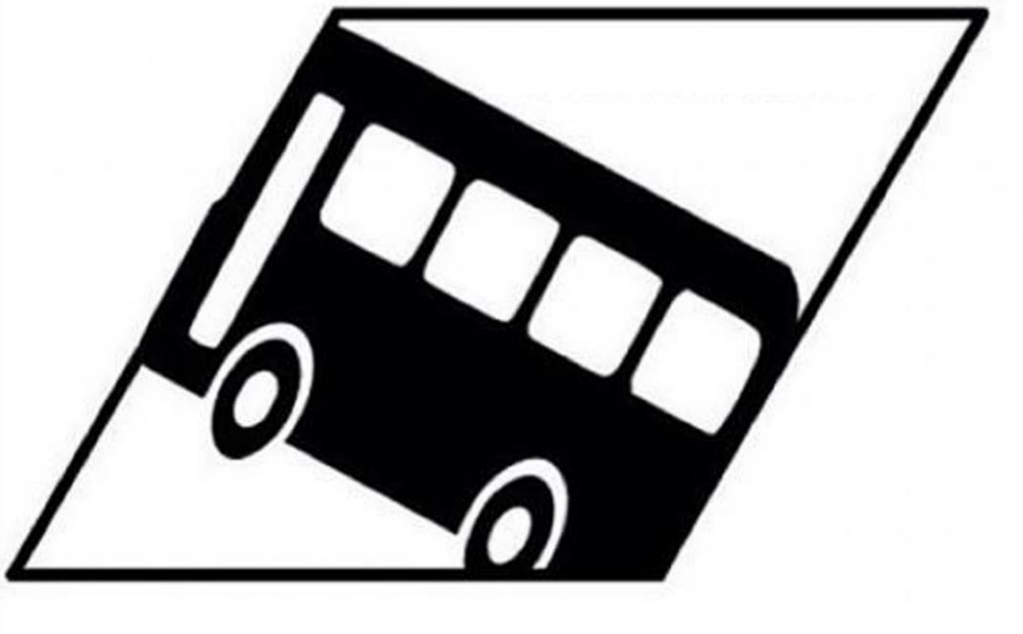
LET'S TAKE THE RHOMBUS



St. Theresa's Catholic High School Math

Diagnostic: Fractions

1. List three fractions equivalent (equal) to each fraction.

a) $\frac{2}{3}$ b) $\frac{8}{10}$ c) $\frac{24}{100}$

2. Use a greater than ($<$) or less than ($>$) sign to make these statements true.

a) $\frac{1}{2} \square \frac{3}{8}$ b) $2\frac{1}{3} \square 1\frac{5}{4}$

c) $\frac{5}{6} \square \frac{8}{9}$ d) $\frac{9}{5} \square \frac{5}{9}$

e) $2\frac{1}{3} \square 1\frac{5}{4}$ f) $1\frac{1}{8} \square 1\frac{3}{10}$

3. Order these values from least to greatest:

$\frac{4}{10}$ $\frac{1}{3}$ $\frac{2}{7}$ $\frac{6}{10}$ $1\frac{1}{3}$ $2\frac{7}{10}$

4. Add each pair of numbers.

a) $\frac{4}{9} + \frac{2}{9}$ b) $\frac{2}{3} + \frac{1}{5}$

c) $\frac{3}{8} + \frac{5}{6}$ d) $\frac{9}{4} + \frac{7}{4}$

e) $\frac{8}{3} + 2\frac{1}{2}$ f) $3\frac{2}{3} + 4\frac{5}{8}$

5. Subtract:

a) $\frac{7}{8} - \frac{3}{8}$ b) $\frac{2}{3} - \frac{1}{5}$

c) $\frac{5}{6} - \frac{1}{4}$ d) $\frac{8}{5} - \frac{2}{3}$

e) $4 - 1\frac{2}{3}$ f) $4\frac{1}{3} + 2\frac{3}{5}$

Multiply each pair of numbers.

a) $\frac{3}{5} \times \frac{5}{6}$ b) $\frac{4}{5} \times \frac{2}{3}$

c) $\frac{9}{4} \times \frac{2}{3}$ d) $2\frac{1}{3} \times 2\frac{1}{4}$

6. Divide:

a) $\frac{6}{9} \div \frac{2}{9}$

b) $\frac{5}{8} \div \frac{2}{8}$

c) $\frac{9}{4} \div \frac{3}{8}$

d) $\frac{8}{3} \div \frac{5}{6}$

e) $\frac{3}{10} \div \frac{5}{6}$

f) $3\frac{1}{2} \div 4\frac{1}{3}$

7. A painter uses $2\frac{1}{2}$ cans of paint to paint $\frac{1}{4}$ of a room. How much of a room could he paint with 1 can of paint?

8. Write an equation involving fractions and an operation sign that you would complete to solve the problem.

a) Mia read $\frac{5}{8}$ of her book. How much of her book does she have left to read?

b) Mia read $\frac{5}{8}$ of her book. She read $\frac{1}{3}$ of that amount on Monday. What fraction of the whole book did she read on Monday?

c) Mia read $\frac{5}{8}$ of her book. If she read $\frac{1}{5}$ of the book each hour, how many hours was she reading?

Diagnostic: Integers

1. Draw a number line from -10 to +10. Mark the locations of these integers:

   -2, -8, 0, +5

2. Describe three things that the number -2 might represent.

3. Order these integers form least to greatest: 6, -2, 3, -8, -20, +15, 9, -9
   Explain how you know which number is the least.

4. Explain why $-2 < -1$, even though $+2 > +1$.
   [Recall that $<$ means "less than" and $>$ means "greater than."]

5. Add each pair of integers.

   a) (-3) + (-8)

   b) (-20) + (+16)

   c) (+9) + (-13)

   d) (+13) + (-3)

6. Subtract each pair of integers.

   a) 4 – (-2)

   b) 8 – (+16)

   c) (-9) – (-2)

   d) (-11) – (-18)

7. Multiply each pair of integers.

   a) $(-3) \times 8$

   b) $9 \times (-2)$

   c) $(-5) \times (-10)$

   d) $(9) \times (-7)$

8. Divide each pair of integers.

   a) $(-4) \div (-2)$

   b) $(-8) \div 4$

   a) $16 \div (-4)$

   d) $(+20) \div (-5)$

9. Using BEDMAS circle the correct equation. Explain why it is right.

$(-2) \div 8 \times (-4) = -24$ or $(-2) + 8 \times (-4) = -34$

10. Which of these expressions is greater? How much greater?

$(-3) + 6 \div [4 - (-2)]$ or $(-3) + 8 \div 4 - (-2)$

Diagnostic: Ratio, Rate and Percent **(** a:b $\frac{a}{b}$ $\frac{x}{100}$)

1. There are 8 boys and 3 girls on the Tech Team.

   a) Write the ratio of the number of girls to number of boys in the form : ☐ ☐

   b) Write the ratio of the number of boys to the number on the whole team.

   c) Another Tech Team of 11 students has a higher ratio of number of girls to number of boys. What could the ration be?

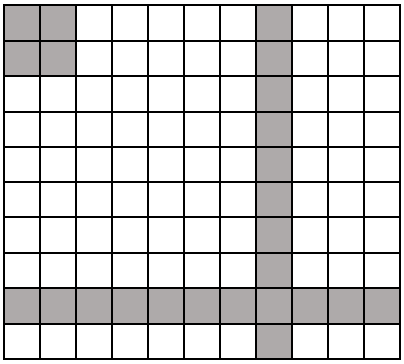
2. The ratio of Vada's height to Melissa's height is 5 : 4.

   a) Who is taller?

   b) Is she twice as tall? How do you know?

3. Valene's running rate is 0.18 km/min. Explain what that means.

4. a) What percent of the grid is shaded?



b) What percent is not shaded?

5. Indicate whether each statement does or does not make sense by circling your choice.

a) 8% of something is a lot of it.

MAKES SENSE DOES NOT MAKE SENSE

b) 80% of something is a lot more than half of it.

MAKES SENSE DOES NOT MAKE SENSE

c) 35% of the people in a high school building on a school day are adults, not students.

MAKES SENSE DOES NOT MAKE SENSE

6. Complete the missing amounts so that the ratios are equivalent.

a) 2 : 7 = ☐ : 14 b) 5 : 10 = ☐ : 8

c) 12 : ☐ = 3 : 5

7. Suppose your heart beats 144 times in 2 minutes. How many times would you expect it to beat in 5 minutes?

8. What fraction is equivalent to each percent?

a) 40% b) 112% c) 3.5%

9. Three bars of soap cost $2.61. At this rate, how much would each number of bars below cost?

   a) 6 bars

   b) 8 bars

10. A car goes 78 km in 45 minutes. At that speed, how far would it go in an hour?

11. A 2.6 L container of juice costs $3.00. How much are you paying for 1 L?

12. Suppose the ratio of the number of boys to the number of girls in a class is 7 : 3. What percent of the class are girls?

13. A T-shirt is priced at $12.99. The store is offering a discount of 30%. How much will the shirt cost (before taxes)?

14. Tell if each statement is TRUE or FALSE by circling the correct word.

a)	40% of 120 is about 30	TRUE	FALSE
b)	20% of 83 is about 16	TRUE	FALSE
c)	11% of 198 is about 20	TRUE	FALSE

15. Lea spend $25 of the money she saved. She still has 60% of her money left. How much does she have left?

Diagnostic: Equations

1. Describe what each expression or equation tells you to do with a number represented by the letter "j". The first one is modelled for you.

   a) 2j *Double the number j represents* _____

   b) 8 – j _____

   c) 4j = 8 _____

   d) 20 – 2j = 10 _____

2. Use an algebraic expression to say the same thing.

   a) Triple a number and then add 2 _____

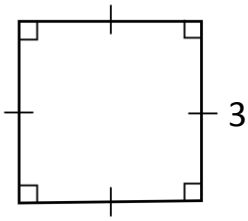
   b) Multiply a number by 4 and then subtract the product from 30 _____

   c) Three more than twice a number is 85 _____

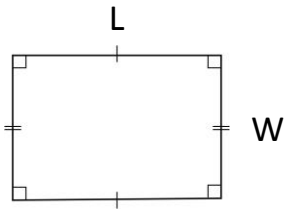
   d) One number is four less twice another number _____

3. Use an algebraic expression to describe each of the following:

   a) The perimeter of the square _____



   b) The perimeter of the rectangle _____



   c) The total value of the money _____

t - bills

l - loonies

4. Explain why 4a + (-3a) = a

5. Explain why 5a - 1 is not 4a.

6. Write the simplest form of each expression. Hint: Collect like terms.

a) $2a + 4 + 5a + 8$ _____

b) $-2a + (-7) + 3a - 8$ _____

c) $9t + (-5) + (-8s) + 10$ _____

7. Evaluate the following expressions for the given values.

a) $4k - 3$, if $k = 8$ _____

b) $20 - 3k$, if $k = -2$ _____

c) $6 + m + 2m^2$, if $m = -3$ _____

d) $3a^2$, if $a = 4$ _____

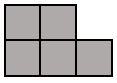
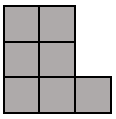
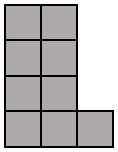
8. Without substituting values, tell why each has to be true.

a) $3m - 20 > 2m - 20$, if m is positive

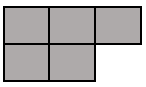
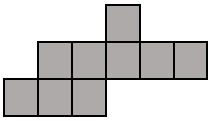
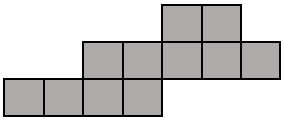
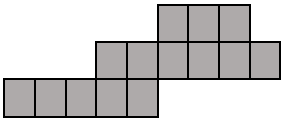
b) $40 - 3t > 40 - 2t$, if t is negative

9. Write a pattern rule for the number of tiles in each pattern using the variable f, where f is the figure number.

a) Figure 1 Figure 2 Figure 3 Figure 4

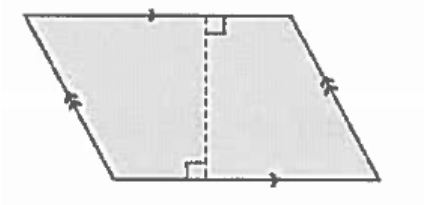
b) Figure 1 Figure 2 Figure 3 Figure 4

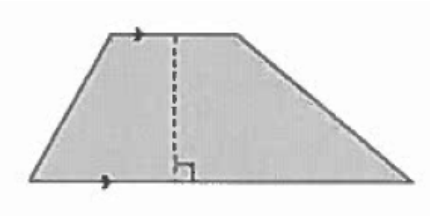
Diagnostic: Calculating Area and Volume

1. Use a marker or a coloured pencil to indicate the lengths needed to calculate the area of each shape. Make only the necessary measurements on each shape.

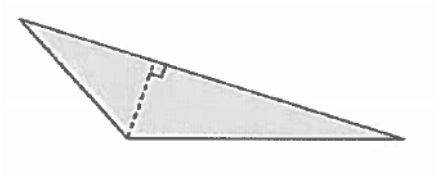
a) Parallelogram



b) Trapezoid

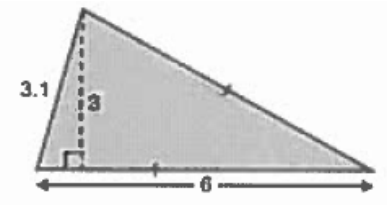


c) Triangle

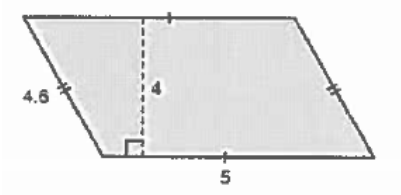


2. Calculate each area:

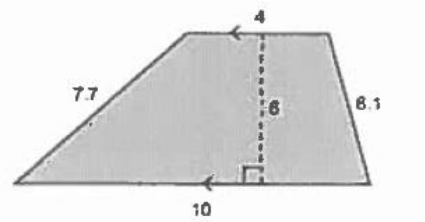
a)



b)



c)

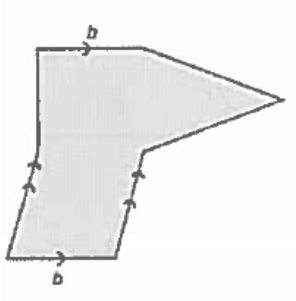


3. A triangle has a base of 5 cm and a height of 10 cm. A parallelogram with a base of 5 cm has the same area. What is the height of the parallelogram?

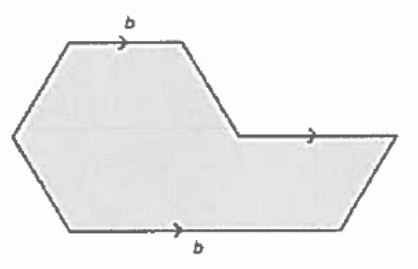
4. A trapezoid has an area of 20 cm^2. What could the height and base lengths be?

5. Show a way to divide each shape into any combination of triangles, rectangles, parallelograms, or trapezoids.

a)

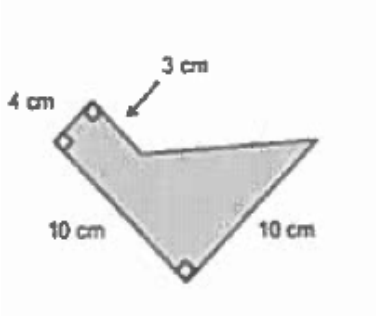


b)

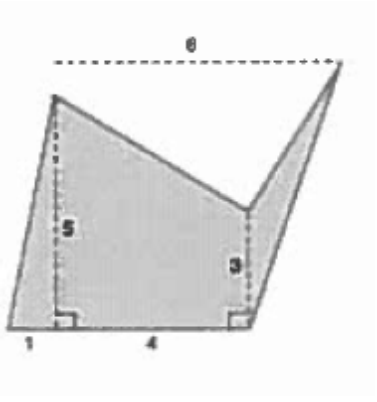


6. Calculate the area of each shape. Show your work.

a)



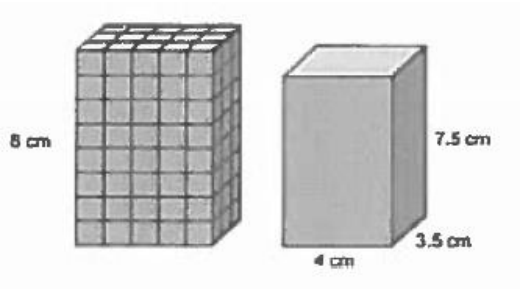
b)



Note: If an answer involves the number π you may leave the answer in terms of π or you may estimate the answer using the value, 3.14.

1. Which prism has a greater volume? How much greater? Show your work.

a)



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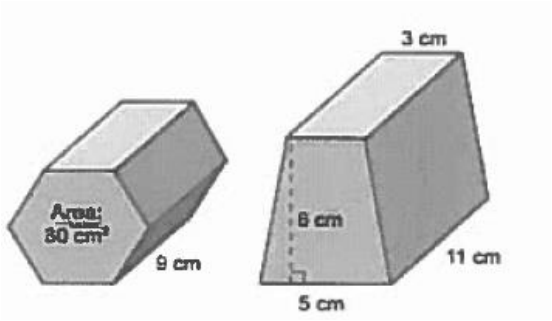
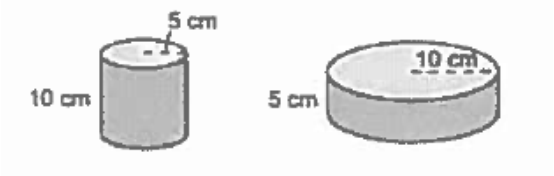


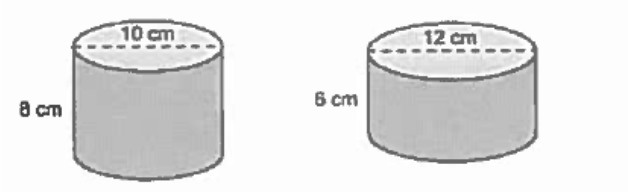
2. The volume of a prism is 100 cm^3. Its height is 4 cm. What else do you know about the prism?

3. Which cylinder has a greater volume? How much greater? Show your work.

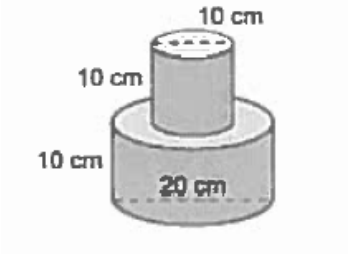
a)



b)



4. What is the volume of this container?



Diagnostic: Solving Algebraic Equations/Expressions

1. Solve the following one step equations.

   a) $3x = 120$
   b) $2x = 18$
   c) $6s = 126$

2. Solve the following two step equation.

   a) $5x - 30 = 65$

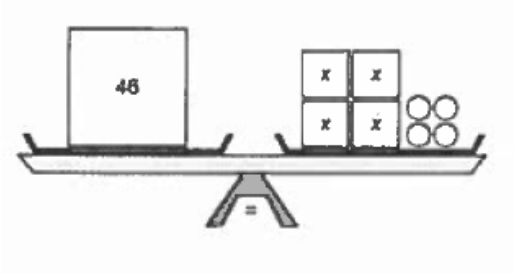
   b) $124 = 200 - 4s$

   c) $7m + 18 = 165$

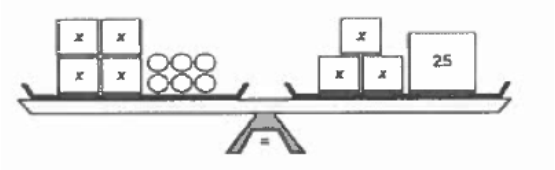
3. What equation does each pan balance model? Solve for the equations

Note: The box marked 46 would contain 46 small balls like the 4 balls on the right of the balance. It is just quicker to show than drawing 46 separate balls.

a)



b)



4. What is the first operation you would perform to solve the equation?

a) $6m + 14 = 86$

b) $9m - 600 = 228$

c) $154 - 3m = 58$

d) $5m + 8 = 2m + 149$

5. Solve each equation in Question 7 using opposite operations. Hint: BEDMAS backwards

6. Suppose you wanted to change the equation to the form x = ….
What is the first step you would take in each situation?

a) If $y = 2x$

b) If $y = x + 50$

c) If $y = 2x - 80$

7. Write an equation that tells how to calculate t if you know m.

a) $m = t + 10$

b) $m = 4t$

c) $m = 3t - 9$

d) $3m = 4t$

e) $3m = 6t + 8$

f) $2m + 4t = 60$