

6th Grade Assignment – Week #8

Individual Homework: See how much you can do on Sheet #8 in the workbook.

Special Note:

- During Wednesday's lecture I will be leading the students through a construction that begins with the 24-division. Before watching the lecture, they will need a 24-division already marked. They can either make the 24-division themselves, or use the **24-division template** (see 2 pages below). If you wish, you can print out the template, place it on top of the page where the drawing will be, prick through the 24 points with their compass needle, and then mark them in pencil. We will then take off from there in the lecture.

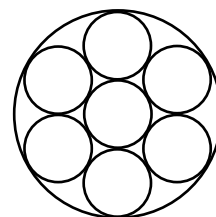
Group Assignment for Tuesday and Thursday:

1. Work together on problems #47-49 on Sheet #8. Your goal is to find the trick for converting from a fraction to a decimal (which can repeat) if the denominator is 20, 11, 9, 99, 999, etc.
2. Figure out together how you can construct an equilateral triangle onto a given line so that each side of the triangle has a length equal to the given line.
3. Work together on the *Geometry Practice Sheet* (see below).
4. Show the others in your group a drawing you did that you are most pleased with.

Main Lesson Work (geometry) – Pages coming out of Lecture #1

- Main Lesson Book Page (Geometric Construction)
Title: **Constructing a Parallel Line**
Instructions: Draw any line and a point not on that line. Construct a new line that passes through the given point which is parallel to the given line. (You may wish to follow the instructions from the lecture.)

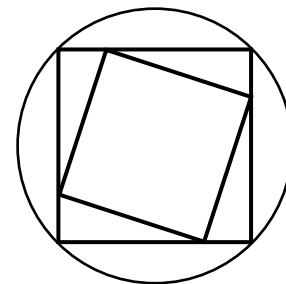
- Main Lesson Book Page (Geometric Drawing)
Title: **The Eight Circles Configuration**
Instructions: Construct the configuration shown on the right. (You may wish to follow the instructions I gave in the lecture.) Color it in beautifully!



- Main Lesson Book Page (Geometric Drawing)
Title: **Quarter-square Spirals**

Instructions:

- Draw a circle, and then do the 4-division (locate four equally spread out points). Connect these points to form a square. Erase the construction lines; keep only the square and the circle.
- Locate the quarter-point of one side of the square by bisecting it twice. You can do the same to the other three sides of the square, but to save time, copy that quarter-side distance to the other three sides. The result should look like what is shown here, where the second square has been rotated clockwise.
- Keep drawing more of these nested squares – each one rotated clockwise and connecting the quarter-points of the previous square. See how many squares you can draw.
- Look for the spirals, and color them in beautifully.



Main Lesson Work (geometry) – Pages coming out of Lecture #2

- Main Lesson Book Page (Geometric Drawing)

Title: **12-Division with Three Knotted Squares**

Instructions: I went over this in the lecture – three square “frames” within a 12-division, where the three squares weave in and out of one another. Follow the instructions I gave in the lecture, except that you can just start with a 12-division instead of a 24-division. Color it in beautifully!

- (Optional!) Main Lesson Book Page (Geometric Drawing)

Title: **12-Division with Four Knotted Triangles**

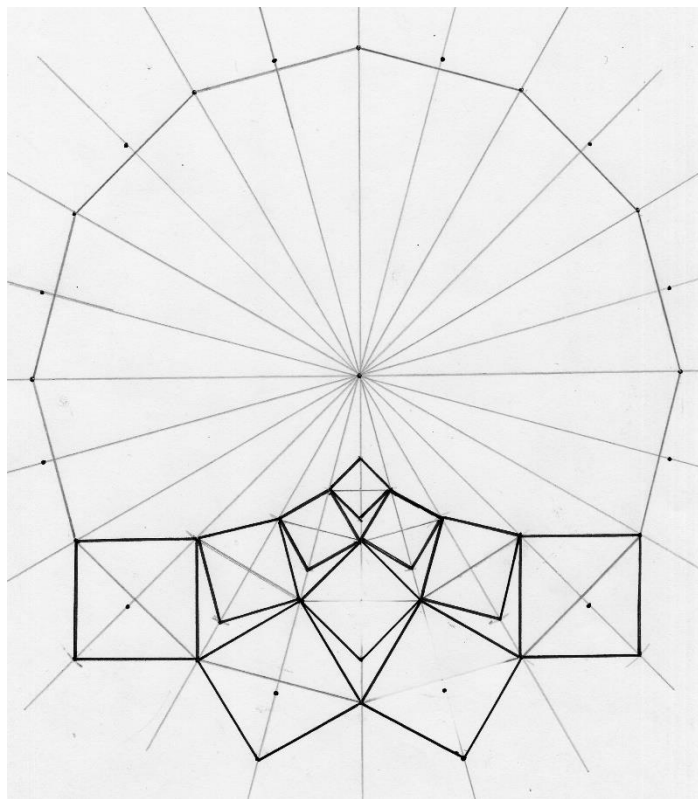
Instructions: I didn't do this in the lecture, but it is similar to the above drawing – you just need to start instead with four triangles inside the 12-division. Part of the fun is figuring out how to get the four triangles to weave together. (Hint: the midpoints of the triangles can be used to determine the width of the triangles' frames.)

- (Optional!) Main Lesson Book Page (Geometric Drawing)

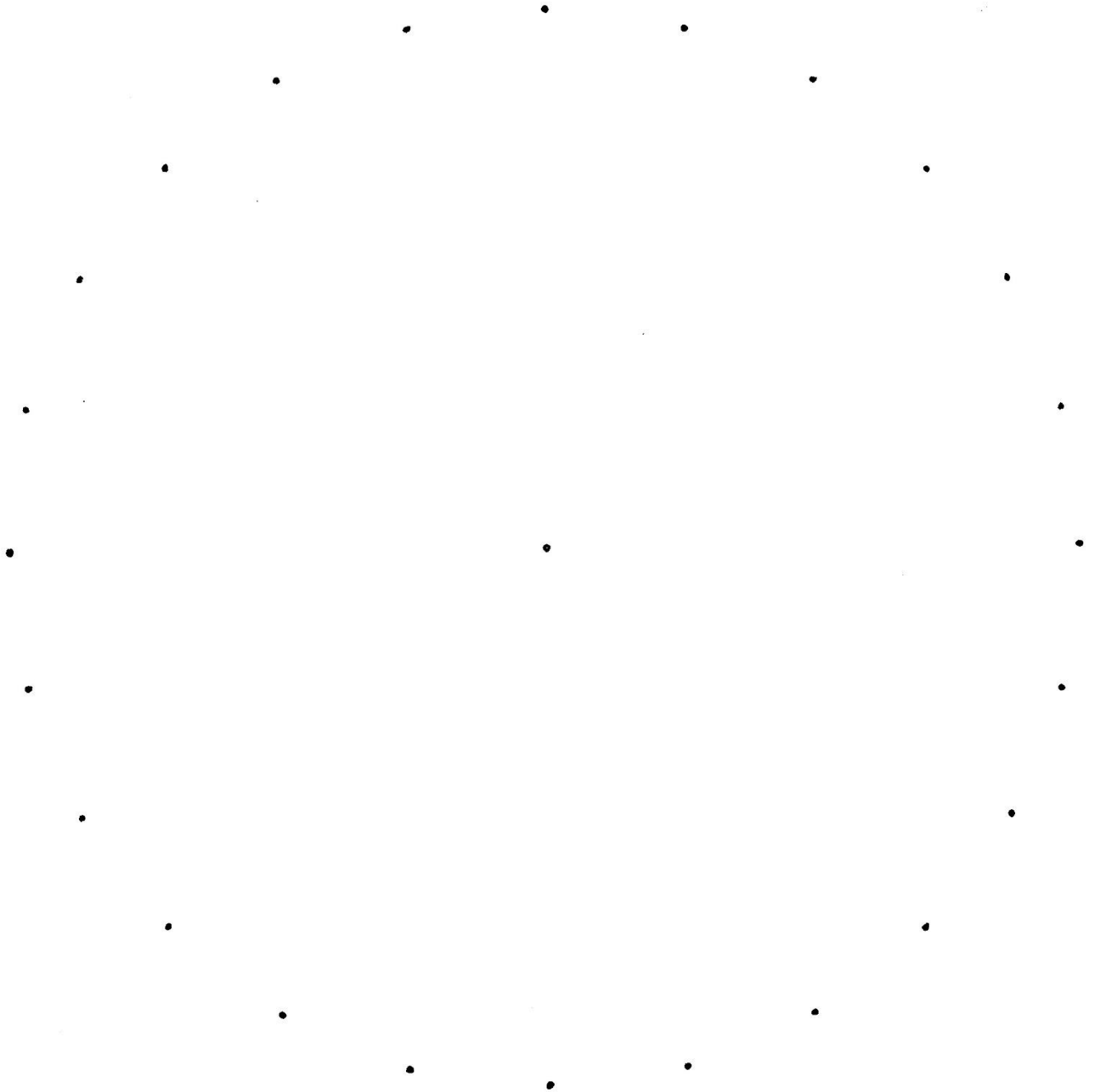
Warning! This drawing is particularly time consuming. Do it if you dare!

Title: **Rings of Squares**

Instructions: I did this at the end of the lecture. Follow the instructions I gave in the lecture. The below drawing shows some of the completed squares. (I didn't want to complete the drawing and spoil it for you!) Remember to keep looking for the diagonals upon which you can draw a new square. The drawing here shows four levels of squares, where each level produces squares that are smaller than the previous level. Once you are finished, beautifully color in only the squares, and make sure each spiral is colored in with the same color.

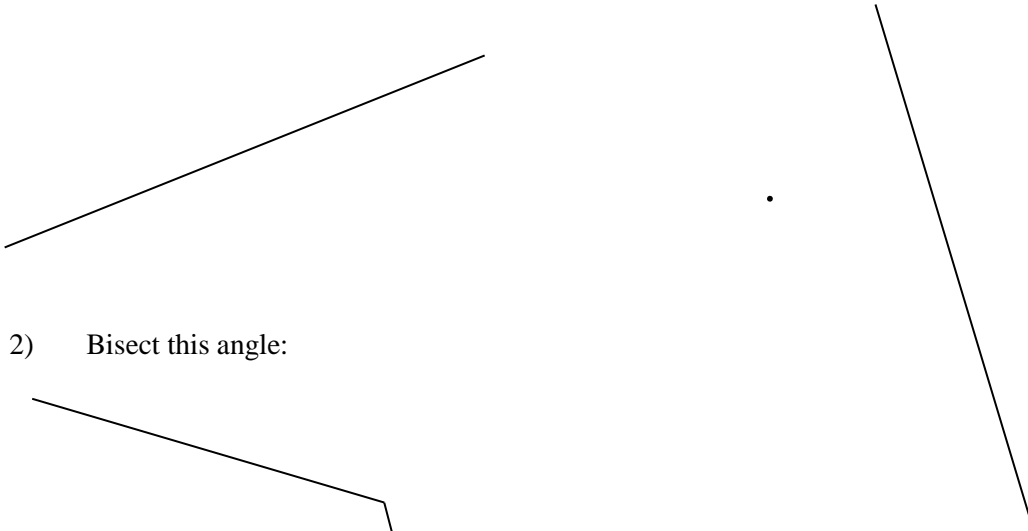


24-division template

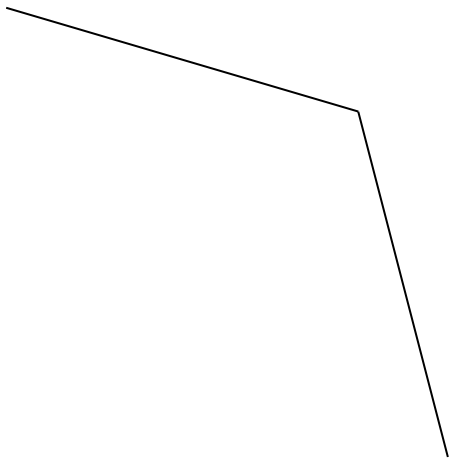


Geometry Practice Sheet

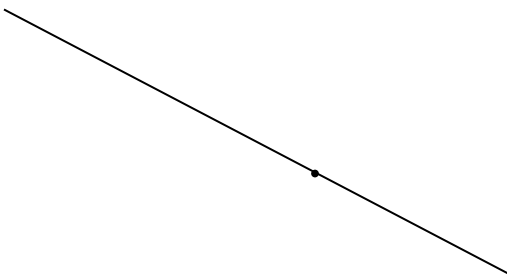
1) Bisect this line segment:



2) Bisect this angle:

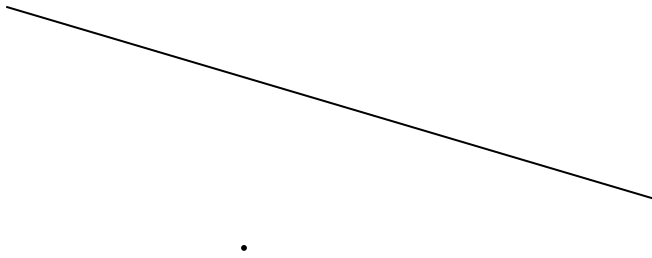


3) Draw a line through the point that is perpendicular to the line:

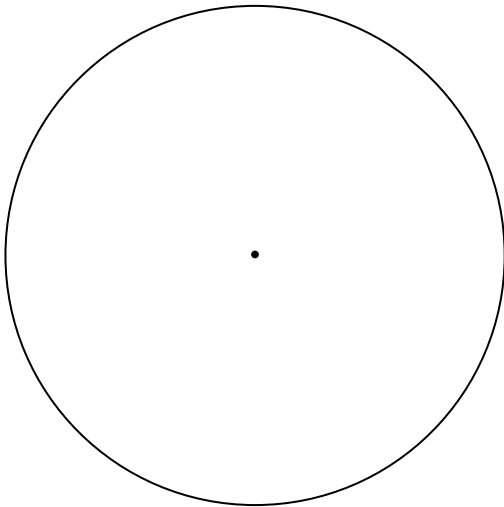


4) Draw a line through the point that is perpendicular to the line:

5) Draw a line through the point that is parallel to the line:



6) Construct an equilateral triangle inside this circle:



6th Grade Math – Sheet #8

Do it in your head.

- 1) $500 \cdot 1200$
- 2) $30,000 \div 500$
- 3) $0.053 \cdot 100$
- 4) $973.1 \div 10$
- 5) $11 \cdot 560$
- 6) $0.45 \cdot 4$
- 7) $1.2 \cdot 1.1$
- 8) $300 \div 4$
- 9) $107 \cdot 112$
- 10) 1200^2
- 11) 10^4
- 12) $(0.05)^2$
- 13) $\frac{7}{8} + \frac{1}{4}$
- 14) $\frac{7}{10} \cdot \frac{5}{6}$
- 15) $\frac{2}{5} \div \frac{3}{5}$
- 16) $\frac{\frac{2}{5}}{\frac{3}{5}}$
- 17) $(\frac{3}{5})^2$
- 18) $\sqrt{81}$
- 19) $\sqrt{64}$
- 20) $\sqrt{2500}$
- 21) $\sqrt{\frac{16}{49}}$

Do it in your head.

- 22) $34 - 1.9$
- 23) $813 - 795$
- 24) $6025 - 5998$
- 25) 13^2
- 26) $16 \cdot 4$
- 27) $25 \cdot 6$
- 28) $13 \cdot 4$
- 29) 15^2
- 30) $15 \cdot 5$
- 31) 14^2
- 32) Convert to a decimal.
 - a) $\frac{2}{5}$
 - b) $\frac{3}{4}$
 - c) $\frac{1}{3}$
 - d) $\frac{5}{8}$
 - e) $\frac{1}{6}$
 - f) $\frac{4}{9}$
 - g) $\frac{3}{5}$
- 33) Convert to a fraction.
 - a) 0.5
 - b) 0.8
 - c) 0.125
 - d) 0.3
 - e) 0.6

Fractions.

- 34) $\frac{5}{6} - \frac{3}{8}$
- 35) $(3\frac{3}{5})^2$
- 36) $312\frac{2}{5} - 309\frac{2}{3}$
- 37) $4\frac{1}{6} \div \frac{5}{9}$
- 38)
$$\begin{array}{r} 485 \\ 738 \\ 628 \\ 395 \\ 6897 \\ 274 \\ + 739 \\ \hline \end{array}$$

Estimate. Without doing any exact calculation, circle the closest answer, and state whether the exact answer is *greater than* or *less than* the circled answer.

39) $39,064 + 28,925$

- a) 50,000
- b) 60,000
- c) 70,000
- d) 80,000

40) $7,178 - 3,943$

- a) 2,000
- b) 3,000
- c) 4,000
- d) 5,000

41) $8197 \cdot 7026$

- a) 56,000
- b) 63,000
- c) 560,000
- d) 630,000
- e) 56,000,000
- f) 63,000,000

42) $24,257 \div 39$

- a) 60
- b) 80
- c) 600
- d) 800
- e) 6000
- f) 8000

Divisibility.

State whether each of the following numbers is evenly divisible by 2, 3, 4, 5, 9, or 10.

43) 3,622

44) 687,528

45) 58,395

46) 90,472,550

Discover the trick!

Convert each fraction into a decimal.

Divide only if you need to. Try to discover the trick for yourself, so that you don't have to divide for all of them.

47) Twentieths

- a) $\frac{7}{20}$
- b) $\frac{3}{20}$
- c) $\frac{9}{20}$
- d) $\frac{11}{20}$

48) Elevenths

- a) $\frac{7}{11}$
- b) $\frac{3}{11}$
- c) $\frac{9}{11}$
- d) $\frac{6}{11}$

49) Ninths, etc.

- a) $\frac{7}{9}$
- b) $\frac{4}{9}$
- c) $\frac{14}{99}$
- d) $\frac{58}{99}$
- e) $\frac{374}{999}$
- f) $\frac{176}{999}$
- g) $\frac{7}{99}$

50) *Short Division.*

Leave your answer as an exact decimal.

$3079 \div 40$

51) Jill bought 18 apples at 18¢ each and 4.2 pounds of flour at 45¢ per pound. She must pay 20¢ in tax. If she gives the cashier a \$10 bill, three pennies and a nickel, then how much change does she get back? (Round to the nearest cent.)

Why did she give the three pennies and a nickel?

52) *Long Division.*
Leave your answer rounded to three significant digits.

$0.3 \div 37.1$

53) Convert the following improper fraction to *both* a mixed number and an exact decimal.

$\frac{6231}{88}$