Part I. Short Answer (Two Points Each). Show how you calculate each answer in the space provided for that purpose. Place your answer on the appropriate line in the answer column.

1.   What is 120% of 420?   2.   6 is what percent of 48?   1. _504_

$X = 1.20 \times 420$ $6 = \frac{x}{100}(48)$ 2. _12.5%_

3. _600_

3.   3 is ½ % of what number?   4.   What is 60% of 11?   4. _6.6_

$3 = \frac{\frac{1}{2}}{100}(X)$ $X = 0.60 \times 11$ 5. _72_

6. _$80_

5.   What number is 20% less than 90?   6. _$80_

$X = 0.80 \times 90$ 7. _220_

6.   Tom's weekly pay was recently increased by 12%. His   8. _$1020.10_
      new weekly pay rate became $89.60. What was his pay
      rate before the raise?   9. $\sqrt{401}\ \sqrt{402}\ \sqrt{403}$

$1.12(x) = 89.60$

7.   The ratio of boys to girls in a school is 9 to 11. If there are 400 students in the school,
      how many girls are in the school?

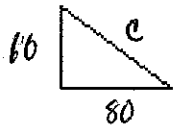$\left[\frac{9}{11} = \frac{400-x}{x}\right]$ OR $\left[\frac{11}{20} = \frac{x}{400}\right]$

8.   A consumer will be charged compound monthly interest at the rate of 1 percent per
      month on a loan of $1000. If the consumer makes no payments on the loan for two
      months, to the nearest cent, how much will be owed by the consumer after the two
      months?

$1000(1.01)(1.01) = X$
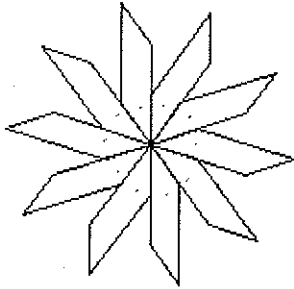
9.   Name three irrational numbers between 20 and 21

10. Consider the scale drawing of the right triangle shown below. Calculate the length of the hypotenuse if the lengths of the legs are 60 cm and 80 cm respectively.

10. ___100 cm___

$60^2 + 80^2 = c^2$

11. The figure below is made up of congruent parallelograms. What are the angle measures of the angles of the parallelogram?

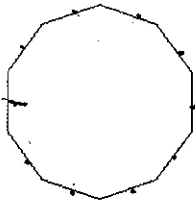11. 36^6, 144^0

$\dfrac{36}{10\,)\,360}$

$180 - 36 = 144$

12. To the nearest degree, what is the angle measure of each interior angle of the regular polygon drawn below?

12. $\dfrac{144^0}{11}$
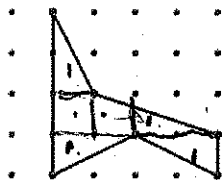

$\dfrac{8(180)}{10} = 144$

13. To the nearest degree, what is the measure of each central angle in the polygon pictured in #12 above?

13. 36^0

14. Will the polygon pictured in #12 above tessellate the plane? (yes or no)

14. NO

15. The horizontal and vertical distance between the dots in the array below is 1 cm. Find the area, in cm^2 of the polygon drawn on the array.
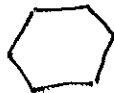
15. $5\frac{1}{2}$ cm^2

Part II. Short Problems (5 points each).

16. Suppose you have previously developed the concept of a simple closed curve. Design a creature card to introduce the concept of a polygon. (Just design the card; don't provide the child's expected responses.)
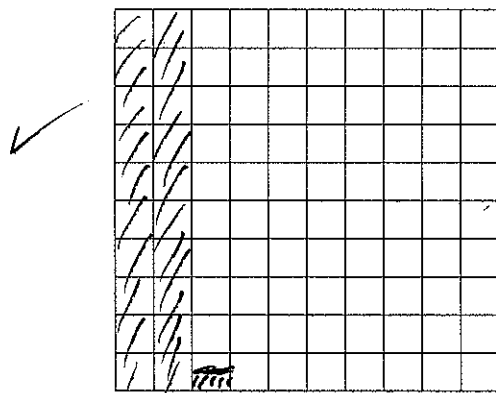
These are polygons

These are not polygons

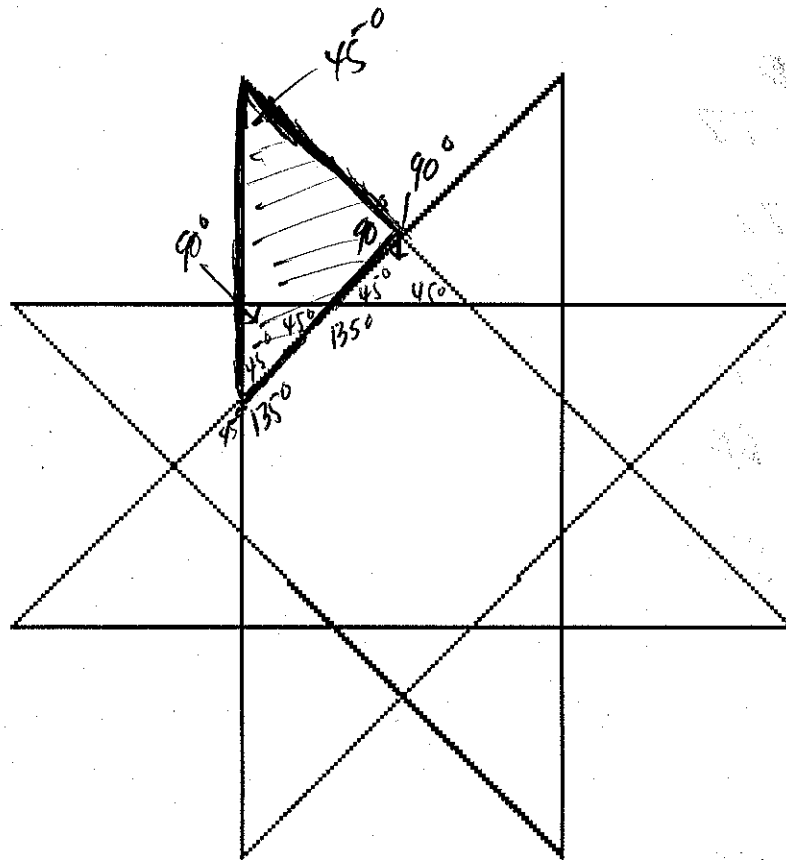Which of these are polygons?

(a)   (b)   (c)

Draw a polygon

What is a polygon

17. Show how to use the decimal square below and the visual method we used in class to determine what percent 41 is of 200. Label the diagram and explain your reasoning.

The 10×10 grid represents 200
Each 1×1 square represents 2
20½ 1×1 squares represent 41
Shaded region is 20½% of 200.
So, 41 is 20½% of 200

18. The eight pointed star below has a regular octagon at its center. To the nearest degree, what is the measure of each angle at the tips of the star? Explain and show how you obtain your answer.

Each angle of a regular octagon is of measure $135°$
The supplementary angles adjacent to those
angles have measure $45°$.
The small triangles that have two $45°$ angles
must have third angle with measure $90°$
The largest angle in the shaded triangle
must also be $90°$. That triangle also
has a $45°$ angle. So the remaining
angle must have measure $45°$.
Hence, the angles at the tips of the
star must have measure $45°$.