45 units^2 Perimeter: $12\sqrt{5} \text{ units}$

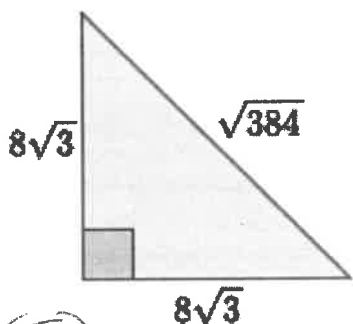
5)



$$\begin{aligned} \text{Area} &= (11\sqrt{3})(\sqrt{75}) \\ A &= (11\sqrt{3})(5\sqrt{3}) \\ A &= 55 \cdot 3 \\ A &= 165 \text{ units}^2 \end{aligned} \quad \left\{ \begin{aligned} P &= 2(11\sqrt{3}) + 2(\sqrt{75}) \\ P &= 22\sqrt{3} + 10\sqrt{3} \\ P &= 32\sqrt{3} \end{aligned} \right. \text{ units}$$

Area: 165 units^2 Perimeter: $32\sqrt{3} \text{ units}$

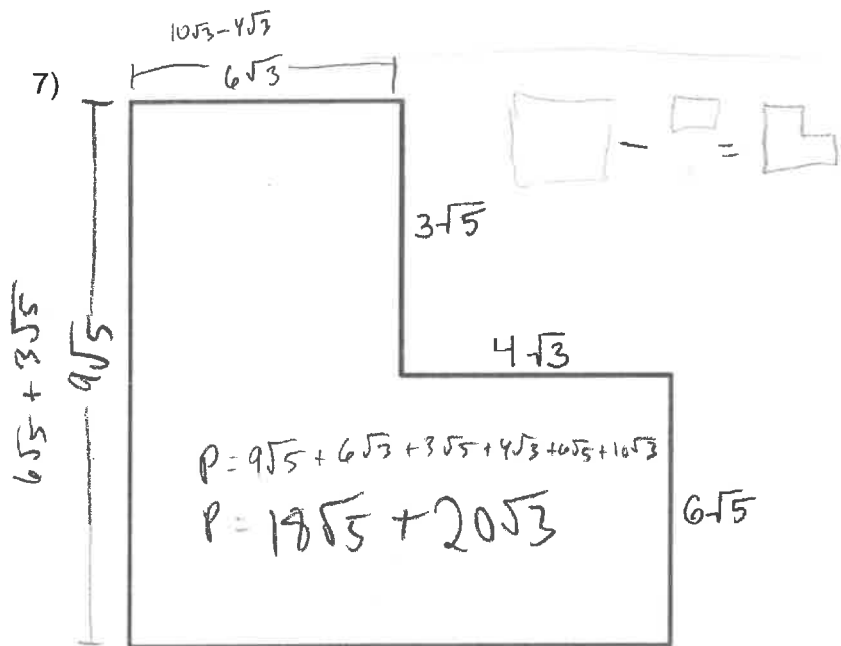
6) $A = \frac{1}{2}bh$



$$\begin{aligned} A &= \frac{1}{2}(8\sqrt{3})(8\sqrt{3}) \\ A &= \frac{1}{2}(64 \cdot 3) \\ A &= \frac{1}{2} \cdot 64 \cdot 3 \\ A &= 32 \cdot 3 \\ A &= 96 \text{ units}^2 \end{aligned} \quad \left\{ \begin{aligned} P &= 8\sqrt{3} + 8\sqrt{3} + \sqrt{384} \\ P &= 16\sqrt{3} + 8\sqrt{6} \end{aligned} \right.$$

Area: 96 units^2 Perimeter: $16\sqrt{3} + 8\sqrt{6} \text{ units}$

7)



$$\begin{aligned} P &= 9\sqrt{5} + 6\sqrt{5} + 3\sqrt{5} + 4\sqrt{3} + 6\sqrt{5} + 10\sqrt{3} \\ P &= 18\sqrt{5} + 20\sqrt{3} \end{aligned}$$

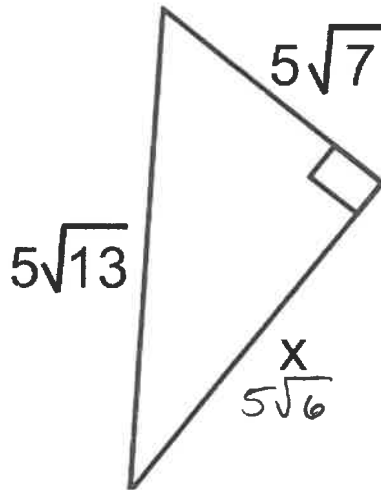
$$\begin{aligned} A_{\square} &= (9\sqrt{5})(10\sqrt{3}) \\ A_{\square} &= 90\sqrt{15} \end{aligned} \quad \left\{ \begin{aligned} A_{\square} &= (3\sqrt{5})(4\sqrt{3}) \\ A_{\square} &= 12\sqrt{15} \end{aligned} \right.$$

$$\begin{aligned} A_T &= A_{\square} - A_{\square} \\ A_T &= 90\sqrt{15} - 12\sqrt{15} = 78\sqrt{15} \end{aligned}$$

Area: $78\sqrt{15} \text{ units}^2$ Perimeter: $18\sqrt{5} + 20\sqrt{3} \text{ units}$

Find the missing side length, and then find the area and perimeter.

8)



$$\begin{aligned} a^2 + b^2 &= c^2 \\ x^2 + (5\sqrt{7})^2 &= (5\sqrt{13})^2 \\ x^2 + (25 \cdot 7) &= 25 \cdot 13 \\ x^2 + 175 &= 325 \\ -175 &-175 \\ \hline x^2 &= 150 \\ x &= \sqrt{150} \\ x &= \sqrt{25 \cdot 6} \\ x &= 5\sqrt{6} \end{aligned}$$

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(5\sqrt{6})(5\sqrt{7})$$

$$A = \frac{25\sqrt{42}}{2}$$

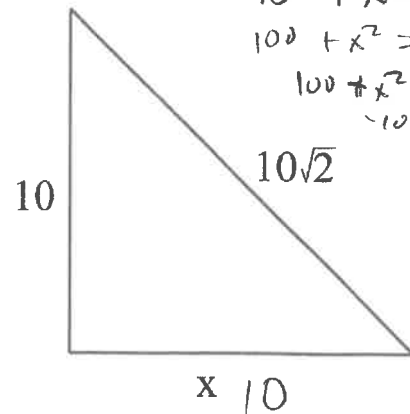
$$P = 5\sqrt{6} + 5\sqrt{7} + 5\sqrt{13}$$

$$x: 5\sqrt{6}$$

$$\text{Area: } \frac{25\sqrt{42}}{2} \text{ units}^2$$

$$\text{Perimeter: } 5\sqrt{6} + 5\sqrt{7} + 5\sqrt{13} \text{ units}$$

9)



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 10^2 + x^2 &= (10\sqrt{2})^2 \\ 100 + x^2 &= (100 \cdot 2) \\ 100 + x^2 &= 200 \\ -100 &-100 \\ \hline x^2 &= 100 \\ x &= 10 \end{aligned}$$

$$\text{Area} = \frac{1}{2}bh$$

$$A = \frac{1}{2}(10)(10)$$

$$h = 10$$

$$x: 10 \text{ units}$$

$$\text{Area: } 50 \text{ units}^2$$

$$\text{Perimeter: } 20 + 10\sqrt{2} \text{ units}$$

10) Use the distance formula to find the distance between $(3, \sqrt{20})$ and $(19, \sqrt{45})$.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(19 - 3)^2 + (\sqrt{45} - \sqrt{20})^2}$$

$$d = \sqrt{(16)^2 + (3\sqrt{5} - 2\sqrt{5})^2}$$

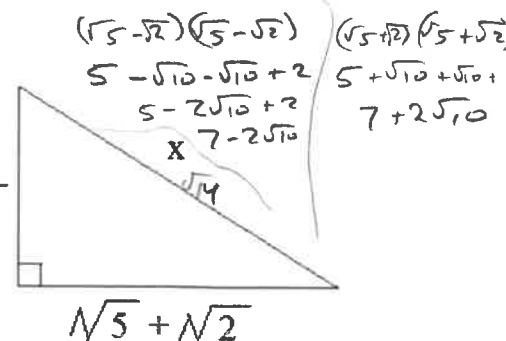
$$d = \sqrt{256 + (\sqrt{5})^2}$$

$$d = \sqrt{256 + 5}$$

$$d = \sqrt{261}$$

$$d = 3\sqrt{29} \text{ units}$$

11) **Challenge



$$\begin{aligned} a^2 + b^2 &= c^2 \\ (\sqrt{5} - \sqrt{2})^2 + (\sqrt{5} + \sqrt{2})^2 &= x^2 \\ (7 - 2\sqrt{10}) + (7 + 2\sqrt{10}) &= x^2 \end{aligned}$$

$$14 = x^2$$

$$\sqrt{14} = x$$

$$\text{Perimeter} = \sqrt{5} - \sqrt{2} + \sqrt{5} + \sqrt{2} + \sqrt{14}$$

$$P = 2\sqrt{5} + \sqrt{14}$$

$$\text{Area} = \frac{1}{2}bh$$

$$A = \frac{1}{2}(\sqrt{5} - \sqrt{2})(\sqrt{5} + \sqrt{2})$$

$$A = \frac{1}{2}(5 + \sqrt{10} - \sqrt{10} - 2)$$

$$A = \frac{1}{2}(3)$$

$$A = \frac{3}{2}$$

$$x: \sqrt{14} \text{ units}$$

$$\text{Area: } \frac{3}{2} \text{ units}$$

$$\text{Perimeter: } 2\sqrt{5} + \sqrt{14} \text{ units}$$

