# AIMS Grade 6 Mathematics Sample Test and Think-Throughs

FOR STUDENTS



## GRADE 6


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## *Introduction*

AIMS sample tests are provided to give students experience in taking AIMS. The samples are not meant to be practice tests, but they offer a sample of the kinds of questions students will find on AIMS. The best way to make sure you have the knowledge necessary to Meet and Exceed on AIMS is to *be in class*, *be prepared*, and *be on time to class* each day. Learning in class and through homework is the basis of meeting proficiency on AIMS.

It is understandable that sometimes students get nervous when taking tests. They may need some help with test-taking strategies. In this document, you will not only be able to take an AIMS sample test for mathematics, but you will also find that some of the items have explanations of the process used for solving them. This will help you think through the problems, just like you do in class. There will also be more application problems, like the ones explained, so you can try them on your own.

As you go through the sample test, please remember a few important facts.

- The AIMS Mathematics Sample Tests follow the AIMS mathematics blueprints for the 2008 Mathematics Academic Standards, but only represent half the number of items that are on the actual AIMS 3-8 and AIMS HS assessments.
- The best way to study for AIMS is to be sure you know and are able to do the grade-level performance objectives in each content area tested. Your teacher creates your lessons based on all of these grade-level mathematics standards.
- The activities contained in this document will give you experience in taking AIMS. It is not a practice test. Practice by doing your homework.
- Work through the sample test as if it is the AIMS – don't use a calculator or any other support materials. The reference sheets for formulas at the back of this guide are the same as those that are included in actual AIMS testing. Use the reference sheets to become familiar with them.

When you look at the sample problems that show the solution process, you will also see listed on the answer key the Strand, Concept, and Performance Objective that is being measured. This is listed so you can see how it connects to the lessons your teacher creates from the AZ Academic Standards. Read through the samples and see how your thoughts and answers compare.

The guide will help you make better response choices based on the knowledge that mastery of the grade-level standard provides.

Good luck and have fun!

# Mathematics Sample Test

# Grade 6

**Directions:** **Read each problem and select the best answer.**

**1** What represents a $\frac{2}{3}$ ratio?

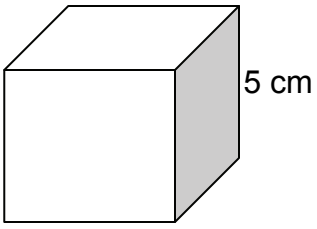
**A** 30%

**B** 0.33

**C** 60%

**D** 0.67

**2** The cube shown has a volume of 125 $cm^3$. What is the area of the base of the cube?




**A** 15 $cm^2$

**B** 20 $cm^2$

**C** 25 $cm^2$

**D** 30 $cm^2$

**3** There are 3 classes of 22 students making ice cream sundaes. A sundae can be made using one of 3 syrups and one of 3 candy toppings. Each student makes one sundae. Which expression can be used to find the total number of sundaes made by the students?

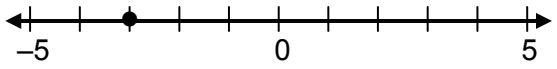
**A** 3 x 22

**B** $3^2$ x 22

**C** 3 x 3 x 22

**D** $3^2$ x 9 x 22

**4** What is the absolute value of the coordinate of the point shown on the number line?




**A** –4

**B** –3

**C** 3

**D** 4

**5** What is the value of the expression?

$$2 + 7(3.8 - 1.4)$$

**A** 18.8

**B** 21.6

**C** 27.2

**D** 32.8

**6** What is equal to $\sqrt[3]{27}$ ?

**A** $\frac{3}{27}$

**B** 3

**C** $\frac{24}{3}$

**D** 9

***Go On*▶**

**Use the four stem-and-leaf plots below to answer Numbers 7 and 8. Each stem-and-leaf plot shows the number of points scored by a team in a basketball tournament.**

**Cobras**

| Stem | Leaf |
|---|---|
| 7 | 2 8 |
| 8 | 4 6 |
| 9 | 1 2 6 6 |
| 10 | 0 5 |

**Tigers**

| Stem | Leaf |
|---|---|
| 6 | 4 |
| 7 | 7 |
| 8 | 5 6 9 9 |
| 9 | 2 3 |
| 10 | 0 0 |

**Sharks**

| Stem | Leaf |
|---|---|
| 8 | 0 6 |
| 9 | 0 2 4 5 |
| 10 | 2 3 7 |
| 11 | 5 |

**Eagles**

| Stem | Leaf |
|---|---|
| 7 | 2 6 |
| 8 | 9 |
| 9 | 2 8 9 |
| 10 | 1 5 7 |
| 11 | 0 |

| Key | |
|---|---|
| 11 | 2 = 112 |

**7** How many total scores are represented by all stem-and-leaf plots?

**A** 10

**B** 16

**C** 18

**D** 40

**8** What is the greatest number of points scored by any team in one game?

**A** 45

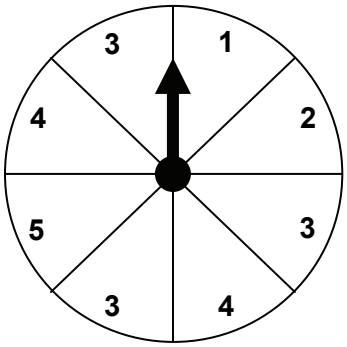
**B** 86

**C** 113

**D** 115

***Go On*▶**

**9** Look at the spinner.




What are the possible outcomes (sample space) of the spinner?

**A** 3, 1, 2, 4, 5

**B** 3, 1, 2, 3, 4, 5, 4

**C** 3, 1, 2, 3, 4, 3, 5

**D** 3, 1, 2, 3, 4, 3, 5, 4

**10** Look at the sequence.

15, 3, 0.6, 0.12, …

What is the next number in the sequence?

**A** 0.015

**B** 0.024

**C** 0.15

**D** 0.24

**11** Look at the equation.

$$2n + 1.4 = 8.6$$

Which inverse operations will solve the equation?

**A** add, then divide

**B** add, then multiply

**C** subtract, then divide

**D** subtract, then multiply

**12** Look at the expression.

$$6n + 3$$

What is the value of the expression when $= \frac{2}{3}$?

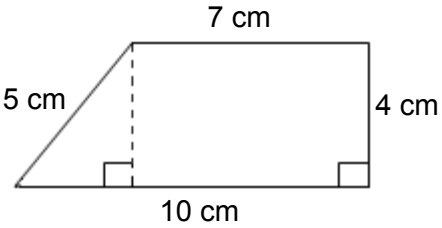
**A** $6$

**B** $7$

**C** $7\frac{2}{3}$

**D** $9\frac{2}{3}$

**13** Look at the figure below.




What is the total area of the figure?

**A** 26 $cm^2$

**B** 34 $cm^2$

**C** 40 $cm^2$

**D** 68 $cm^2$

**14** What is the value of the expression?

$$\frac{6}{7} \div \frac{3}{4}$$

**A** $\frac{1}{2}$

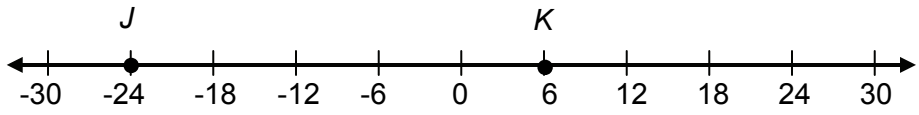
**B** $\frac{9}{14}$

**C** $\frac{8}{7}$

**D** $\frac{46}{21}$

**Go On▶**

**15** Look at points *J* and *K* on the number line.




Which expression represents the distance between points *J* and *K* on the number line?

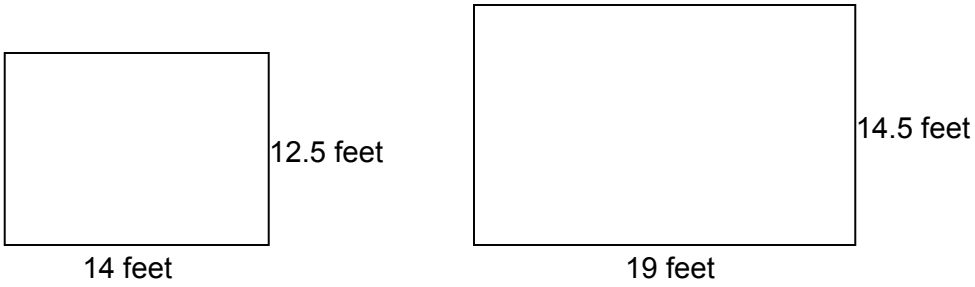
**A** –24 + 6

**B** –24 + 30

**C** 6 – (–24)

**D** 6 – (6 + 24)

**16** Kara plans to carpet the entire floor in each of the two rooms shown below.




What is the **best** estimate of the total amount of carpet, in square feet, needed to completely cover both floors?

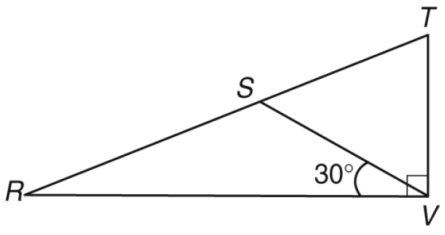
**A** between 120 and 150

**B** between 420 and 450

**C** between 460 and 490

**D** between 520 and 550

**17** What is the measure, in degrees, of the angle that is complementary to ∠ *RVS*?




**A** 30°

**B** 60°

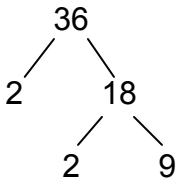
**C** 90°

**D** 110°

**Go On▶**

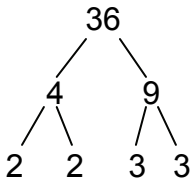
**18** Which diagram represents the prime factorization of 36?

**A**



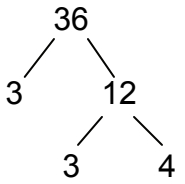

$2^2 \cdot 9$

**C**



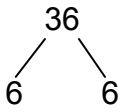

$2^2 \cdot 3^2$

**B**



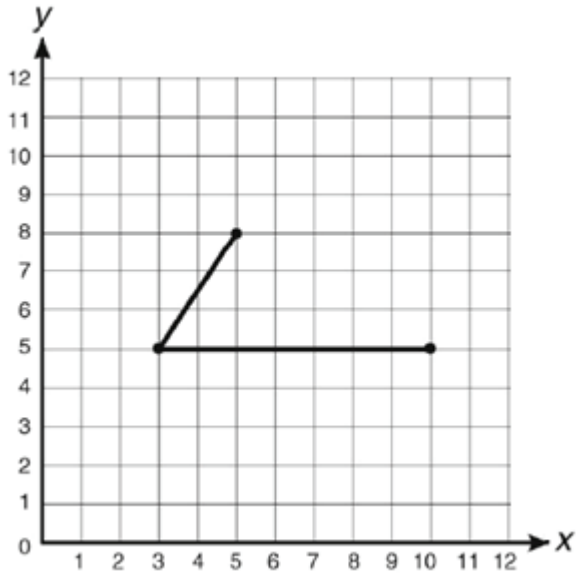

$3^2 \cdot 4$

**D**




$6 \cdot 6$

**19** What are the coordinates of the missing vertex of the parallelogram below?




**A** (8, 8)

**B** (10, 8)

**C** (11, 8)

**D** (12, 8)

***Go On***▶

**20** Vincent's baseball coach suggested that he drink one-half gallon of water daily. If Vincent drinks one-half gallon of water, how many 8-ounce glasses will he drink?

| 1 gallon = 128 fluid ounces |
|---|

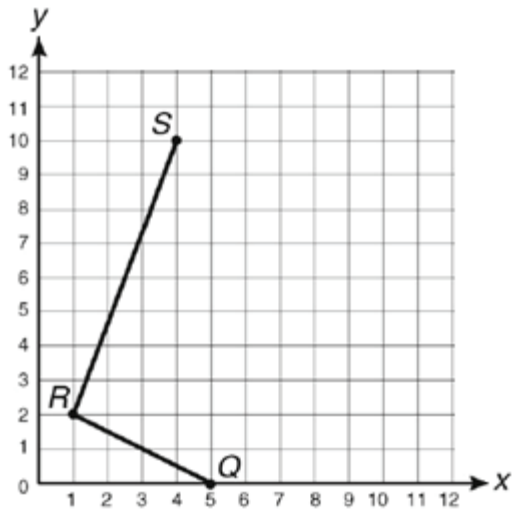
**A** 6

**B** 8

**C** 10

**D** 12

**21** On the grid below, points Q, R, and S represent three vertices of a rectangle.




What are the coordinates of point *T*, the vertex that will complete rectangle *QRST*?

**A** (7, 8)

**B** (8, 7)

**C** (8, 8)

**D** (8, 9)

**22** Which expression is the same as 11%?

**A** $\frac{1}{11}$

**B** 0.11

**C** 1.11

**D** 1 : 11

**23** Rafael performed an experiment by spinning the arrow on a spinner 200 times. His results are recorded in the table below.

**Rafael's Spinner Results**

| Color | Frequency |
|---|---|
| Blue | 46 |
| Red | 105 |
| Green | 49 |

Rafael will spin the arrow 20 more times. Based on the results in the table, which is closest to the number of times he should expect the arrow to land on a red section?

**A** 5

**B** 10

**C** 15

**D** 20

**24** Randy has $7.50 to use on buying notebooks for school. If each notebook costs $1.09 including tax, how many can Randy buy?

**A** 5

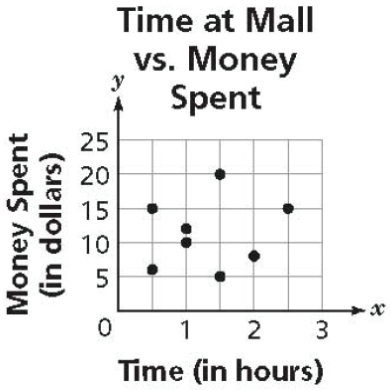
**B** 6

**C** 7

**D** 8

***Go On▶***

**25** The scatter plot shows the relationship between the amount of time Casey was at the mall and the amount of money she spent there.




Which statement best describes the relationship between the amount of money Casey spent and the amount of time she was at the mall?

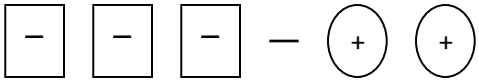
**A** The amount of money spent was not affected by the amount of time at the mall.

**B** The amount of money spent decreased as the amount of time at the mall increased.

**C** The amount of money spent increased as the amount of time at the mall increased.

**D** The amount of money spent remained the same without regard to the amount of time at the mall.

**26** Which expression matches the model shown?



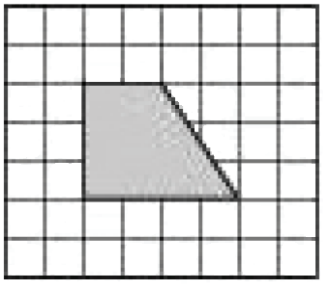

**A** –2 + 3

**B** 3 + 2

**C** –3 – 2

**D** 2 – 3

**27** Lauren wants to put a brick border around her garden. A drawing of her garden is represented by the shaded section on the grid below.



Key= 1 unit is approximately 2 meters

What is closest to the number of meters of brick border Lauren will need to put around her garden?

**A** 12 meters

**B** 16 meters

**C** 20 meters

**D** 26 meters

**28** Look at the table of values.

| *x* | *y* |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

Which equation represents the relationship between *x* and *y*?

**A** $y = x - 3$

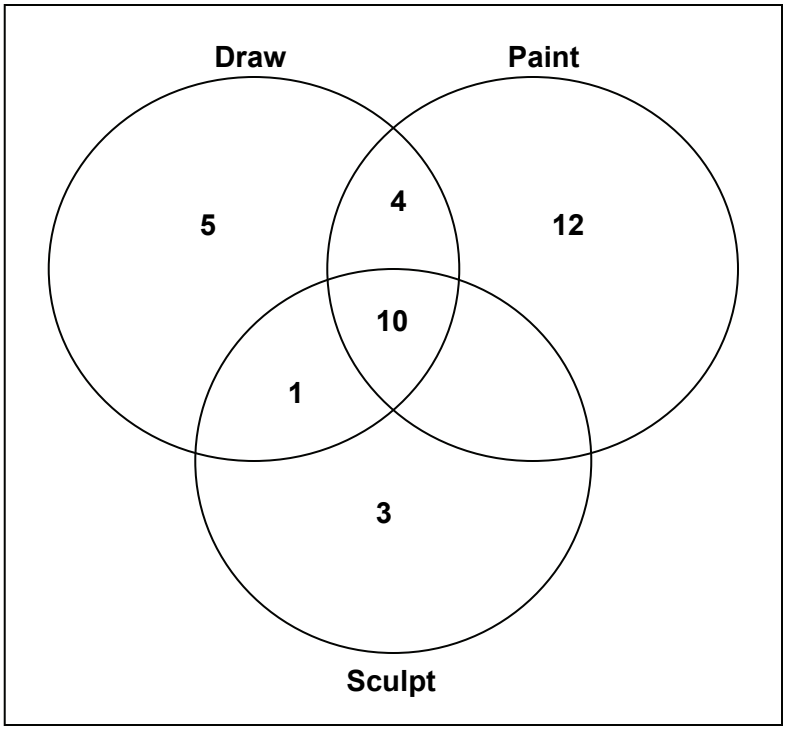
**B** $y = 3x + 1$

**C** $y = -x - 3$

**D** $y = 3x - 1$

***Go On*▶**

**29** Valerie has 35 students in her art class. She asked each student what types of activities they like to do and made a Venn diagram of the results.




How many students in Valerie's class told her that they only like to draw and sculpt?

**A** 1

**B** 8

**C** 10

**D** 11

**30** Kelly's math teacher asked her to solve the problem below.

> Jim and Don are playing darts. Jim has scored 16, 12, and 2 points. Don's turn is after Jim's. Don has scored 12, 10, and 2 points. They have taken the same number of turns. Who is ahead at this time?

Which statement does Kelly need for solving the problem?

**A** Jim and Don are playing darts.

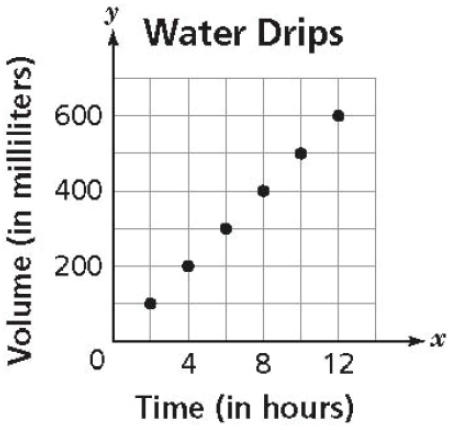
**B** Don's turn is after Jim's.

**C** Don has scored 12, 10, and 2 points.

**D** They have taken the same number of turns.

***Go On***▶

**31** Look at the graph.




If the water continues to drip at the same rate, how many milliliters of water will have dripped at 14 hours?

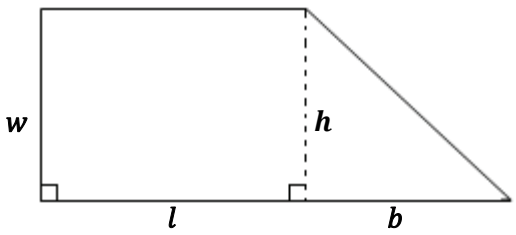
**A** 600

**B** 700

**C** 800

**D** 900

**32** Which statement explains how to find the area of the figure below?




**A** Find the length times the width of the rectangle, then add that to the base times the height of the triangle.

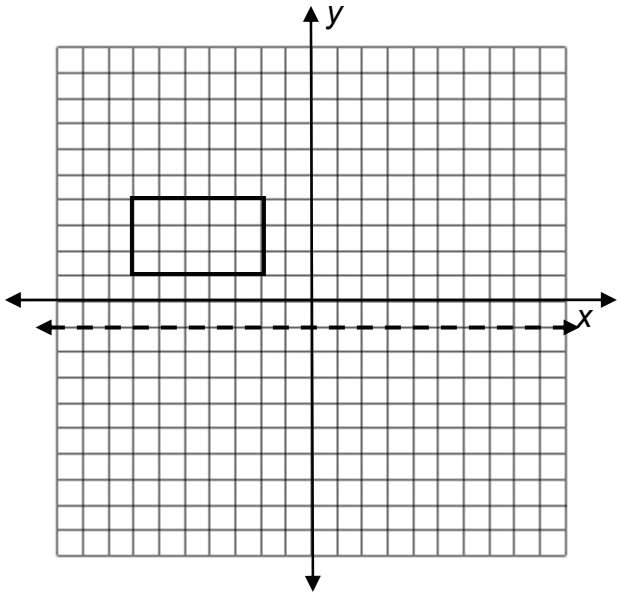
**B** Find the length times the width of the rectangle, then add that to one half of the base times the height of the triangle.

**C** Find two times the length of the rectangle plus two times the width of the rectangle, then add that to the base times the height of the triangle.

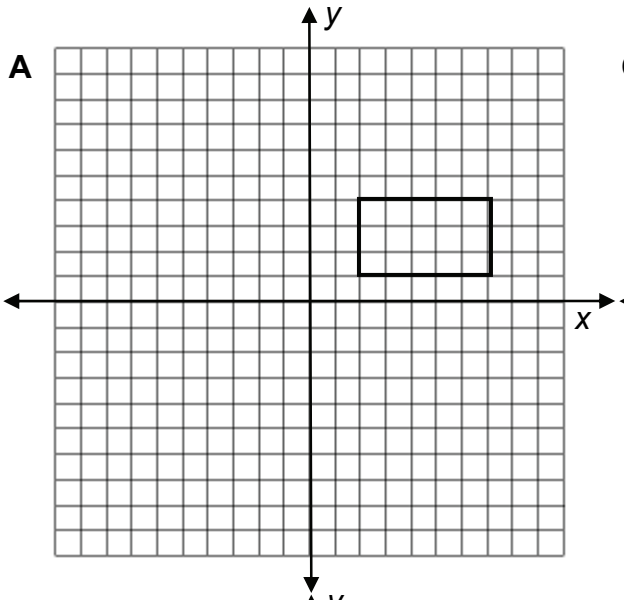
**D** Find two times the length of the rectangle plus two times the width of the rectangle, then add that to one half of the base times the height of the triangle.

***Go On*▶**

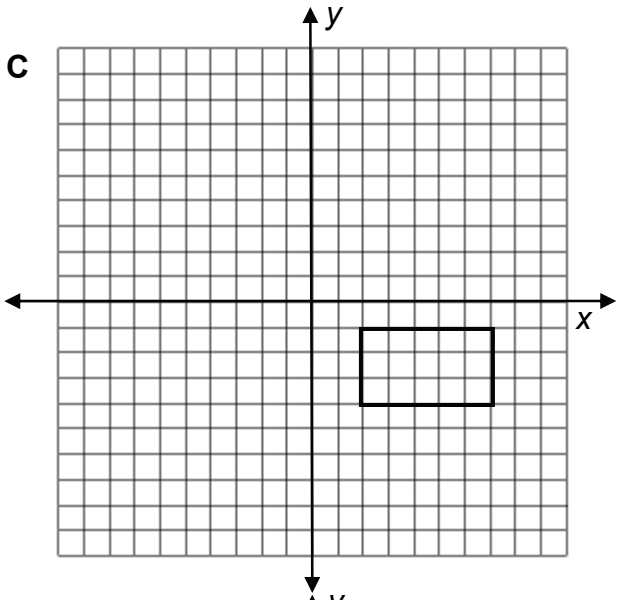
**33** Which graph shows a reflection of the rectangle across the horizontal dotted line?



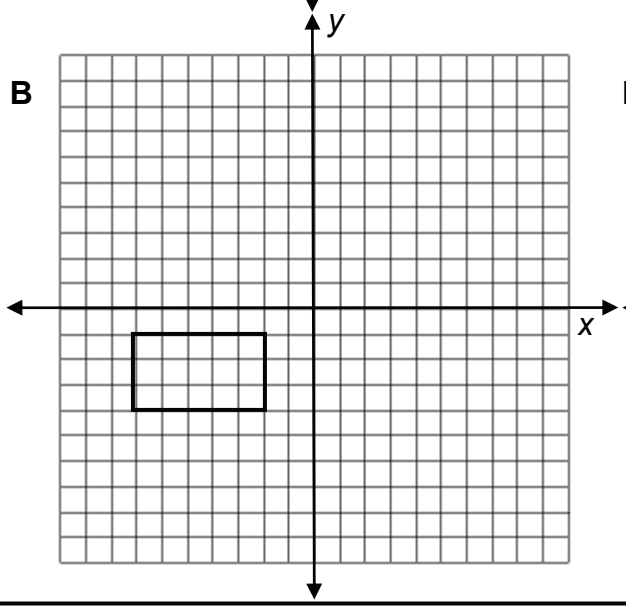

**A**



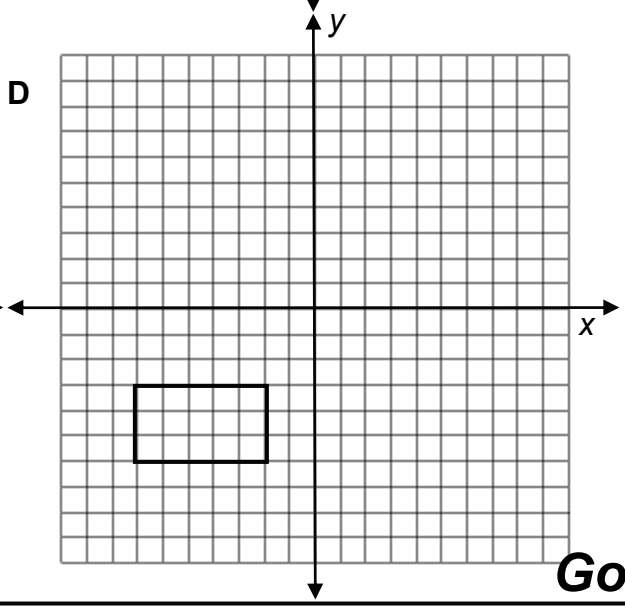

**C**




**B**

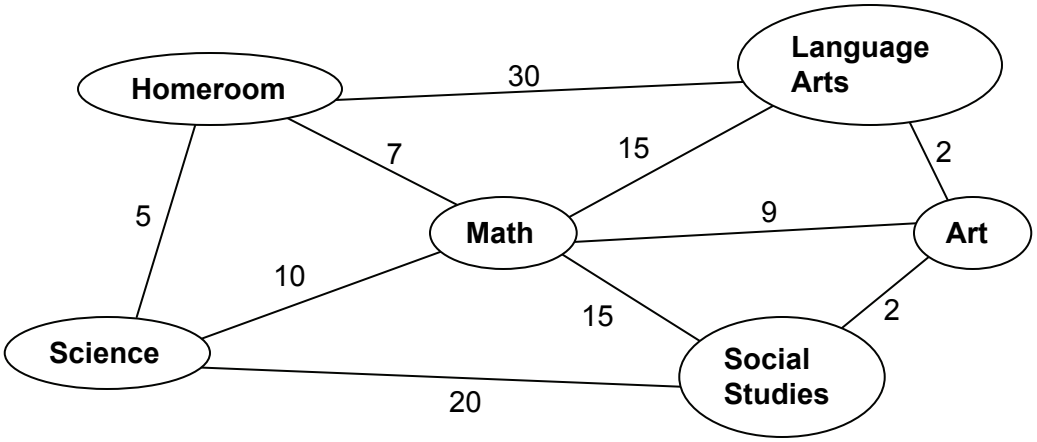



**D**




***Go On*▶**

**34** Scott delivers the 6th grade newsletter to five rooms at his school. He must find the quickest route. The vertex-edge graph shows the rooms that Scott must deliver to and the time, in seconds, it takes him to get from room to room.




If Scott begins and ends at his Homeroom, what is the quickest route for him to take and to make sure he visits each room only once?

**A** Homeroom→Science→Math→Social Studies→Art→Language Arts→Homeroom

**B** Homeroom→Science→Social Studies→Art→Language Arts→Math→Homeroom

**C** Homeroom→Language Arts→Math→Art→Social Studies→Science→Homeroom

**D** Homeroom→Language Arts→Art→Math→Social Studies→Science→Homeroom

## *AIMS Grade 6 Mathematics Think-Throughs & Practice Applications*

The problems on the following pages are from the sample test you just finished. They have been worked out for you to show the thought process behind finding the answers.

As you go through them, see how your thoughts compare to the ones given. Not every problem from the sample test will be shown in this same manner.

The number for each problem matches the same number that it is in the sample test. This way, if you got the problem incorrect you can compare your answers and go back to see what you may have done differently.

Then, after each Think-Through problem, you will find two more problems to apply what you just learned from the Think-Through problems. These will be very similar to the Think-Through problem. They are also testing the same academic performance objective. This will give you even more practice to think through your own problem solving process.

As you read through the solution process of the problems, you may notice that some of the words are *italicized*. This indicates some mathematics terms that would be helpful to know.

After the two application problems, there will be a Summary Statement which explains the basic concept that the problems are testing. This will help you to understand which concepts you may need more work on or which concepts you may have mastered.

**3** There are 3 classes of 22 students making ice cream sundaes. A sundae can be made using one of 3 syrups and one of 3 candy toppings. Each student makes one sundae. Which expression can be used to find the total number of sundaes made by the students?

**A** 3 x 22

**B** $3^2$ x 22

**C** 3 x 3 x 22

**D** $3^2$ x 9 x 22

What is this question asking of me? It wants me to find which expression can be used to find the total number of sundaes that will be made by all students.

I need to break down my information.

I know that ….

- **there are 3 classes of 22 students**
- **a sundae has 1 syrup and 1 candy topping on it**
- **there are 3 syrups and 3 candy toppings to choose from**
- **each student makes 1 sundae**

But, the question only asks me to find an expression for the total number of sundaes made.
In this case, all I need to know is that there are 3 classes of 22 students in each class.

If each student only makes 1 sundae, that is translated to 3 classes x 22 students. This is answer choice ***A***.

**3a** Sam raked 12 bags of leaves on Monday, 3 bags of leaves on Tuesday, no bags of leaves on Wednesday, 5 bags of leaves on Thursday, and 2 bags of leaves on Friday. Sam earns $2.50 for each bag of leaves he rakes. Which expression can be used to find the total amount of money Sam earned from Monday through Wednesday?

**A** 2.50 (0)

**B** 2.50 (12 + 3)

**C** 2.50 (12 + 3 + 5)

**D** 2.50 (12 + 3 + 5 + 2)

**3b** The temperature in Glendale was 72°F at 7:00 a.m. By noon, the temperature rose to 86°F. Three hours later, the temperature rose another 13°F. At 7:00 p.m. the temperature was 6°F more than it was at 7:00 a.m. Which expression can be used to find the temperature at 7:00 p.m.?

**A** 72 – 6

**B** 72 + 6

**C** 86 – 13 + 6

**D** 86 + 13 – 6

**Summary Statement:**
These problems involve analyzing and comparing mathematical strategies for efficient problem solving, and selecting and using one or more strategies to solve a problem.

**11** Look at the equation.

$$2n + 1.4 = 8.6$$

Which inverse operations will solve the equation?

**A** add, then divide

**B** add, then multiply

**C** subtract, then divide

**D** subtract, then multiply

The question asks me which inverse operations will solve the equation. First, what is *inverse*? *Inverse* means opposite. So, it seems that the words *inverse operations* tell me that I need to find what operations are the opposite of the ones in the equation. I am not asked to solve the equation. I only need to determine the opposite operations of the ones given.

So, first I will look at the equation again and determine what operations are used.

$$\mathbf{2n + 1.4 = 8.6}$$

**This operation is multiply.** **This operation is to add.**

The main point of this equation is to solve for *n*. Even though I am not asked to do that, I think of if I had to solve for *n*, what would I do first?

First, I would combine like terms. And to do that, I would subtract 1.4 from both sides of the equals sign. Subtracting is the *inverse* of adding.

$$\mathbf{2n + 1.4 = 8.6}$$
$$-1.4 \quad -1.4$$

Then, after I did that, I would have left **2*n* = 7.2**. What is the next *inverse* operation I would use? Since I still have 2 times *n*, it looks like I would be dividing each side by 2. Dividing is the *inverse* of multiplying.

$$\frac{\mathbf{2n}}{2} = \frac{\mathbf{7.2}}{2}$$

The *inverse*, or opposite, operations that I performed to solve the equation were subtraction, then division. I see that this is answer choice ***C***.

**11a** Look at the equation.

$$\frac{n}{5} + 24.5 = 100$$

Which inverse operations will solve the equation?

**A** add, then divide

**B** add, then multiply

**C** subtract, then divide

**D** subtract, then multiply

**11b** Look at the equation.

$$\frac{n}{9} + 10.36 = 25.36$$

What is the value of *n*?

**A** 15

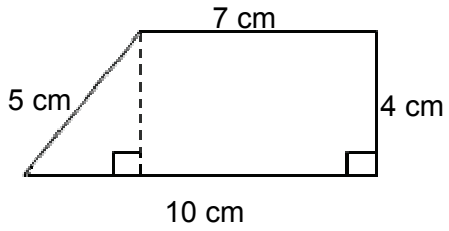
**B** 135

**C** 218.88

**D** 321.48

**Summary Statement:**
These problems involve creating and solving two-step equations that can be solved using inverse properties with fractions and decimals.

**13** Look at the figure below.




What is the total area of the figure?

**A** 26 $cm^2$

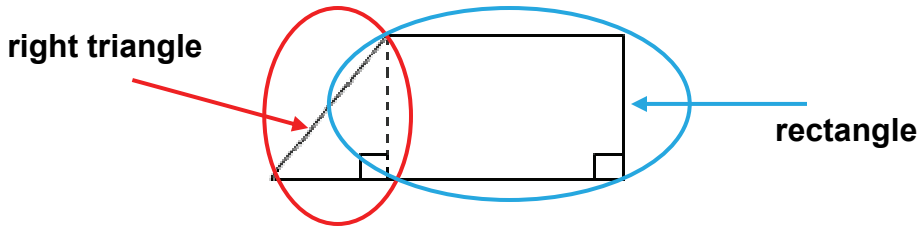
**B** 34 $cm^2$

**C** 40 $cm^2$

**D** 68 $cm^2$

What am I being asked to do? I need to find the *total area* of the figure. When I see the word *area*, this tells me that I will have to apply geometry strategies to find the measure of the area, or the inside of the figure.

Looking at the figure, I see that it is kind of a strange shape, but it looks like a right triangle and a rectangle put together.




This means that if I find the *area* of the right triangle and the *area* of the rectangle and add them together, I will have the *total area* of the figure.

I can find the formula for the area of right triangles and for rectangles on the Grade 6 AIMS Reference Sheet.

**Plane Figures: Perimeters and Areas**

| Name | Notation | Circumference ($C$) Perimeter ($P$) | Area ($A$) |
|---|---|---|---|
| Circle | $r$ = radius<br>$d$ = diameter | $C = \pi d$ or $C = 2\pi r$ | $A = \pi r^2$ |
| Parallelogram | $a, b$ = sides<br>$h$ = height | $P = 2(a + b)$ | $A = bh$ |
| Rectangle | $l$ = length<br>$w$ = width | $P = 2(l + w)$ | $A = lw$ |
| Trapezoid | $a, b, c, d$ = sides<br>$b_1$ = long base<br>$b_2$ = short base<br>$h$ = height | $P = a + b + c + d$ | $A = \frac{1}{2}h(b_1 + b_2)$ |
| Triangle | $a, b, c$ = sides<br>$h$ = height | $P = a + b + c$ | $A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$ |

(continued on page 22)

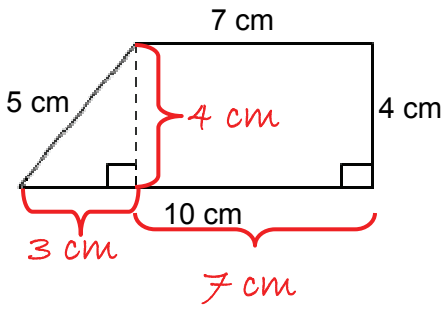
So, the formulas I will use are **Area of a right triangle:** $A = \frac{1}{2}bh$

**Area of a rectangle:** $A = l\,w$

Now I will substitute the values into the formulas.

**Triangle:** The height, or *h*, is 4 cm. I know this because it is the same height as the given height of the rectangle.

The base, or b, is 3 cm. I figured this out because the length of the entire base is 10 cm. I subtracted 7 cm, the length of rectangle.



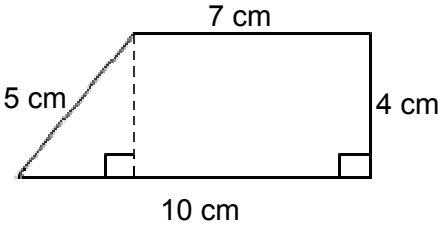

$A = \frac{1bh}{2}$

$A = \frac{1(3)(4)}{2}$

$A = \frac{12}{2}$

$A = 6\ cm^2$

**Rectangle:** The length, or *l*, is 7 cm. I know this because it is marked.
The width, or *w*, is 4 cm. That too is given.




$A = lw$

$A = 7(4)$

$A = 28\ cm^2$

Now I that I have the area for each figure, I can add them together to get the *total area* of the figure.

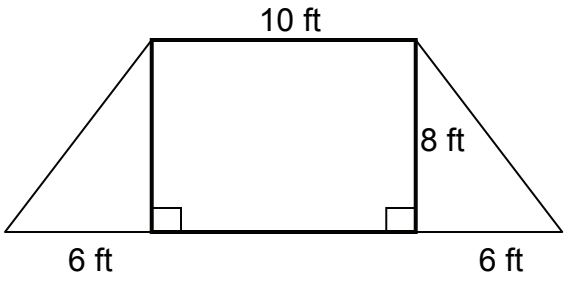
**Area of triangle + Area of rectangle = Total area**

$6\ cm^2 + 28\ cm^2 = 34\ cm^2$

My answer is 34 $cm^2$, which is answer choice ***B***.

Because the question says *total area*, the first thing that came to mind was adding the area of the two shapes within the image. But, there is another way that I could have figured out the answer to this problem. This shape is a *trapezoid*. Because I know that, I could have also substituted the values into the formula for the area of a *trapezoid* and gotten the same answer.

**13a** Look at the figure below.




What is the total area of the figure?

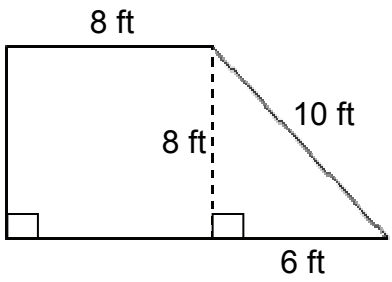
**A** 64 $cm^2$

**B** 88 $cm^2$

**C** 120 $cm^2$

**D** 128 $cm^2$

**13b** Look at the figure below.




What is the perimeter of the figure?

**A** 32 ft

**B** 40 ft

**C** 48 ft

**D** 94 ft

**Summary Statement:**
These problems involve solving for the area and perimeter of regular and irregular polygons. Students should be able to use formulas for shapes within the polygons for total area, as well as use the formula for trapezoid.

**23** Rafael performed an experiment by spinning the arrow on a spinner 200 times. His results are recorded in the table below.

**Rafael's Spinner Results**

| Color | Frequency |
|---|---|
| Blue | 46 |
| Red | 105 |
| Green | 49 |

Rafael will spin the arrow 20 more times. Based on the results in the table, which is closest to the number of times he should expect the arrow to land on a red section?

**A** 5

**B** 10

**C** 15

**D** 20

What do I need to figure out? This problem involves the results from an experiment. It is asking me about how many times Rafael should expect the arrow of his spinner to land on red if he spins it 20 more times. This sounds like a *probability* experiment to me.

I know that *probability* is how likely it is that something will happen, like in an experiment. I can estimate the *probability* of something based on a similar experiment. First, I will think about what I know.

Based on the information from the table, I know that in Rafael's first experiment…

- **he spun the arrow on a spinner 200 times**
- **blue, red, and green are the colors on the spinner**
- **the arrow landed on blue 46 times out of 200 spins**
- **the arrow landed on red 105 out of 200 spins**
- **the arrow landed on green 49 out of 200 spins**

**Rafael's Spinner Results**

| Color | Frequency |
|---|---|
| Blue | 46 |
| Red | 105 |
| Green | 49 |

Then, it says if he spins the arrow 20 more times, about how many times will it land on red? I know that *probability* of something happening, like the arrow landing on red, can be predicted from how many times it has already landed on red from the first experiment.

I see that it landed on red 105 out of 200 spins. So, about half of the time, the arrow landed on red: 105 is about one-half of 200. That means that if this experiment is repeated, the arrow should land on red about half of the spins.

So, if Rafael spins the arrow 20 more times, it should land on red about half of those spins, which is 10. This is answer choice ***B***.

**23a** Harry used a number cube with the numbers 1 – 6 on each side. He rolled the number cube 100 times. The results are shown in the chart below.

| Number Rolled | Frequency |
|---|---|
| 1 | 7 |
| 2 | 18 |
| 3 | 12 |
| 4 | 28 |
| 5 | 19 |
| 6 | 16 |

Harry will roll the number cube 10 more times. Based on the results in the table, which number is **closest** to the number of times that Harry will roll an even number?

**A** 3

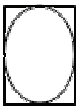
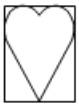
**B** 6

**C** 10

**D** 60

**23b** Katie experimented by selecting a card from a set of cards that was face down on a table. She put it back and shuffled the cards each time before selecting a new card. Each card has a different shape on it. She performed the experiment 60 times and recorded her results.

**Katie's Card Experiment**

| Shape | Frequency |
|---|---|
| star  | 12 |
| oval  | 9 |
| heart  | 16 |
| triangle  | 23 |

Based on the table, if Katie performs the experiment 10 more times, about how many times will she probably select a star?

**A** 2

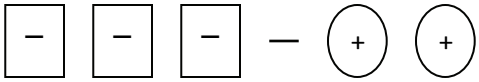
**B** 5

**C** 10

**D** 12

**Summary Statement:**
These problems use data collected from multiple trials of a single event to form a conjecture about the theoretical probability.

**26** Which expression matches the model shown?



**A** –2 + 3

**B** 3 + 2

**C** –3 – 2

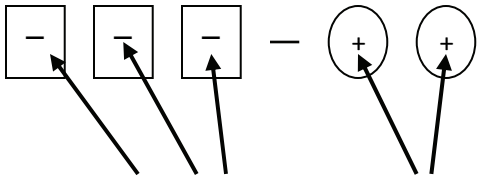
**D** 2 – 3

After I read the problem, I see that it is asking me to find which *expression* matches the model. This means that I am finding the numbers and operations that I could use to solve the problem, but I do not have to actually find the solution.

I will look again at the model and try to make up my own *expression*, or mathematical phrase, that describes it.

It looks like 3 squares minus 2 ovals.

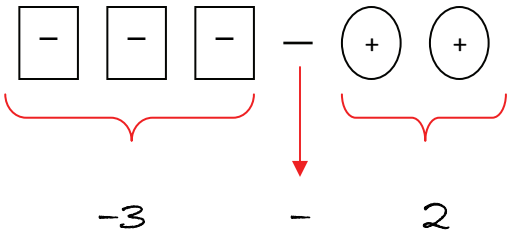
And, since the models are different shapes, they actually represent something else.



Looking closely, I see that inside of the shapes are signs for negative (–) and for positive (+).

This means that in this problem, a square represents a negative number and an oval represents a positive number.

There are 3 squares, which represents –3.




There are 2 ovals, which represents +2.

I will change my answer to – 3 – 2. That is answer choice ***C***.

**26a** Which expression matches the model shown?

**A** 4 + (–3)

**B** –4 + (–3

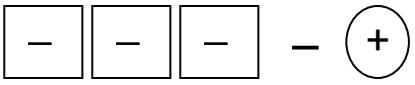
**C** –3 – 4

**D** 3 – (–4)

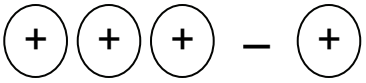
**26b** Which model matches the expression shown?

**3 – (–1)**

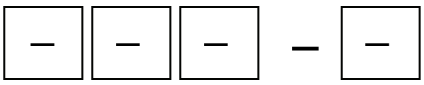
**A**



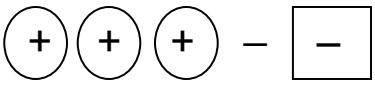
**B**



**C**



**D**



**Summary Statement:**
These problems require applying and interpreting the concepts of addition and subtraction with integers using models.

**28** Look at the table of values.

| *x* | *y* |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

Which equation represents the relationship between *x* and *y*?

**A** $y = x - 3$

**B** $y = 3x + 1$

**C** $y = -x - 3$

**D** $y = 3x - 1$

The question is asking me to decide which equation will represent the relationship between the *x* values and the *y* values in the table. I know I can do this by working the problem backward. I will use each answer given, and substitute the values for *x* and for *y* from what is in the table.

So, everywhere in the equation that I see a *y*, I will substitute the value given for *y*. And, when I see *x* in the same equation, I will substitute the *x* value that is paired with that *y* value from the table. I will know which equation is correct when **all values in the table for both *x* and *y*** make each side of the equation equal.

**Answer choice A says $y = x - 3$.**

| *x* | *y* |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

x is –1, y is –4

$y = x - 3$

$-4 = -1 - 3$

$-4 = -4$

x is 0, y is –1

$y = x - 3$

$-1 = 0 - 3$

$-1 = -3$

So for answer choice A, the first values in the table worked, but the **second set did not**. I do not even need to try the other values since the second set I tried did not work. This means the answer is not choice A. **All** sets of values for *x* and *y* must work when substituted into the equation.

I will continue this same process for the other answer choices until I have an equation that works for all sets of values.

(continued on page 29)

**Answer choice B**
**says $y = 3x + 1$.**

| x | y |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

x is –1, y is –4

$y = 3x + 1$
$-4 = 3(-1) + 1$
$-4 = -3 + 1$
~~$-4 = -2$~~

For answer choice B, the **first set of values in the table did not work**. This means the answer is not choice B.

**Answer choice C**
**says $y = -x - 3$.**

| x | y |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

x is –1, y is –4

$y = -x - 3$
$-4 = -(-1) - 3$
$-4 = 1 - 3$
~~$-4 = -2$~~

For answer choice C, the **first set of values in the table did not work**. This means the answer is not choice C.

**Answer choice D**
**says $y = 3x - 1$.**

| x | y |
|---|---|
| –1 | –4 |
| 0 | –1 |
| 1 | 2 |
| 2 | 5 |
| 3 | 8 |

x is –1, y is –4

$y = 3x - 1$
$-4 = 3(-1) - 1$
$-4 = -3 - 1$
$-4 = -4$

x is 0, y is –1

$y = 3x - 1$
$-1 = 3(0) - 1$
$-1 = 0 - 1$
$-1 = -1$

x is 1, y is 2

$y = 3x - 1$
$2 = 3(1) - 1$
$2 = 3 - 1$
$2 = 2$

x is 2, y is 5

$y = 3x - 1$
$5 = 3(2) - 1$
$5 = 6 - 1$
$5 = 5$

x is 3, y is 8

$y = 3x - 1$
$8 = 3(3) - 1$
$8 = 9 - 1$
$8 = 8$

For answer choice D, **all** sets of values in the table work for this equation. This means ***D*** is the correct answer.

**28a** Look at the table of values.

| *x* | *y* |
|---|---|
| –6 | 11 |
| –2 | 7 |
| 0 | 5 |
| 4 | 1 |
| 8 | –3 |

Which equation represents the relationship between *x* and *y*?

**A** $y = x - 1$

**B** $y = x - 4$

**C** $y = 5 - x$

**D** $y = 2x + 3$

**28b** Look at the table of values.

| *a* | *b* |
|---|---|
| –6 | 19 |
| –3 | 13 |
| 1 | 5 |
| 3 | 1 |
| 12 | –17 |

Which equation represents the relationship between *a* and *b*?

**A** $a = 5b - 2$

**B** $a = b - 4$

**C** $b = 3a + 4$

**D** $b = 7 - 2a$

**Summary Statement:**
These problems require students to be able to recognize and describe a relationship between two quantities, given by a chart, table, or graph, using words and expressions.

**30** Kelly's math teacher asked her to solve the problem below.

> Jim and Don are playing darts. Jim has scored 16, 12, and 2 points. Don's turn is after Jim's. Don has scored 12, 10, and 2 points. They have taken the same number of turns. Who is ahead at this time?

Which statement does Kelly need for solving the problem?

**A** Jim and Don are playing darts.

**B** Don's turn is after Jim's.

**C** Don has scored 12, 10, and 2 points.

**D** They have taken the same number of turns.

I need to figure out what I am supposed to do. The question wants me to decide which of the statements is needed for Kelly to solve her problem. I will read the problem again to see what Kelly is supposed to find.

> **Jim and Don are playing darts. Jim has scored 16, 12, and 2 points. Don's turn is after Jim's. Don has scored 12, 10, and 2 points. They have taken the same number of turns. Who is ahead at this time?**

Okay. I see that Kelly is supposed to find out who is winning the dart game **at this time**.

Now I will go through each answer choice and decide if they are needed to solve the problem.

| | | |
|---|---|---|
| **A** | **Jim and Don are playing darts.** | This is not needed to see who is winning. It doesn't matter what game is played. |
| **B** | **Don's turn is after Jim's.** | The order that they take turns is not needed because the question that Kelly is figuring out is "Who is ahead **at this time**?". |
| **C** | **Don has scored 12, 10, and 2 points.** | Scores are important to know who is ahead. They need to be added and then compared to each other. |
| **D** | **They have taken the same number of turns.** | This is like answer B. It does not matter because the question is "Who is ahead **at this time**?". |

Answer choice ***C*** is the only statement that is necessary to figure out who is ahead. The other statements are not needed.

**30a** Jenny is helping her friend Brian to build a dog house for his puppy. He told her he needs 9 square feet of wood for each of the 3 sides of the dog house, 9 square feet of wood for the floor, and two panels of 3 square feet each for the roof. What information does Jenny still need in order to build the dog house?

**A** the name of Brian's puppy

**B** the dimensions of the dog house

**C** how much money Brian can spend

**D** how soon Brian needs the dog house made

**30b** David runs every day after school. He runs two miles every day. David can run one mile in 8 minutes. He lives 3 miles away from school. David wants to know how many minutes he spends running each week. Which statement is **not** necessary for him to calculate the total number of minutes he runs in one week?

**A** David runs every day after school.

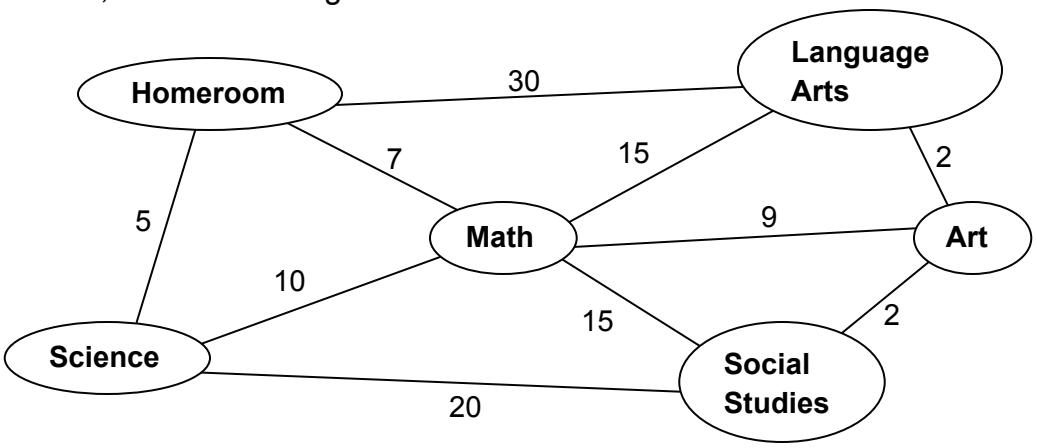
**B** He runs two miles every day.

**C** David can run one mile in 8 minutes.

**D** He lives 3 miles away from school.

**Summary Statement:**
These problems involve identifying relevant, missing, and extraneous information related to the solution of a problem.

**34** Scott delivers the 6th grade newsletter to five rooms at his school. He must find the quickest route. The vertex-edge graph shows the rooms that Scott must deliver to and the time, in seconds, it takes him to get from room to room.




If Scott begins and ends at his Homeroom, what is the quickest route for him to take and to make sure he visits each room only once?

**A** Homeroom→Science→Math→Social Studies→Art→Language Arts→Homeroom

**B** Homeroom→Science→Social Studies→Art→Language Arts→Math→Homeroom

**C** Homeroom→Language Arts→Math→Art→Social Studies→Science→Homeroom

**D** Homeroom→Language Arts→Art→Math→Social Studies→Science→Homeroom

The problem is saying that Scott will start at Homeroom and visit each room only once, and that he also needs to find the quickest route. I will follow the vertex edge graph for each answer choice and add the seconds that it takes to get from room to room. I also need to make sure that the correct answer choice starts and ends at Homeroom and visits each room **only** once.

**A** **Homeroom**$\overset{5}{\rightarrow}$**Science**$\overset{10}{\rightarrow}$**Math**$\overset{15}{\rightarrow}$**Social Studies**$\overset{2}{\rightarrow}$**Art**$\overset{2}{\rightarrow}$**Language Arts**$\overset{30}{\rightarrow}$**Homeroom**
Total seconds is 64 for choice A.

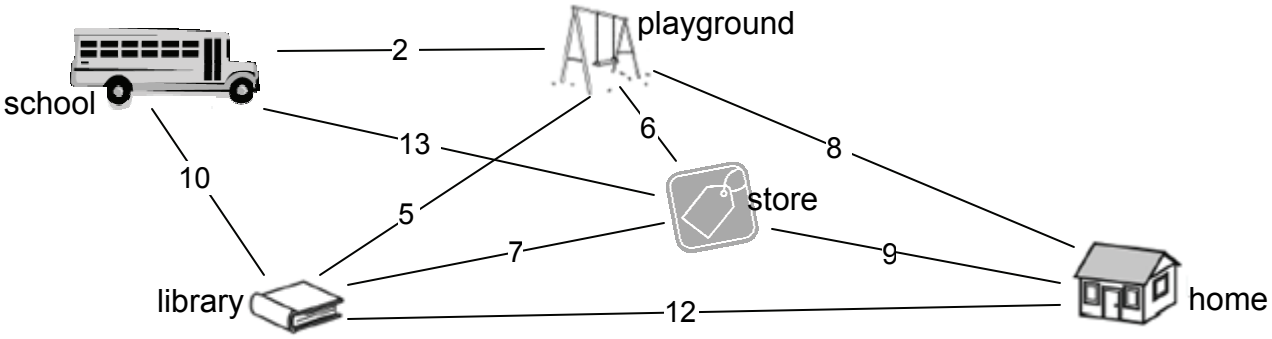
**B** **Homeroom**$\overset{5}{\rightarrow}$**Science**$\overset{20}{\rightarrow}$**Social Studies**$\overset{2}{\rightarrow}$**Art**$\overset{2}{\rightarrow}$**Language Arts**$\overset{15}{\rightarrow}$**Math**$\overset{7}{\rightarrow}$**Homeroom**
Total seconds is 51 for choice B.

**C** **Homeroom**$\overset{30}{\rightarrow}$**Language Arts**$\overset{15}{\rightarrow}$**Math**$\overset{9}{\rightarrow}$**Art**$\overset{2}{\rightarrow}$**Social Studies**$\overset{20}{\rightarrow}$**Science**$\overset{5}{\rightarrow}$**Homeroom**
Total seconds is 81 for choice C.

**D** **Homeroom**$\overset{30}{\rightarrow}$**Language Arts**$\overset{2}{\rightarrow}$**Art**$\overset{9}{\rightarrow}$**Math**$\overset{15}{\rightarrow}$**Social Studies**$\overset{20}{\rightarrow}$**Science**$\overset{5}{\rightarrow}$**Homeroom**
Total seconds is 81 for choice D.

The path that is the quickest is answer choice ***B***, with 51 seconds and the path starts and ends at Homeroom and visits each room only once.

**34a** Ray needs to get home. The vertex-edge graph shows all of the places that Ray's bus stops before he gets home, and how long it takes, in minutes, to get to each place.




If Ray's bus leaves school at 3:00 p.m. and stops at each place only once, which route will **not** get Ray home by 3:30 p.m.?

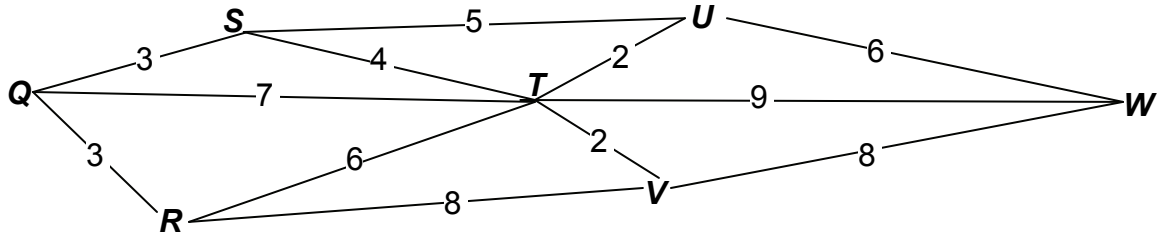
**A** school → playground → store → library → home

**B** school → store → library → playground → home

**C** school → library → playground → store → home

**D** school → playground → library → store → home

**34b** Look at the vertex-edge graph.




Which path shows the shortest distance from point *Q* to point *W*?

**A** Q → T → W

**B** Q → R → V → W

**C** Q → S → U → W

**D** Q → S → T → U → W

**Summary Statement:**
These problems involve solutions related to Hamilton paths and circuits. A Hamilton path is a vertex-edge graph that starts at some vertex in the graph and visits every other vertex of the graph exactly once. Edges may be repeated. A Hamilton circuit is a Hamilton path that ends at the starting vertex.

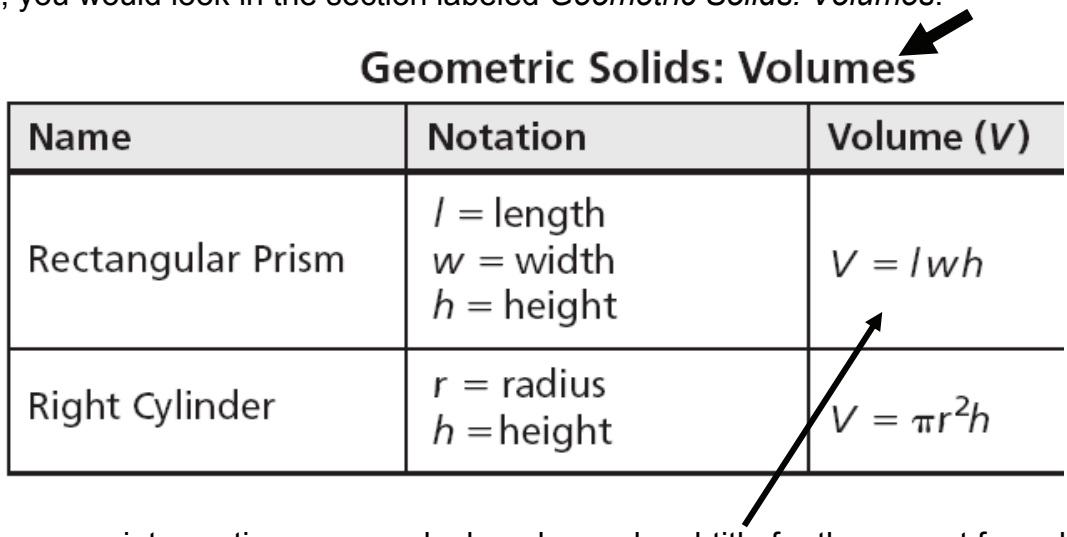
## *Grade 6 AIMS Reference Sheet*

The next page contains the reference sheet that is on the AIMS assessment. You can use it when you need formulas in order to solve equations. You can also use it to find other information that may help when problem solving.

The Arizona Department of Education recommends that you also use the Grade 6 AIMS Reference Sheet throughout the school year. This will allow you time to become familiar with its content and format before taking AIMS.

Your teachers can identify the formulas that may be written differently from those printed in your classroom resources and explain to you in more detail how they are organized on the sheet.

Each area of the Reference Sheet is labeled for the particular area of mathematics that it belongs to. For instance, if you are working on a problem that involves finding the volume of a rectangular prism, you would look in the section labeled *Geometric Solids: Volumes*.



**Geometric Solids: Volumes**

| Name | Notation | Volume ($V$) |
|---|---|---|
| Rectangular Prism | $l$ = length<br>$w$ = width<br>$h$ = height | $V = lwh$ |
| Right Cylinder | $r$ = radius<br>$h$ = height | $V = \pi r^2 h$ |

Once you find the appropriate section, you can look under each subtitle for the correct formula.

Not all problems on AIMS will require the use of formulas, but in case you do need one, these sheets are here for you to use