

Welcome to 8<sup>th</sup> grade mathematics! To help prepare you for a great beginning to eighth grade, some review work over the summer is being required. Work on these activities and bring them to school with you in the fall.

The following skills should be **mastered** to be successful in 8<sup>th</sup> grade math:

1. Operations with rational numbers (add, subtract, multiply and divide whole numbers, fractions, decimals and integers) **WITHOUT a calculator.**
2. Order of operations – use inverted pyramid style to show work to solve.
3. Proportions – be able to set up a proportion, find the scale factor and solve.
4. Areas of circles, rectangles and triangles – know these formulas and be able to find the areas of these figures.
5. Plotting points on a coordinate graph.
6. Solving basic equations using algebra format and check steps.

The following worksheets will help review the above skills. Make sure you **READ and FOLLOW ALL DIRECTIONS and SHOW ALL YOUR WORK.** You may write and do everything on the packet. There are notes and examples (the first 5 pages) included in the packet to help you remember how to do some skills. Another resource you can use is Kahn Academy by using the website: [www.kahnacademy.com](http://www.kahnacademy.com). You can use your school email to register to use this site for free. Please make sure your work is organized so that you will be able to grade and correct it. Bring this binder of work with you on the **second week** of the school year. We will be going over this packet of work and **it will be taken as a grade.** You will be taking a **basic skills quiz** to make sure you have these concepts mastered. If you don't, you will have additional work and practice to do to get yourself prepared to do 8<sup>th</sup> grade work. There are **OPTIONAL Math iXL** codes also included if you feel you need more practice on a skill. When you log in with CLEVER, go to the Search box and type in the code of the lesson you wish to work on.

If you have any questions, contact Mrs. Brenner or Ms. Keleher via email @ [gbrenner@sylvaniaschools.org](mailto:gbrenner@sylvaniaschools.org) or [hkeleher@sylvaniaschools.org](mailto:hkeleher@sylvaniaschools.org)

8<sup>th</sup> grade math department

## Notes for Adding and Subtracting Fractions

\*\*\* You MUST have common denominators

\*\*\* LEAVE mixed numbers as mixed numbers to add and subtract

ex.  $\frac{2}{9} + \frac{1}{6}$

$$\begin{array}{r} 2 \times 2 = 4 \\ \frac{2}{9} = \frac{4}{18} \\ + \frac{1 \times 3 = 3}{6 \times 3 = 18} \\ \hline \frac{7}{18} \end{array}$$

1) Make common denominator and scale up numerator by the same value.  
2) Add/subtract numerator. Leave over common denominator.  
3) Simplify if possible.

ex.  $2\frac{4}{9} + 3\frac{5}{12}$

$$\begin{array}{r} 2\frac{4 \times 4 = 16}{9 \times 4 = 36} \\ + 3\frac{5 \times 3 = 15}{12 \times 3 = 36} \\ \hline 5\frac{31}{36} \end{array}$$

ex.  $\frac{8}{14} - \frac{3}{7}$

$$\begin{array}{r} \frac{8}{14} - \frac{3 \times 2 = 6}{7 \times 2 = 14} \\ \hline \frac{2}{14} = \frac{1}{7} \end{array}$$

ex.  $8\frac{1}{2} - 2\frac{2}{3}$

Borrow 1 ( $1 = \frac{6}{6}$  and  $\frac{6}{6} + \frac{3}{6} = \frac{9}{6}$ )

$$\begin{array}{r} 8\frac{1 \times 3 = 3}{2 \times 3 = 6} = 7\frac{9}{6} \\ - 2\frac{2 \times 2 = 4}{3 \times 2 = 6} \\ \hline 5\frac{5}{6} \end{array}$$

## To multiply fractions

\*\*\*\* Do NOT make common denominators

\*\*\*\* Change mixed numbers into improper fractions

\*\*\*\* Simplify within the problem to make it easier, by dividing out common factors.

$$\text{ex. } \frac{3}{7} * \frac{5}{9} = \frac{5}{21}$$

1) Cross simplify  
2) multiply across

$$\text{ex. } \frac{8}{21} * \frac{14}{20} = \frac{4}{15}$$

(8:20 divide by 4; 14:21 divide by 7)

$$\text{ex. } 2\frac{1}{2} * 3\frac{2}{5} = \frac{5}{2} * \frac{17}{5} = \frac{17}{2} \text{ or } 8\frac{1}{2}$$

## To divide fractions

\*\*\*\* Do NOT make common denominators

\*\*\*\* Change mixed numbers into improper fractions

\*\*\*\* Multiply by the reciprocal

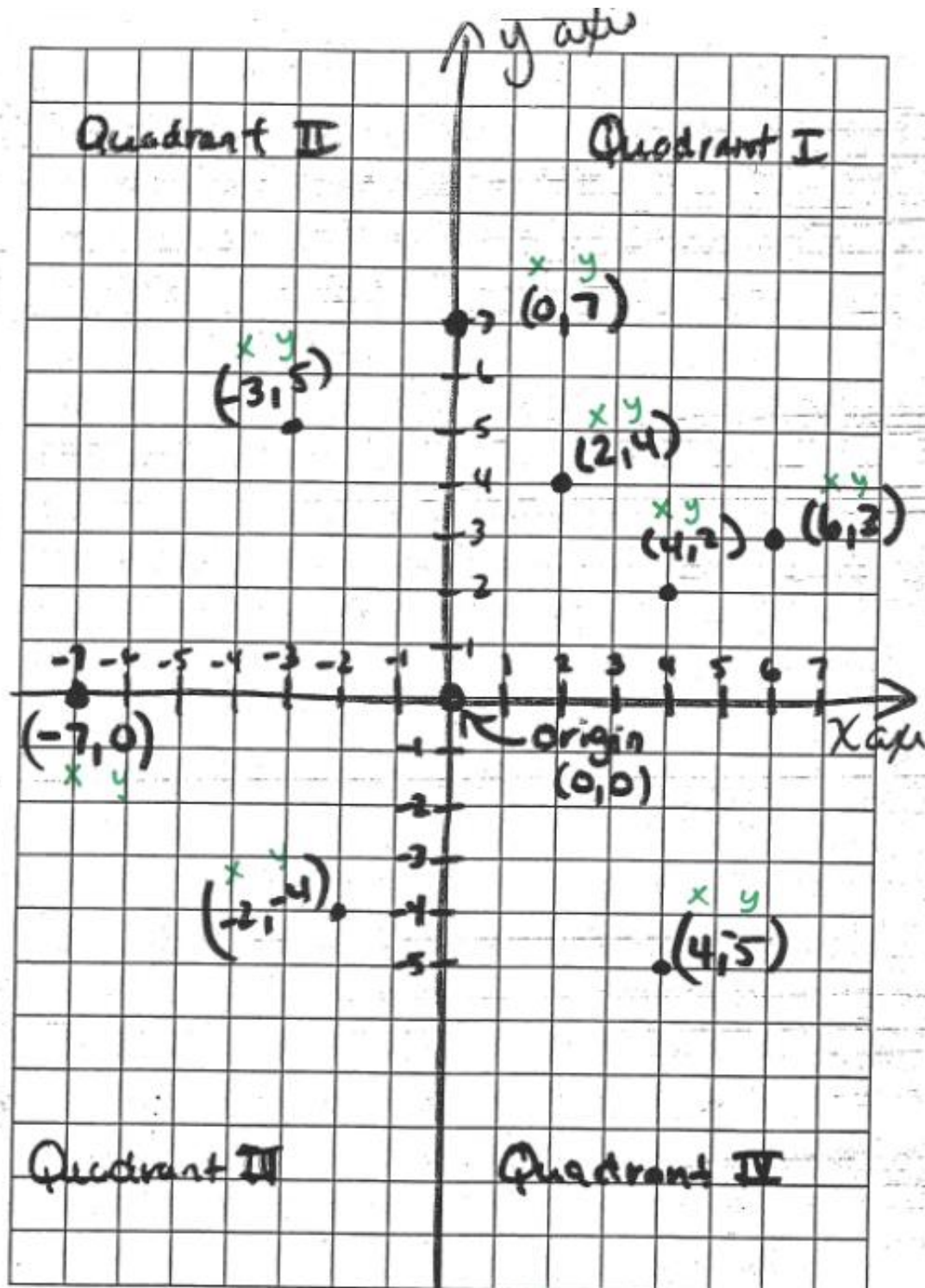
$$\text{ex. } \frac{3}{8} \div \frac{5}{7} \rightarrow \frac{3}{8} * \frac{7}{5} = \frac{21}{40}$$

$$\text{ex. } 4\frac{2}{3} \div 2\frac{1}{3} \rightarrow \frac{14}{3} \div \frac{7}{3} \rightarrow \frac{14}{3} * \frac{3}{7} = 2$$

$$\text{ex. } 8\frac{1}{3} \div 2\frac{1}{2} \rightarrow \frac{25}{3} \div \frac{5}{2} \rightarrow \frac{25}{3} * \frac{2}{5} = \frac{10}{3}$$

## Coordinate Points – Graphing

Ordered pairs are ALWAYS in the form of  $(X, Y)$ . The x-coordinate tells how far to the RIGHT (+) or LEFT (-) you go from the origin  $(0,0)$ . You do the x-coordinate FIRST. The y-coordinate tells how far you go UP (+) or DOWN (-). You do the y-coordinate SECOND. Think of an airplane...you have to go down the runway before you can take off.



## AREA – Formulas and examples

To find the area of a figure use the following formulas:

Rectangle =  $l * w$

Square =  $S^2$

Triangle =  $\frac{1}{2}bh$  or  $\frac{bh}{2}$

Parallelogram =  $b * h$

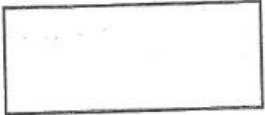
Trapezoid =  $\frac{1}{2}h(b_1 + b_2)$


Circle =  $\pi r^2$     Circumference =  $\pi d$


Use the following steps: Formula

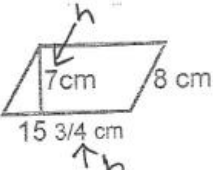
Substitution

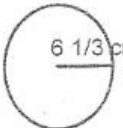
Answer with Label

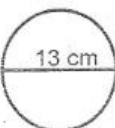
1.   $A = L W$   
 $A = 21.6 * 13.5$   
 $A = 291.6 \text{ cm}^2$

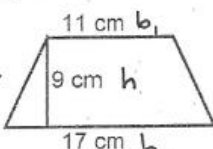
2.   $A = S^2$   
 $A = 5.7^2$   
 $A = 32.49 \text{ cm}^2$

3.   $A = \frac{1}{2}bh$  or  $\frac{bh}{2}$   
 $A = \frac{1}{2} * 8.4 * 11$   
 $A = 46.2 \text{ cm}^2$

4.   $A = bh$   
 $A = 15 \frac{3}{4} * 7$   
 $A = 110 \frac{1}{4} \text{ cm}^2$

5.  Area and Circumference  
 $A = \pi r^2$      $C = \pi d$   
 $A = 3.14 * 6 \frac{1}{3}^2$      $C = 3.14 * 12 \frac{2}{3}$   
 $A = 125.9 \text{ cm}^2$      $C = 39.8 \text{ cm}$   
 $r = 6 \frac{1}{3}$   
 $d = 12 \frac{2}{3}$

6.  Area and Circumference  
 $A = \pi r^2$      $C = \pi d$   
 $A = 3.14 * 6.5^2$      $C = 3.14 * 13$   
 $A = 132.7 \text{ cm}^2$      $C = 40.82 \text{ cm}$   
 $r = 6.5$   
 $d = 13$

7.   $A = \frac{1}{2}h(b_1 + b_2)$   
 $A = \frac{1}{2} * 9 * (11 + 17)$   
 $\frac{1}{2} * 9 * 28$   
 $A = 126 \text{ cm}^2$

## Add and Subtract Integers –

Adding Integers – When the signs are the *same*, ADD and KEEP the sign. When the signs are *different*, SUBTRACT and keep the sign of the HIGHEST ABSOLUTE VALUE.

Subtracting Integers – Subtraction is the same as adding the opposite. To subtract, change the subtraction sign to an addition sign and then change the second number sign to its opposite. Then use the above adding integer rules.

Ex.  $-4 + -8 = -12$

$$+11 + +7 = +18$$

$$-11 + +5 = -6 \text{ (subtract and keep negative)}$$

$$+12 + -3 = +9 \text{ (subtract and keep positive)}$$

$$-6 - +8 \text{ becomes } -6 + -8 = -14$$

$$14 - -5 \text{ becomes } 14 + +5 = +19$$

$$-7 - -4 \text{ becomes } -7 + +4 = -3$$

## Multiply and Divide Integers –

Multiply and divide “like normal” then count the number of negative signs to determine the sign of the answer. If there are an **odd number** of **negative** signs, the answer is **negative**. If there is an **even number** of **negative** signs, the answer is **positive**. (Remember negative times negative = positive!)

$$-3 * -7 = +21 \text{ or } 21 \text{ (2 negatives make a positive)}$$

$$-24 \div 3 = -8 \text{ (1 negative makes a negative)}$$

## Order of Operations: Hint: Please Excuse My Dear Aunt Sally

Parenthesis and Exponents

Multiplication and Division – in order from left to right

Addition and Subtraction – in order from left to right

Use inverted pyramid style to solve

Ex.  $(5 + 3)^2 + 3 * 7 - 18 \div 2$

$$8^2 + 3 * 7 - 18 \div 2$$

$$64 + 3 * 7 - 18 \div 2$$

$$64 + 21 - 9$$

**Basic Skills Worksheet: NO CALCULATORS! Show all work!!**

Optional Math iXL CODES - Add/Subtract Decimals: 7VJ ; Multiply Decimals: FLL; Divide Decimal: 8FT ; Add Integers: ZM6; Subtract Integers: WQ6 ; Multiply Integers: J6V ; Divide Integers: JZC

1)  $134 + 45 + 27 =$

2)  $453 - 169 =$

3)  $78 \times 94 =$

4)  $391 \div 17 =$

5)  $24.7 + 1.52 + 36 =$

6)  $75.6 - 43.62 =$

7)  $26 \times 3.7 =$

8)  $10.54 \div 2.5 =$

9)  $-15 + 7 =$

10)  $8 - -21 =$

11)  $3 * -9 =$

12)  $-24 \div 4 =$

13)  $-9 + -13 =$

14)  $-2 * -25 =$

15)  $-50 - 30 =$

16)  $-56 \div -8 =$

**All fraction answers must be simplified to lowest terms.**

Optional Math iXL Codes - Add Fractions: D9N ; Subtract Fractions: VSP ;  
Add Mixed Numbers: FHD ; Subtract Mixed Numbers: FAA; Multiply  
Fractions: 8KV ; Divide Fractions: GL6 ; Multiply Mixed Numbers: P73 ;  
Divide Mixed Numbers: AE2

$$17) \frac{2}{7} + \frac{4}{9} =$$

$$18) 7\frac{2}{3} + 8\frac{5}{6} =$$

$$19) \frac{7}{8} - \frac{1}{6} =$$

$$20) 5\frac{1}{3} - 2\frac{3}{4} =$$

$$21) \frac{5}{8} \times \frac{4}{9} =$$

$$22) 2\frac{1}{4} \times 4\frac{5}{6} =$$

$$23) \frac{12}{21} \div \frac{4}{15} =$$

$$24) 4\frac{1}{5} \div 2\frac{7}{10} =$$



**Rational Numbers – Do NOT use a calculator! Show all your work next to each problem.**

Optional Math iXL Codes – Add/Subtract Rational: GDR ; Multiply/Divide Rational : L8B

1.  $-\frac{2}{3} + -\frac{4}{5} =$

6.  $\frac{-6}{7} * \frac{3}{8} =$

2.  $\frac{1}{2} - \frac{7}{10} =$

7.  $-1\frac{5}{9} * -2\frac{1}{7} =$

3.  $1\frac{1}{4} + -3\frac{5}{6} =$

8.  $\frac{-9}{10} \div \frac{-6}{15} =$

4.  $-7\frac{3}{10} - -4\frac{4}{5} =$

9.  $5\frac{2}{3} \div -1\frac{2}{15} =$

5.  $-3\frac{2}{5} - \frac{5}{6} =$

**Order of Operations - Show ALL your steps using inverted pyramid style**  
**(see pg. 6 of instructions)**

Optional Math iXL Codes: Order of Operations: 7YN and D7P

1.  $(8 + 2) * 9$

2.  $(6 + 3) \div 18$

3.  $80 - 6 * 7$

4.  $4 * (6 + 3)$

5.  $(-4)^2 + 10 * 2$

6.  $-4^2 + 10 * 2$

7.  $9 + (7 - 4)^2$

8.  $-9 + 7 - 4^2$

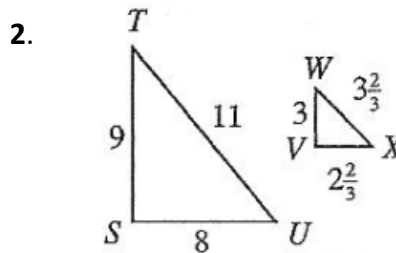
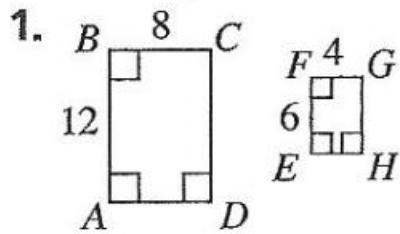
9.  $23 + 4(8 - 5) - 5^2$

10.  $(2^3 + 8) - 5 * 4 - 5^2$

**Skill: Similarity and Ratios**

Optional Math iXL Codes: Side lengths and angles of similar figures: JA5

Tell whether each pair of polygons is similar. **EXPLAIN why or why not.**

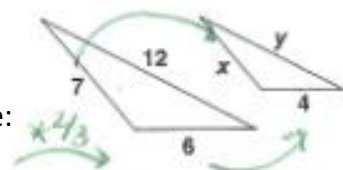


Find the missing side lengths. Use the following steps: 1. Create a proportion

2. Find the Scale Factor

3. Solve

Example:



$$\frac{7}{6} = \frac{x}{4}$$

$$7 * \frac{2}{3} = x$$

$$4 * \frac{2}{3} = x$$

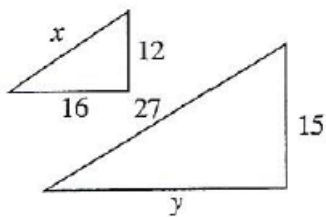
$$4 \div 6 = \frac{2}{3} \text{ for Scale factor}$$

$$\frac{12}{6} = \frac{y}{4}$$

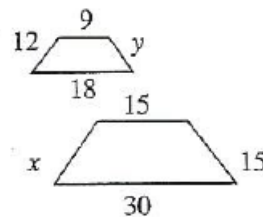
$$12 * \frac{2}{3} = y$$

$$8 = y$$

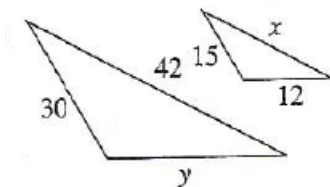
3.



4.



5.



# Optional Math iXL Work: Coordinate plane review: VXU

Name \_\_\_\_\_

## PRACTICE

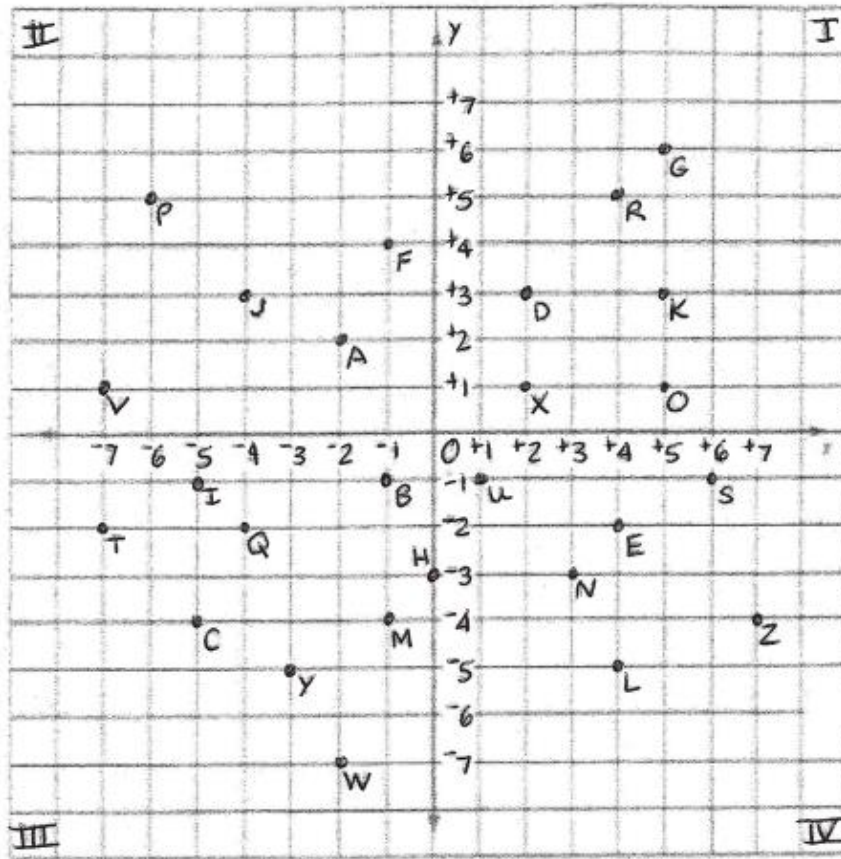
WORKSHEET

137

### Locating Points for Ordered Pairs

Give the coordinates of points R, S, V, and Q. Always start at the origin.

- point R      $(+4, +5)$
- point S      $(+6, -1)$
- point V      $(-7, +1)$
- point Q      $(-4, -2)$



Practice • Give the coordinates of each point.

- |             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|
| 1. Z _____  | 2. Y _____  | 3. X _____  | 4. W _____  | 5. T _____  |
| 6. P _____  | 7. O _____  | 8. N _____  | 9. M _____  | 10. L _____ |
| 11. K _____ | 12. J _____ | 13. I _____ | 14. H _____ | 15. G _____ |
| 16. F _____ | 17. E _____ | 18. D _____ | 19. C _____ | 20. B _____ |

Give the point named by the coordinates.

- |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| 21. $(0, -3)$ _____  | 22. $(+4, -5)$ _____ | 23. $(-4, +3)$ _____ | 24. $(-3, -5)$ _____ |
| 25. $(+3, -3)$ _____ | 26. $(-4, -2)$ _____ | 27. $(+4, +5)$ _____ | 28. $(-1, +4)$ _____ |

In which quadrant is each point located?

- |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| 29. $(-5, -4)$ _____ | 30. $(+2, +3)$ _____ | 31. $(+6, -1)$ _____ | 32. $(-2, +2)$ _____ |
|----------------------|----------------------|----------------------|----------------------|

### **Moving Straight Ahead Inv. 3**

Optional Math iXL Code - Solving two-step equations: GK7

**1.** Find the value of the indicated variable.

**a.** Suppose  $y = 2x + 10$ . Find  $y$  if  $x = -2$ .

**b.** Suppose  $y = 2x - 2.5$ . Find  $x$  if  $y = 10$ .

**2.** Solve each equation to find the value of  $x$ . Use Algebraic format and check your equations.

**a.**  $4x + 10 = 22$

**b.**  $3x + 9 = 6x$

**c.**  $2(x + 3) = 18$

**d.**  $2x + 15 = 27 - 4x$

**Area – Show your work (3 steps):**

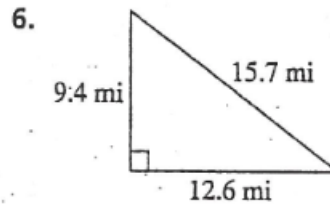
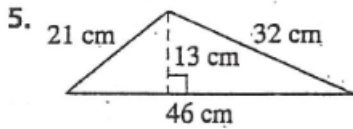
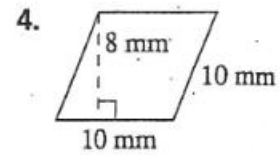
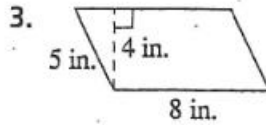
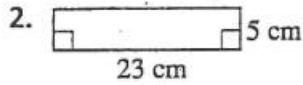
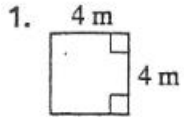
**1) formula**

**2) substitution**

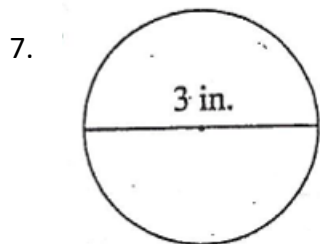
**3) answer with label**

Optional Math iXL Codes: Area of rectangles and parallelograms: 62H

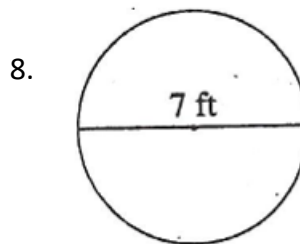
Area of triangles: C8S Area of circles: YA8 ; Circumference of circles: KS7



**Find the circumference and area for each figure (that means 2 answers for each!!)**



A =  
14 C =



A = C =