Algebra Readiness 8

Summer Math Packet

Name:

_____

May 2011

Dear Crofton Middle School Students and Parents,

This year, CMS is continuing to implement a summer math program. Each student will be receiving a packet containing material that is necessary to **retain** skills for a successful upcoming year. These skills **should be mastered as they will be applied** to learning this upcoming school year.

Students should turn in the completed packet to their math teacher within the first week of school. It will be counted as a homework grade. Students should show their work for each problem, where applicable.

The following is a list of online resources that can be used to help students with the completion of their packet.
• Math Dictionary   http://www.amathsdictionaryforkids.com
• Algebra and Geometry   http://www.gomath.com
• Ask Dr. Math   http://www.mathforum.org/dr.math
• Webmath   http://www.webmath.com/
• Problem of the week   http://www.olemiss.edu/mathed/contest
• Rainforest Math - Interactive activities; Brain-Games & Puzzles in Math: http://www. funbrain.com
• A-plus Math - Interactive Math Practice site   http://www.aplusmath.com

The following is a list of supplies needed, by course level.

Math 6, Algebra Readiness 6	Algebra Readiness 7	**ALGEBRA, GEO, Algebra Readiness 8**
TI-83 or TI-84 graphing calculator Students are expected to bring their graphing calculator to class every day.	TI-83 or TI-84 calculator Students are expected to bring their graphing calculator to class every day.	**TI-83 or TI-84 calculator Students are expected to bring their graphing calculator to class every day.**
Spiral notebook	Spiral notebook	**Spiral notebook**
Loose leaf paper	Loose leaf paper	**Index cards**
Graph paper	Graph paper	**Carrying case to hold index cards**
Dividers	Dividers	**Graph paper**
Pencils/Erasers	Pencils/Erasers	**Pencils/Erasers**
Low odor dry erase markers	Low odor dry erase markers	**Dividers**
For home- compass, protractor, ruler	For home- compass, protractor, ruler	**For home- compass, protractor, ruler**

Thank you for your continued support hi the success of our students. We are looking forward to working with your child next year.

Crofton Middle School Math Department

Math Teacher: _____

Graphing Calculator Borrower's Agreement

I, _____ , understand my responsibilities as outlined in this agreement and agree to borrow a graphing calculator for the duration of the mathematics course in which I am enrolled for a nonrefundable fee of $ 15.

Responsibilities:
1. The graphing calculator will come into my possession in good working order but without batteries. I will return it at the end of this course in good working order.
2. I am responsible for bringing the calculator to class ever day.
3. I will provide my own batteries for this calculator.
4. If I loan the calculator to anyone else, any damage to or loss of the calculator resulting from that individual's use of the calculator is my responsibility.
5. If the calculator is lost, damaged, or stolen, I will replace it with a **new** calculator of the same model in its original packaging or pay the balance of $98.96
6. I will return the calculator at the teacher's request if the teacher feels I am being irresponsible in caring for it.
7. I understand that this calculator is the property of AACPS and that failure to comply with these conditions will result in my student report card being withheld.

Issued to: _____   Date: _____
       (Please print name)

Calculator ID Number: _____

Calculator Serial Number: _____

School ID Number: _____

Signatures by both the student and parent are required. This signifies that you have read and understand the agreement and that you agree to all of the above responsibilities and are willing to assume responsibility for any loss or damage.

_____   _____
Student's signature   **Date**   **Parent's signature**   **Date**

_____   _____
Home Phone Number   **Work Phone Number**

Make checks payable to your middle school and include student's name on the check.

if calculator is lost or damaged, then this obligation form will be submitted to the main office.

<u>OBLIGATION NOTICE</u>

Teacher's Name: Ms. Robertson

Date: _____

Student's Name: _____

Grade: _____

This notice is to advise you that you owe an obligation to Crofton Middle School for the following item(s) listed below:

Description of Item(s) (include title and book number)	Amount of Obligation
Calculator Rental – TI-83 / 84	**$98.96**

* indicate whether or not the item is lost or damaged; list extent of damage if applicable.

ORIGINAL – Blue (Financial Secretary)
COPY –   Other (to the Student)

Integers

Adding	**Subtracting**	**Multiplying/Dividing**
- Same sign- add the numbers, keep the sign Ex. $-4 + -6 = -10$ $\quad 8 + 12 = 20$ - Different sign- subtract the numbers, take the sign of the larger number Ex. $\quad -8 + 12 = 4$ $\quad\quad 15 + -18 = -3$	- Change to adding the opposite and then follow the addition rules Ex. $5 - 8$ becomes $5 + -8 = -3$ Ex. $-16 - 12 =$ $-16 + -12 = -28$ Ex. $-12 - -3 = -12 + 3 = -9$	- Same sign- answer is positive Ex. $-9 \times -8 = +72$ $\quad -20 \div -4 = 5$ - Different sign- answer is negative Ex. $13 \times -4 = -52$ $\quad -15 \div 3 = -5$

Find each sum.

1. $12 + 24$

2. $-6 + 14$

3. $-12 + (-15)$

Find each difference.

1: $11 - 41$

2. $15 - (-21)$

3. $-33 - (-17)$

Find each product.

1. $11(4)$

2. $-5(-3)$

3. $(-24)(-2)$

Find each quotient.

1. $-80 \div (-10)$

2. $-32 \div 16$

3. $80 \div 5$

Rounding

Set 1 – Write the given number:

1. twelve and thirteen hundredths   _____

2. one thousand and five tenths   _____

3. eleven and three hundred-ten thousandths   _____

Set 2 – Identify the place value of the given digits in 437,652.189:

1. 6 _____   2. 8 _____

3. 9 _____   4. 5 _____

5. 1 _____   6. 3 _____

Set 3 – Round the answer as specified:

1. 17.6 (whole)   _____   2. 0.78 (tenth)   _____

3. 12.0092 (thousandth)   _____   4. 2.2949 (hundredth)   _____

5. 0.009 (tenth)   _____   6. 35.64789 (whole)   _____

7. 7.98 (tenth)   _____   8. 12.123 (hundredth)   _____

9. 32.072 (tenth)   _____   10. 4.1113 (thousandth) _____

The Distributive Property

Simplify $4(a^2 + 3ab) - ab$.

$$4(a^2 + 3ab) - ab = 4(a^2 + 3ab) - 1ab \qquad \text{Multiplicative Identity}$$
$$= 4a^2 + 12ab - 1ab \qquad \text{Distributive Property}$$
$$= 4a^2 + (12 - 1)ab \qquad \text{Distributive Property}$$
$$= 4a^2 + 11ab \qquad \text{Substitution}$$

Simplify each expression. If not possible, write *simplified*.

1. $12a - a$ **2.** $3x + 6x$ **3.** $3x - 1$

4. $12g - 10g + 1$ **5.** $-2x - 12$ **6.** $4x^2 + 3x + 7$

7. $20a + 12a - 8$ **8.** $3x^2 + 2x^2$ **9.** $-6x + 3x^2 + 10x^2$

Rewrite $-2(3x^2 + 5x + 1)$ using the Distributive Property. Then simplify.

$$-2(3x^2 + 5x + 1) = -2(3x^2) + (-2)(5x) + (-2)(1) \qquad \text{Distributive Property}$$
$$= -6x^2 + (-10x) + (-2) \qquad \text{Multiply.}$$
$$= -6x^2 - 10x - 2 \qquad \text{Simplify.}$$

Rewrite each expression using the Distributive Property. Then simplify.

7. $5(4x - 9)$ **8.** $3(8 - 2x)$ **9.** $12\left(6 - \frac{1}{2}x\right)$

11. $\frac{1}{4}(12 - 4t)$ **12.** $3(2x - y)$ **13.** $2(3x + 2y - z)$

Solving Multi-Step Equations

Example   Solve $5x + 3 = 23$.

$5x + 3 = 23$	Original equation.
$5x + 3 - 3 = 23 - 3$	Subtract 3 from each side.
$5x = 20$	Simplify.
$\dfrac{5x}{5} = \dfrac{20}{5}$	Divide each side by 5.
$x = 4$	Simplify.

Exercises

Solve each equation. Then check your solution.

1. $5x + 2 = 27$ 2. $6x + 9 = 27$ 3. $5x + 16 = 51$

7. $16 = \dfrac{d - 12}{14}$ 8. $8 + \dfrac{3n}{12} = 13$ 9. $\dfrac{g}{-5} + 3 = -13$

Solving Equations with the Variable on Each Side

Example 1   Solve $5y - 8 = 3y + 12$.

$5y - 8 = 3y + 12$

$5y - 8 - 3y = 3y + 12 - 3y$

$2y - 8 = 12$

$2y - 8 + 8 = 12 + 8$

$2y = 20$

$\dfrac{2y}{2} = \dfrac{20}{2}$

$y = 10$

The solution is 10.

Solve each equation.

1. $6 - b = 5b + 30$

2. $5y - 2y = 3y + 2$

3. $5x + 2 = 2x - 10$

Solving Equations and Formulas

Solve for Variables Sometimes you may want to solve an equation such as $V = \ell wh$ for one of its variables. For example, if you know the values of V, w, and h, then the equation $\ell = \dfrac{V}{wh}$ is more useful for finding the value of ℓ. If an equation that contains more than one variable is to be solved for a specific variable, use the properties of equality to isolate the specified variable on one side of the equation.

Example 1 Solve $2x - 4y = 8$ for y.

$$2x - 4y = 8$$
$$2x - 4y - 2x = 8 - 2x$$
$$-4y = 8 - 2x$$
$$\frac{-4y}{-4} = \frac{8 - 2x}{-4}$$
$$y = \frac{8 - 2x}{-4} \text{ or } \frac{2x - 8}{4}$$

The value of y is $\dfrac{2x - 8}{4}$.

Example 2 Solve $3m - n = km - 8$ for m.

$$3m - n = km - 8$$
$$3m - n - km = km - 8 - km$$
$$3m - n - km = -8$$
$$3m - n - km + n = -8 + n$$
$$3m - km = -8 + n$$
$$m(3 - k) = -8 + n$$
$$\frac{m(3 - k)}{3 - k} = \frac{-8 + n}{3 - k}$$
$$m = \frac{-8 + n}{3 - k}, \text{ or } \frac{n - 8}{3 - k}$$

The value of m is $\dfrac{n - 8}{3 - k}$. Since division by 0 is undefined, $3 - k \neq 0$, or $k \neq 3$.

Exercises

Solve each equation or formula for the variable specified.

1. $ax - b = c$ for x

2. $15x + 1 = y$ for x

3. $(x + f) + 2 = j$ for x

4. $xy + z = 9$ for y

5. $x(4 - k) = p$ for k

6. $7x + 3y = m$ for y

Inequalities

$<$ $>$ graph with an open circle.

$\leq$ $\geq$ graph with a closed circle.

Solve each inequality. Then check your solution, and graph it on a number line.

1. $t + 12 \geq 8$

2. $n + 12 > -12$

3. $16 \leq h + 9$

-6 -5 -4 -3 -2 -1 0 1 2

-26 -25 -24 -23 -22 -21

5 6 7 8 9 10 11 12 13
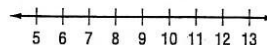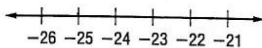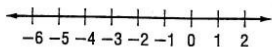
Solving Multi-Step Inequalities

Solve Multi-Step Inequalities To solve linear inequalities involving more than one operation, undo the operations in reverse of the order of operations, just as you would solve an equation with more than one operation.

Example 1 Solve $6x - 4 \leq 2x + 12$.

$6x - 4 \leq 2x + 12$	Original inequality
$6x - 4 - 2x \leq 2x + 12 - 2x$	Subtract $2x$ from each side.
$4x - 4 \leq 12$	Simplify.
$4x - 4 + 4 \leq 12 + 4$	Add 4 to each side.
$4x \leq 16$	Simplify.
$\dfrac{4x}{4} \leq \dfrac{16}{4}$	Divide each side by 4.
$x \leq 4$	Simplify.

The solution is $\{x \mid x \leq 4\}$.

Example 2 Solve $3a - 15 > 4 + 5a$.

$3a - 15 > 4 + 5a$	Original inequality
$3a - 15 - 5a > 4 + 5a - 5a$	Subtract $5a$ from each side.
$-2a - 15 > 4$	Simplify.
$-2a - 15 + 15 > 4 + 15$	Add 15 to each side.
$-2a > 19$	Simplify.
$\dfrac{-2a}{-2} < \dfrac{19}{-2}$	Divide each side by -2 and change $>$ to $<$.
$a < -9\dfrac{1}{2}$	Simplify.

The solution is $\left\{a \mid a < -9\dfrac{1}{2}\right\}$.

Solve each inequality.

1. $11y + 13 \geq -1$

3. $\dfrac{q}{7} + 1 > -5$

7. $\dfrac{-3x + 6}{2} \leq 12$

Multiplying Monomials

Example 1   Simplify $(3x^6)(5x^2)$.

$$(3x^6)(5x^2) = (3)(5)(x^6 \cdot x^2) \qquad \text{Associative Property}$$
$$= (3 \cdot 5)(x^{6+2}) \qquad \text{Product of Powers}$$
$$= 15x^8 \qquad \text{Simplify.}$$

The product is $15x^8$.

Example 2   Simplify $(-4a^3b)(3a^2b^5)$.

$$(-4a^3b)(3a^2b^5) = (-4)(3)(a^3 \cdot a^2)(b \cdot b^5)$$
$$= -12(a^{3+2})(b^{1+5})$$
$$= -12a^5b^6$$

The product is $-12a^5b^6$.

Simplify.

1. $y(y^5)$

2. $n^2 \cdot n^7$

3. $(-7x^2)(x^4)$

5. $m \cdot m^5$

8. $(rs)(rs^3)(s^2)$

9. $(x^2y)(4xy^3)$

11. $(-4x^3)(-5x^7)$

12. $(-3j^2k^4)(2jk^6)$

Dividing Monomials

Quotients of Monomials   To divide two powers with the same base, subtract the exponents.

Example 1   Simplify $\dfrac{a^4b^7}{ab^2}$. Assume neither a nor b is equal to zero.

$$\frac{a^4b^7}{ab^2} = \left(\frac{a^4}{a}\right)\left(\frac{b^7}{b^2}\right) \qquad \text{Group powers with the same base.}$$
$$= (a^{4-1})(b^{7-2}) \qquad \text{Quotient of Powers}$$
$$= a^3b^5 \qquad \text{Simplify.}$$

The quotient is a^3b^5.

Simplify. Assume that no denominator is equal to zero.

1. $\dfrac{5^5}{5^2}$

2. $\dfrac{m^6}{m^4}$

3. $\dfrac{p^5n^4}{p^2n}$

4. $\dfrac{a^2}{a}$

5. $\dfrac{x^5y^3}{x^5y^2}$

6. $\dfrac{-2y^7}{14y^5}$

Graphing linear equations.

$$y = mx + b$$

slope ↗ ↖ y-intercept

$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

Rewrite the equation in slope-intercept form.

1. $5x - y = 8$

2. $-11x + y = 13$

3. $7x + 2y = 12$

Match the equation with its graph.

4. $y = 3x + 4$

5. $y = -3x + 4$

6. $y = \frac{1}{3}x + 4$

A.

B.

C.
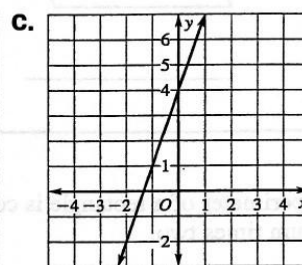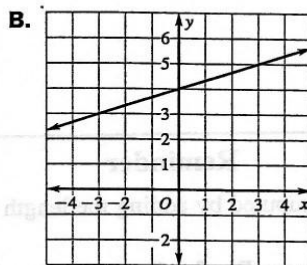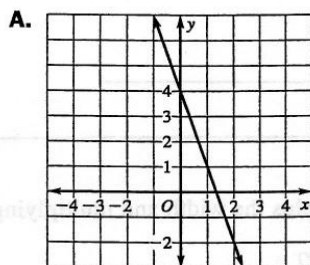
Then graph the equation.

8. $y = \frac{1}{5}x - 2$
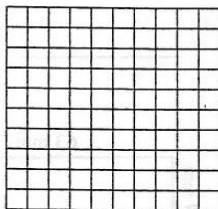
9. $y = -5x + 1$
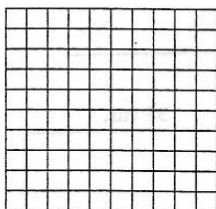
12. $y = \frac{3}{4}x$
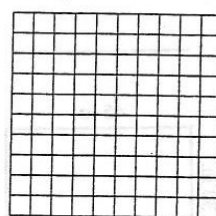
Reminder

The perimeter of a parallelogram is computed by adding the length plus the width and multiplying the sum times two.

$$P = 2 \times (l + w) \quad \text{or} \quad P = S + S + S + S$$

Directions: Compute the perimeter of these shapes

1.

25 yds.

40 yds.

_____

2.

70 cm

60 cm

_____

3.

95 ft.

70 ft.

_____

4.

300 m

15 m

_____
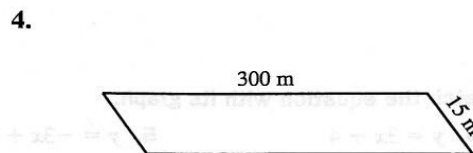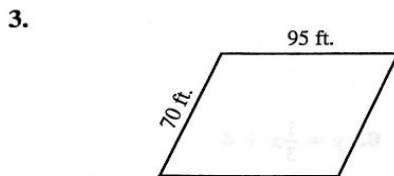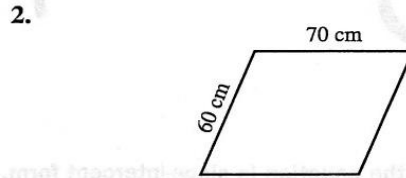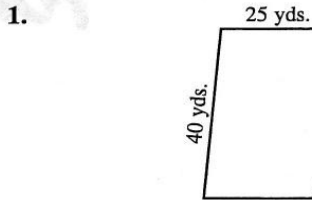
Reminder

The perimeter of a rectangle is computed by adding the length plus the width and multiplying the sum times two.

$$P = 2 \times (l + w) \quad \text{or} \quad P = S + S + S + S$$

Directions: Compute the perimeter of these rectangles.

1.

20 m

12 meters

_____

2.

18 ft.

21 ft.

_____

3.

25 cm

13 cm

_____

4.

45 in.

30 in.

_____

5.

38 yds.

17 yds.

_____

6.

63 mm

19 mm

_____
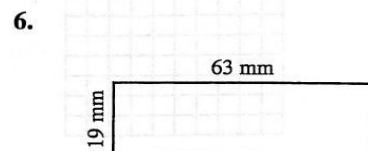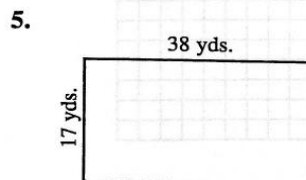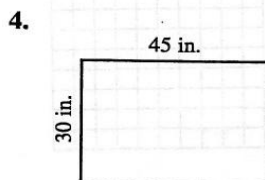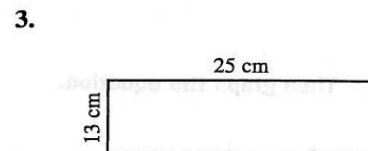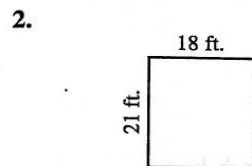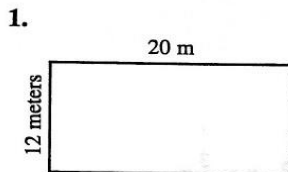
Reminder

- The area of a rectangle is computed by multiplying the width of one side times the length of the adjoining side.
- This may also be expressed as multiplying the base times the height or **A = l x w or A = b x h**

Directions: Compute the area of each rectangle.

1.

30 in.

20 in.

_____ in.^{2}

2.

25 m

12 m

_____ m^2

3.

23 cm

18 cm

_____ cm^2
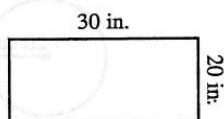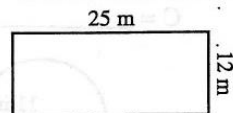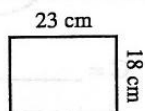
7. w = 96 yards
1 = 57 yards
A = _____

8. w = 76 in.
1 = 29 in.
A = _____

9. b = 88 m
h = 67 m
A = _____

Reminder

The area of a parallelogram is computed by multiplying the base times the height or **A = b x h**

Directions: Compute the area of each rectangle.

1.

25 m

30 m

_____ m^2

2.

40 mm

25 mm
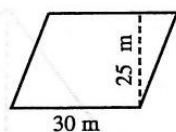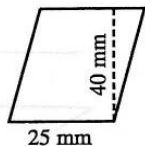
_____ mm^2

7. b = 56 mm
h = 41 mm
A = _____

8. b = 3.1 ft.
h = 8 ft.
A = _____

9. b = 300 in.
h = 48 in.
A = _____

Reminder

- The circumference is the distance around a circle.
- Pi = 3.14
- The circumference can be computed by multiplying 3.14 times the diameter. **C = πd**
- The circumference can be computed by multiplying 2 times the radius times 3.14. **C = 2 πr**

Directions: Compute the circumference of each circle.

1.

10 ft.

C = _____

2.

20 cm

C = _____

3.

7 ft.

C = _____

4.

11 in.
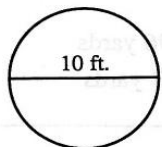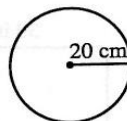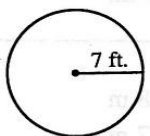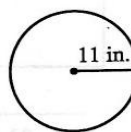
C = _____

Reminder

- The area of a triangle is one-half the area of a parallelogram or a rectangle.
- To compute the area of a triangle, multiply the base times the height and divide by 2 or multiply 1/2 the base times the height or **A = 1/2 (b x h) or A = (b x h) ÷ 2**

Directions: Compute the area of each triangle.

1.

20 mm

18 mm

_____ mm²

2.

34 ft.

40 ft.

_____ ft.²

3.

22 in.

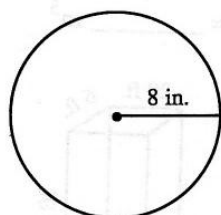40 in.

_____ in.²

4.

44 m

36 m
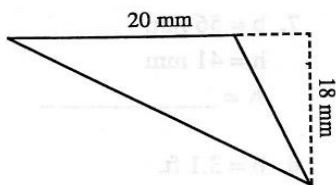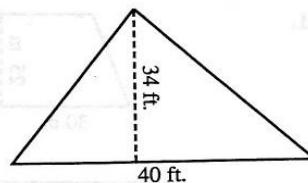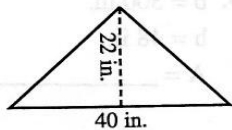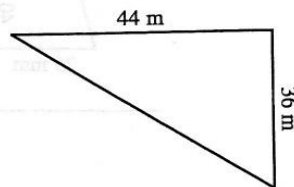
_____ m²

Reminder

- The area of a circle is computed by multiplying the radius times itself and that answer by 3.14.
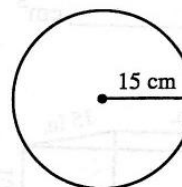- $A = \pi r^2$ (Pi times the radius squared) (Remember, Pi = 3.14)

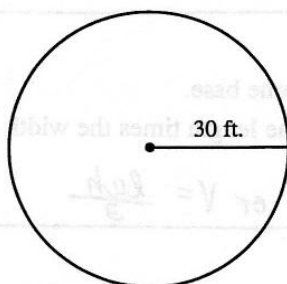**Directions:** Compute the area of each circle.

1.

8 in.

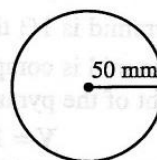$A = \underline{\hspace{1.5cm}} \text{ in.}^2$

2.

15 cm

$A = \underline{\hspace{1.5cm}} \text{ cm}^2$

3.

30 ft.

$A = \underline{\hspace{1.5cm}} \text{ ft.}^2$

4.

50 mm

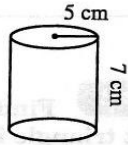$A = \underline{\hspace{1.5cm}} \text{ mm}^2$

Reminder

The volume of a cylinder is computed by multiplying the height times the area of the base.

$$V = h \times \pi r^2$$

— Use 3.14
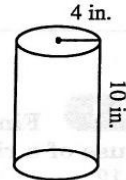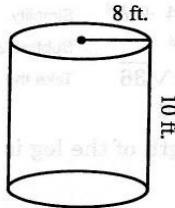
Directions: Compute the volume of each cylinder.

1.

5 cm

7 cm

V = _____ cm³

2.

4 in.

10 in.

V = _____ in.³

3.

8 ft.

10 ft.

V = _____ ft.³

4.

18 cm

10 cm

V = _____ cm³