Released Items
Provincial Achievement Test
2010 and 2011

Knowledge and Employability
Mathematics

GRADE 9

Alberta Government

This document contains released items from the 2010 and 2011 Grade 9 Knowledge and Employability Mathematics Achievement Tests.

A test blueprint and an answer key that includes the difficulty, reporting category, curricular content area, and item description for each test item are also included. These materials, along with the program of studies and subject bulletin, provide information that can be used to inform instructional practice.

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The Alberta Education Internet address is education.alberta.ca.

2010 and 2011 Achievement Test Released Items

The items presented in this document are from the secured 2010 and 2011 Grade 9 Knowledge and Employability Mathematics Achievement Tests. These items are released by Alberta Education.

Grade 9 Knowledge and Employability Mathematics Achievement Test
Released Items 2010 and 2011

Lisa has a bowl of gumdrops that are all the same size. The bowl contains the following different colours of gumdrops.

- 6 green
- 4 orange
- 5 red
- 5 yellow

1. Which colour of gumdrop is Lisa **most likely** to randomly pick from the bowl after first picking a red gumdrop and then an orange gumdrop?

A. Red

B. Green

C. Yellow

D. Orange

David's Work Week	Hours Worked
Week 1	27 h
Week 2	32 h
Week 3	40 h
Week 4	41 h
Total hours	140 h

2. What is the average number of hours that David worked per week?

A. 28 h

B. 35 h

C. 56 h

D. 70 h

Emma's swimming schedule follows a pattern, as shown in the calendar below.

JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 SWiMMiNG	2	3 SWiMMiNG	4	5 SWiMMiNG	6
7	8	9 SWiMMiNG	10	11 SWiMMiNG	12	13
14	15 SWiMMiNG	16	17 SWiMMiNG	18	19 SWiMMiNG	20
21	22	23 SWiMMiNG	24	25 SWiMMiNG	26	27
28	29 SWiMMiNG	30	31 SWiMMiNG			

3. Which of the following statements **best** describes the pattern of Emma's swimming schedule?

A. She swims every weekday.

B. She swims every second day.

C. She swims every second day one week and every third day the next week.

D. She swims Monday, Wednesday, and Friday one week, then Tuesday and Thursday the next week.

Kris buys popcorn before he watches a movie. The price list for the popcorn is shown below.

Popcorn	
Size	**Price**
Small (200 g)	$3.50
Medium (400 g)	$4.25
Large (600 g)	$5.50
Extra butter	$0.75
All prices include GST.	

4. How many small bags of popcorn equal 1 kg?

    A. 2

    B. 3

    C. 4

    D. 5

5. The **total** cost of 2 small bags of popcorn without extra butter and 1 large bag of popcorn with extra butter is

    A. $13.25

    B. $12.00

    C. $9.25

    D. $8.50

6. If a car can travel 550 km on 55 L of gasoline, then how far can it travel on 1 L of gasoline?

    A. 5 km

    B. 10 km

    C. 50 km

    D. 55 km

A student wants to determine the mass of a bag of oranges.

7. Which of the following units would be appropriate for measuring the mass of the oranges?

   A. Feet
   B. Yards
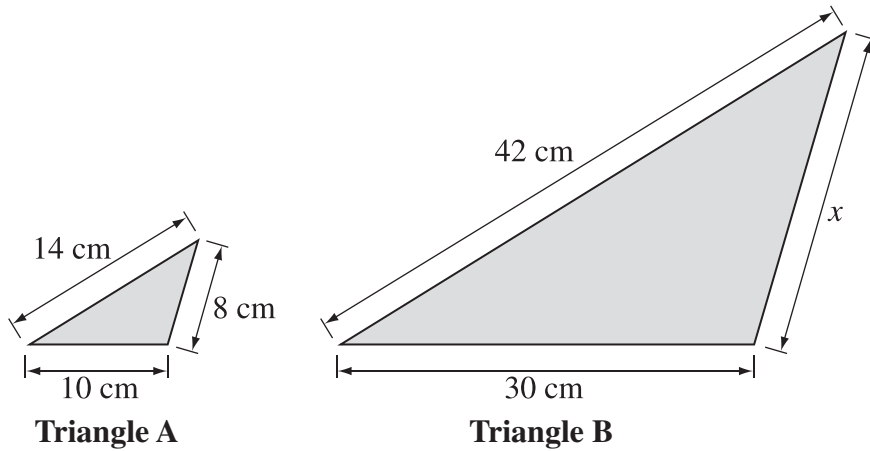   **C.** Litres
   D. Kilograms

A soccer league is raising funds for new equipment. Each team records the amount of money it earns.

8. The **most appropriate** means for displaying this information is a

   A. bar graph
   B. scatter plot
   C. Venn diagram
   D. stem-and-leaf plot

Two similar triangles are shown below.

Triangle A   **Triangle B**

9. What is the length of side *x* of triangle B?

    A.   16 cm

    B.   20 cm
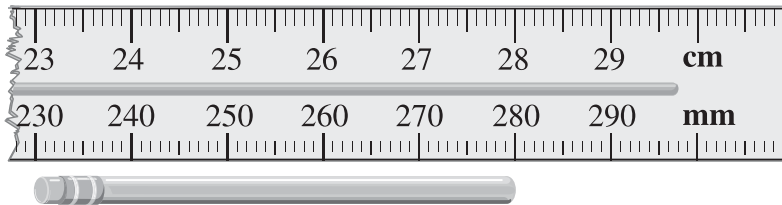
    C.   24 cm

    D.   28 cm

In one day Mandy is paid $10/hour for the first 8 hours she works and $15/hour for every hour after that.

10. How much will Mandy be paid if she works 12 hours in one day?

    A. $120

    B. $140

    C. $160

    D. $180

Samantha uses the broken ruler shown below to measure the length of her pencil.

Not drawn to scale

11. Approximately how long is Samantha's pencil?

 A. 5 mm
 B. 5 cm
 C. 28 mm
 D. 28 cm

Use the following table to answer question 12.

Name of Mountain Peak	Angles of Mountain Slopes
Jones' Peak	Less than 20 degrees
Wells' Peak	Up to 30 degrees
Gallo's Peak	Between 30 and 40 degrees

12. Based on the information in the table, which of the following statements is correct?

 A. All the mountain slopes have acute angles.
 B. All the mountain slopes have obtuse angles.
 C. Gallo's Peak has an obtuse angle for its slopes, and Jones' Peak and Wells' Peak have acute angles.
 D. Gallo's Peak has an acute angle for its slopes, and Jones' Peak and Wells' Peak have obtuse angles.

A cabinetmaker is building a new kitchen countertop that has the dimensions shown below.

Kitchen Countertop
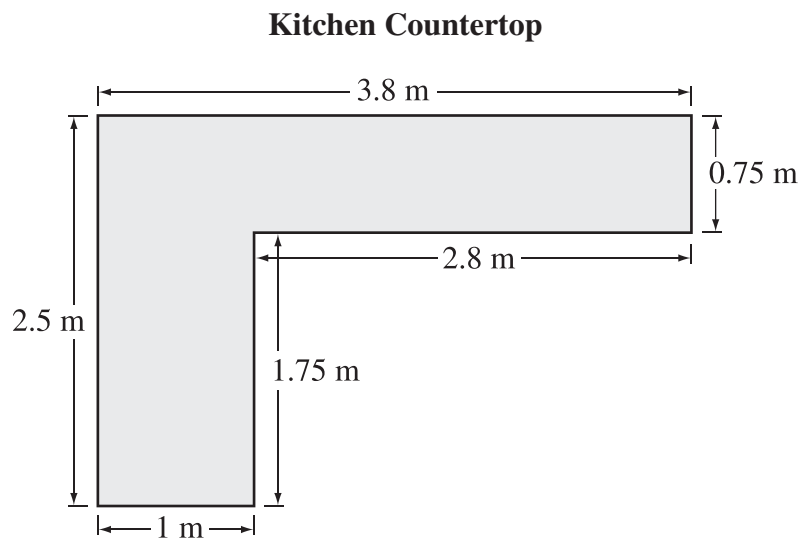
13. What is the perimeter of the new countertop?

    A.   6.3 m

    B.   9.5 m

    C.   12.6 m

    D.   34.2 m

A survey of 20 people was conducted to determine the type of vehicle that each person owns. The survey results are shown in the table below.
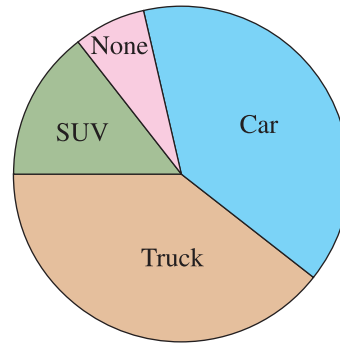
Type of Vehicle	Number Owned
Car	卌 卌
Truck	卌
SUV	|||
None	||

14. Which of the following pie charts **best** represents the data in the table?

A.
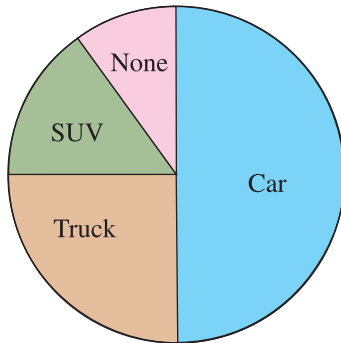
B.

C.
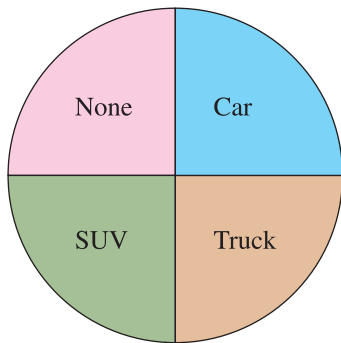
D.
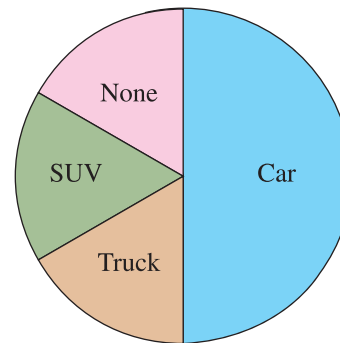
Grade 9 students want to find out the favourite television shows of students in their school. To find and report this information, they need to complete four steps.

|	
1	Make a graph of their findings
2	Survey the students
3	Complete a tally chart of responses
4	Create a survey questionnaire

Numerical Response

1. Listed in order from the first step to the last step, the steps that the students must complete are _____, _____, _____, and _____.

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

The bar graph below shows the distances that several paper airplanes flew.
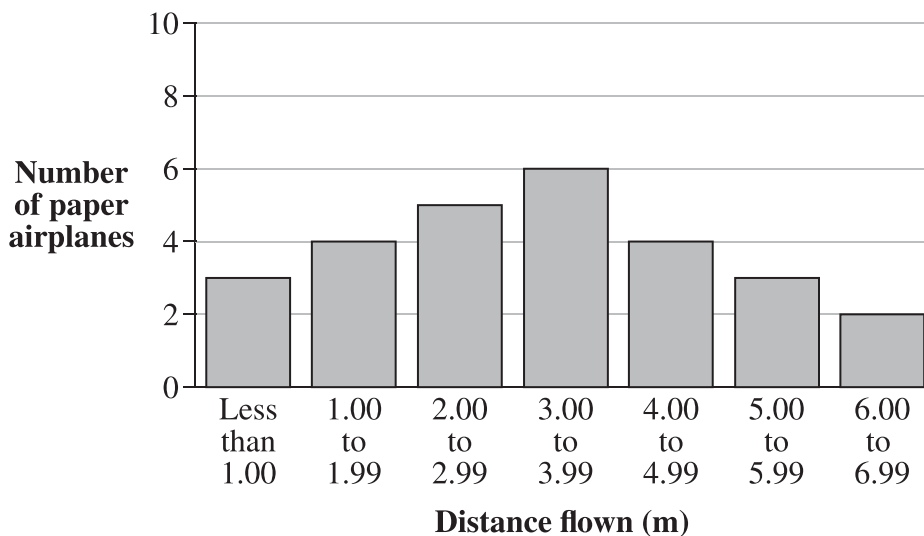
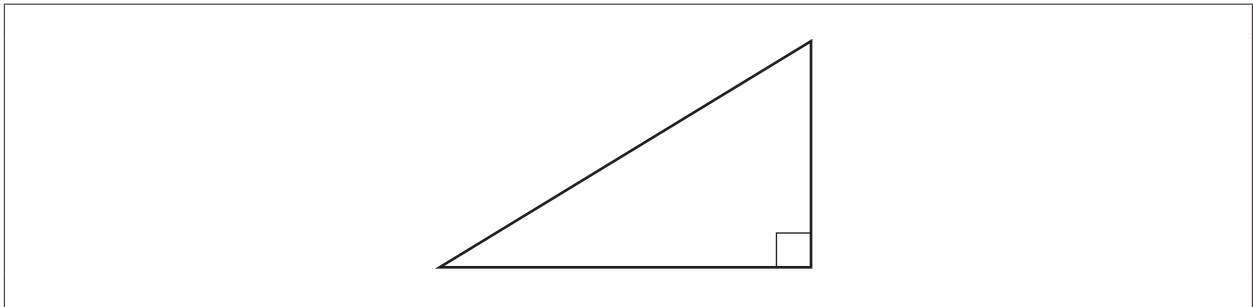**15.** How many paper airplanes flew farther than 3.99 m?

A. 7

B. 9

C. 10

D. 12

Paul cycled 593.6 kilometres in 10 days.

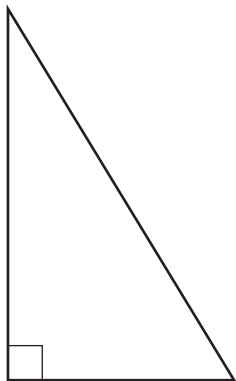**16.** If Paul cycled the same number of kilometres each day, then how many kilometres did Paul cycle each day?

    A.   5.936 km
    B.   59.36 km
    C.   5 936 km
    D.   59 360 km

17. Which of the following triangles represents a 90° rotation of the triangle shown above?

    A.

    B.

    C.

    D.
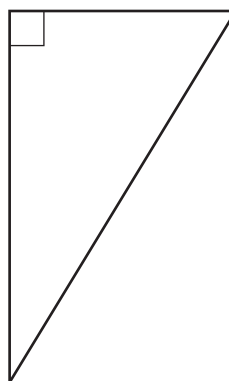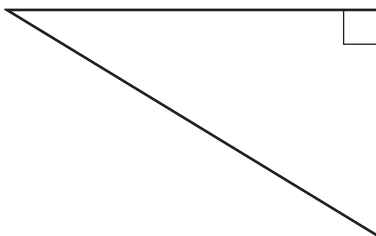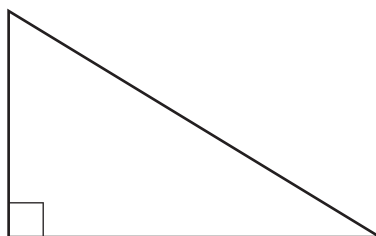
Prenna measures the following dry ingredients for her cookie recipe:

$\frac{1}{3}$ cup brown sugar $\frac{3}{4}$ cup flour $\frac{2}{3}$ cup oatmeal
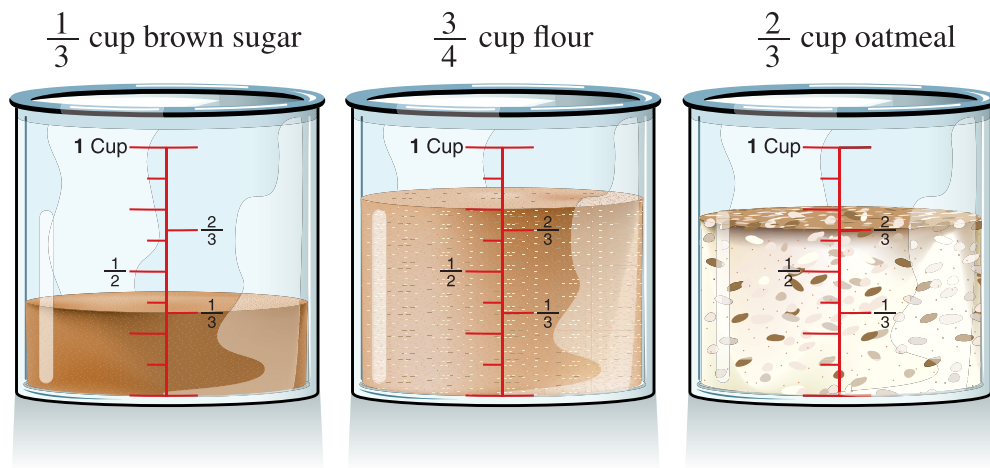
18. The **total** amount of dry ingredients is

    A. $\frac{5}{12}$ cup

    B. $\frac{6}{12}$ cup

    C. $1\frac{1}{4}$ cups

    D. $1\frac{3}{4}$ cups

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19. What is the greatest common factor of 12, 18, and 24?

    A. 2
    B. 3
    C. 6
    D. 8

2, 3, 5, 8, __, __, 23, 30

20. What are the missing numbers in the pattern above?

    A. 12 and 17
    B. 12 and 18
    C. 13 and 17
    D. 13 and 18

$$\$120.00 - x = \$97.50$$

21. Which of the following statements could describe the equation above?

    A. Jane has an unknown amount of money, x, and spends $97.50. She has $120.00 left over.

    B. Jane has an unknown amount of money, x, and spends $120.00. She has $97.50 left over.

    C. Jane has $120.00. She spends an unknown amount of money, x, and has $97.50 left over.

    D. Jane has $120.00. She spends $97.50 and has an unknown amount of money, x, left over.

A mathematics teacher needs to replace the batteries in 20 calculators. Each calculator uses 4 batteries.

Numerical Response

2. If batteries are sold in packages of 16, then what is the **least** number of battery packages that the mathematics teacher needs to buy?

Answer: _____ packages

(Record your answer in the numerical-response section on the answer sheet.)

Knowledge and Employability Mathematics –
Test Blueprint and Item Descriptions

The following blueprint shows the reporting categories by which these questions were classified on the 2010 and 2011 Grade 9 Knowledge and Employability Mathematics Achievement Tests.

General Outcomes	Reporting Category		Number (Percentage) of Questions
	Knowledge	**Skills**	
Number		2 16 4 18 5 19 6 NR2 10	
Patterns and Relations		3 20 21	
Shape and Space	7 11 13	9 12 17	
Statistics and Probability	8	1 15 14 NR1	
Number (Percentage) of Questions			

The table below provides information about each question: the keyed response, the difficulty of the item (the percentage of students who answered the question correctly), the reporting category, the strand, and the item description.

Question	Key	Difficulty (%)	Reporting Category	Strand	Item Description
1	B	87.4%	S	SP	Determine the likelihood of a random event occurring based on the occurrence of two previous events.
2	B	64.7%	S	N	Calculate the average of four given values.
3	D	73.9%	S	PR	Interpret information presented on a calendar to draw a conclusion related to a pattern.
4	D	60.7%	S	N	Solve a problem in an everyday context to determine an equivalent amount.
5	A	83.0%	S	N	Calculate total cost using information presented in a chart.
6	B	61.3%	S	N	Calculate a unit rate to determine fuel consumption.
7	D	84.5%	K	SS	Identify the most appropriate unit for measuring the mass of an item.
8	A	77.6%	K	SP	Determine the most appropriate means of displaying data.
9	C	52.6%	S	SS	Use given similar triangles to determine the unknown side of one of the triangles.
10	B	49.4%	S	N	Apply operations using whole numbers to solve an everyday problem.
11	B	50.9%	K	SS	Determine the length of a given object.
12	A	43.0%	S	SS	Interpret information to classify angles based on the angles of their slopes.
13	C	77.7%	K	SS	Calculate the perimeter of an irregular shape.
14	A	73.3%	S	SP	Identify the graph that best demonstrates the information presented in a table.
NR1	4231	44.7%	S	SP	Determine the order of the given steps to complete a survey.
15	B	60.5%	S	SP	Draw a conclusion based on information in a bar graph.
16	B	59.4%	S	N	Apply arithmetic operations to solve a given problem in an everyday context.

Question	Key	Difficulty (%)	Reporting Category	Strand	Item Description
17	A	58.6%	S	SS	Identify an example of a rotation.
18	D	44.3%	S	N	Solve an addition problem using pictorial representations of fractions.
19	C	60.3%	S	N	Determine the greatest common factor of given numbers.
20	A	64.2%	S	PR	Identify missing numbers to complete a given pattern.
21	C	65.8%	S	PR	Explain a given expression using informal algebraic methods.
NR2	5	50.3%	S	N	Solve an everyday problem using arithmetic operations.