

Answer all questions and **show all work**. Clearly indicate all answers. Choose the best answer for multiple choice questions. Each problem is worth 4 points. Good luck!

1. Name the following shapes as accurately as possible.

1a. concave decagon



1b. regular hexagon



2. What is the measure of **one** interior angle of a regular 18-gon?

- a. 10°
- b. 2880°
- c. 180°
- d. 160°

$$\frac{(18-2)(180)}{18} = 160^\circ$$

3. The sizes of three interior angles of a quadrilateral are 65° , 25° , and 60° . What is the size of the fourth angle of the quadrilateral?

- a) 30°
- b) 100°
- c) 140°
- d) 200°

210°

4. An isosceles triangle has two angles, one with 45° and one with 90° . How large is the third angle?

- a) 40°
- b) 45°
- c) 90°
- d) 135°
- e) none of these

5. The diagonals of a rhombus:

- a. meet at 90° angles
- b. bisect each other
- c. all of the above
- d) a & b
- c) are congruent

6. Sketch the following if possible. If not possible, state why not.

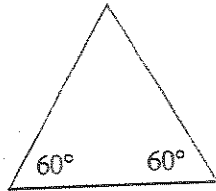
a) a trapezoid that is not a parallelogram



b) a rhombus that is not a kite

not possible - a rhombus must have congruent adjacent sides

7. Classify the triangle shown as equilateral, isosceles, or scalene. Then classify as right, obtuse or acute.



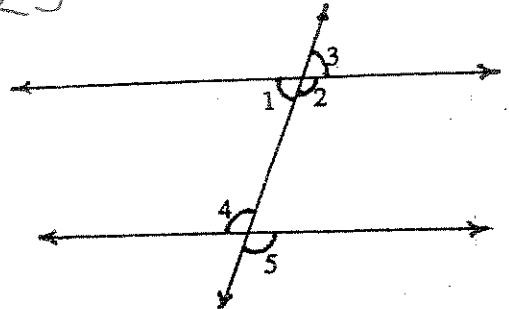
7. acute
equilateral

8. Determine if the following are true: always, sometimes, or never.

- a. A square is always a trapezoid.
 b. A trapezoid is sometimes a square.
 c. A parallelogram is sometimes a kite.
 d. An equilateral triangle is always a isosceles triangle.

9. Use the numbered angles in the figure shown to answer each question.

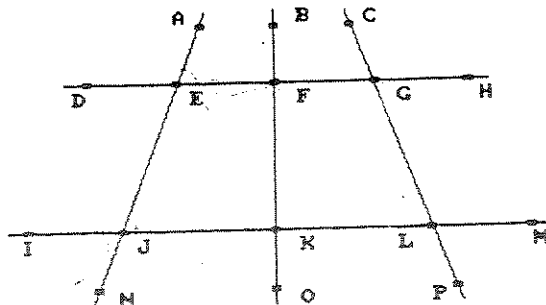
- a. name a pair of corresponding angles: $\angle 2$ & $\angle 5$
 b. name an angle that is vertical to angle 4: $\angle 5$
 c. name a pair of alternate interior angles:
 $\angle 2$ & $\angle 4$



10. Choose the true statement:

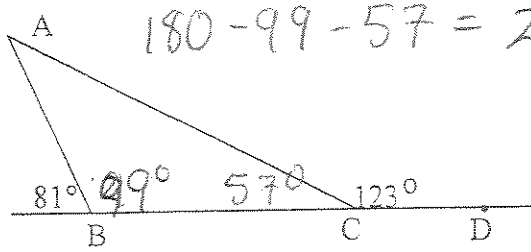
- a. $m\angle IJN + m\angle EJK = 180^\circ$
 b. $m\angle IJN = m\angle AEF$
 c. $m\angle FEJ < m\angle DEJ$
 d. $\angle BFG$ and $\angle CGH$ are complementary

10. B



11. Find the (interior) measure of angle A of the triangle.

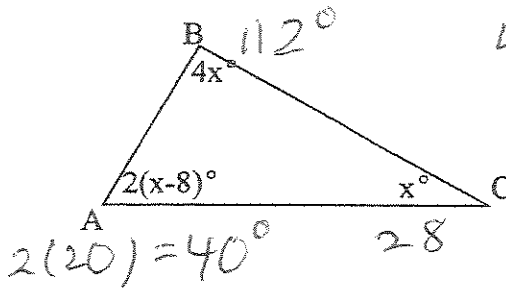
11. B



- A. 156°
- B. 24°
- C. 57°
- D. 20°
- E. not enough information

12. Find the measure of each angle of the triangle

12. $28^\circ, 40^\circ, 112^\circ$



$$4x + 2(x-8) + x = 180$$

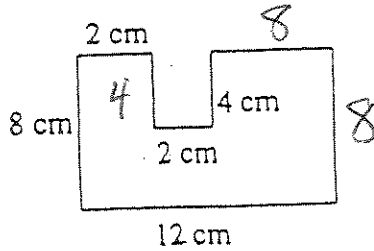
$$4x + 2x - 16 + x = 180$$

$$7x = 196$$

$$x = 28$$

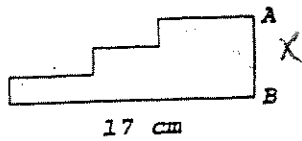
13. Find the perimeter of the figure below

13. 48 cm



14. If the perimeter of the figure shown is 46 cm, what is the length of line segment AB?

14. 6 cm



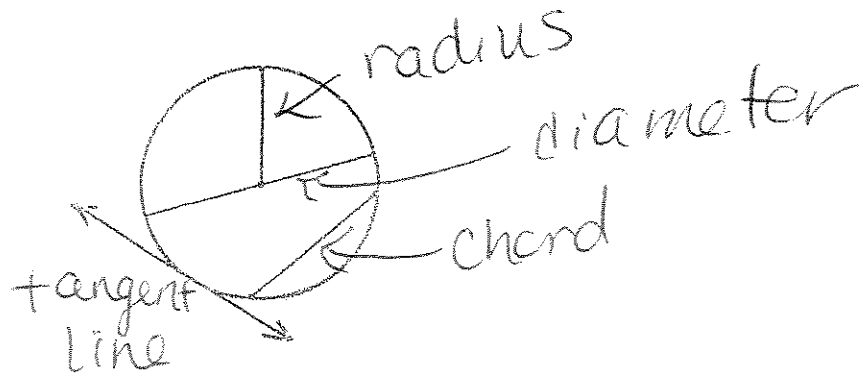
$$2(x + 17) = 46$$

$$2x + 34 = 46$$

$$2x = 12$$

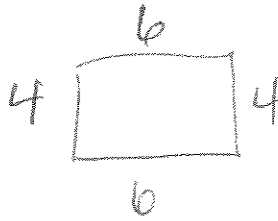
$$x = 6$$

15. Identify the name of each line on the circle shown:



16. What is the area of a rectangle with perimeter 20 meters and base 6 meters?

- a. 120 m^2
- b. 60 m^2
- c. 160 m^2
- d. 24 m^2
- e. 84 m^2



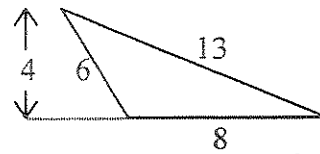
$A = 24$

16. D

17. What is the area of the triangle to the right, in cm^2 ? Given measurements are in cm.

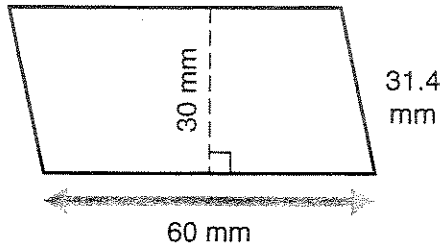
- A. 32
- B. 31
- C. 24
- D. 16
- E. None of A-D

$A = \frac{1}{2} (8)(4) =$



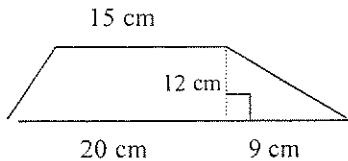
18. 1800 cm^2

18. Find the area of the parallelogram:



$A = 60(30)$

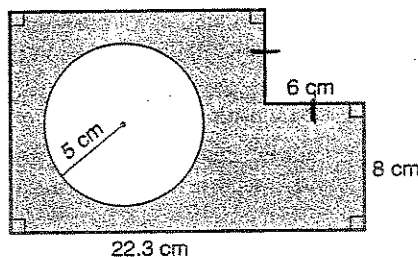
19. Find the area of the trapezoid:



$\frac{1}{2} (15 + 29)(12)$
 $= \frac{1}{2} (44)(12)$

19. 264 cm^2

20. Find the area of the shaded region
 (The rectangle has a circle and *square corner* removed)



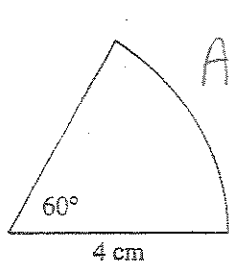
$A_{\text{rect}} = (22.3)(14) = 312.2$

$- A_{\text{square}} = 36$

$- A_{\text{circle}} = 25\pi \approx 78.5$

20. $276.2 - 25\pi \approx 197.7 \text{ cm}^2$

21. Find the area and perimeter of the sector of a circle.



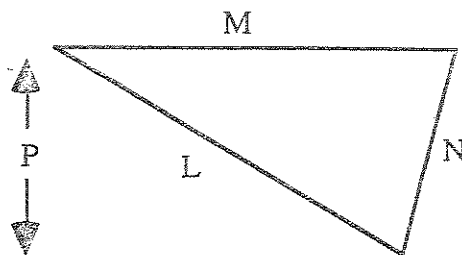
$$A = \frac{60}{360} (16\pi)$$

$$P = \frac{60}{360} (2.4\pi) =$$

$$21. A = \frac{2.67\pi}{1} \approx 8.4 \text{ cm}^2$$

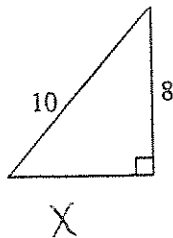
$$P = \frac{1.33\pi}{1} \approx 4.2 \text{ cm}$$

22. L, M, and N represent the lengths of the sides of the triangle below, with P as shown. Derive a formula for the area of the triangle.



$$22. \frac{1}{2} (P \cdot M)$$

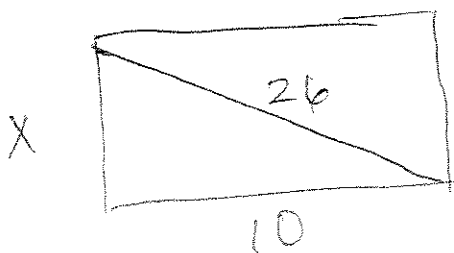
23. Use the Pythagorean Theorem to find the missing length on the triangle.



$$\begin{aligned} x^2 + 8^2 &= 10^2 \\ x^2 + 64 &= 100 \\ x^2 &= 36 \\ x &= 6 \end{aligned}$$

$$23. \underline{6}$$

24. Use the Pythagorean Theorem to find the length of the base of a rectangle whose diagonal length is 26 in. and width is 10 in.



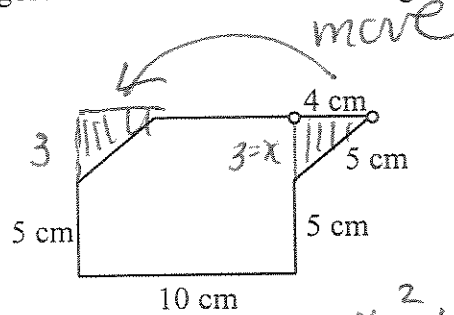
$$\begin{aligned} x^2 + 10^2 &= 26^2 \\ x^2 + 100 &= 676 \\ x^2 &= 576 \\ x &= 24 \end{aligned}$$

$$24. \underline{24}$$

25. What is the area of the hexagonal region to the right, in square centimeters? Assume that lines that look parallel are parallel, and that angles that look like right angles are right angles. Hint: you will need to use the Pythagorean Theorem to find the length of the dashed line.

- A. 100 B. 80 C. 65 D. 40 E. 29

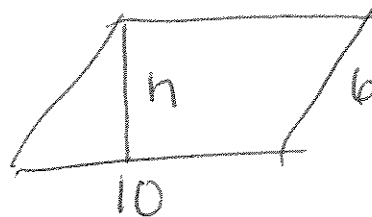
$$A = 8(10) = 80$$



$$\begin{aligned} x^2 + 4^2 &= 5^2 \\ x^2 + 16 &= 25 \\ x^2 &= 9 \\ x &= 3 \end{aligned}$$

26. (extra credit) A parallelogram has sides of 6 cm and 10 cm. Which of the following statements is true?

- a. The area is 60 cm^2
 b. The area is greater than 60 cm^2
 c. The area is less than 60 cm^2
 d. There is not enough information



"h" must be shorter than 6
 so area $< 60 \text{ cm}^2$