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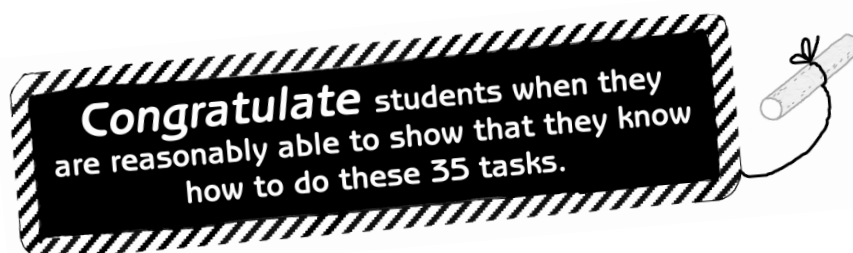
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## To the teacher ...

You can use this book in a variety of ways to help your students show that they know what they need to know by the end of the course. Here are some suggestions ...

- Review the course overview thoroughly. (pages 7–13)
- Provide thorough instruction and resources during the course to build students' understanding and let them practise these skills.
- When students are ready to show what they know, get them started on the 35 tasks.
- Provide more instruction when a student cannot complete all five items correctly. Discuss the right and wrong answers. Help each student get to the place where they are fluent with the concept and process before having the student try the second version of the task.
- Use the two versions of the end-of-course tasks
  - ... as pretests and post-tests
  - ... as consecutive check-ups (with instruction in between)
  - ... as aids in your instruction
  - ... at the beginning of the course and at the end of the course
  - ... throughout the year
  - ... any time students are ready
  - ... with individuals or the whole group
- Encourage students to keep their own record of progress on these tasks. (See **Student Record Sheet**, page 84.)
- Keep a class record of student progress on the tasks. (See **Teacher Record Sheet**, page 85.)
- Choose an appropriate time for the cumulative review. (See **Putting It All Together**, pages 86–91.)  
A student may take this when they are ready. Or, you might give it to the entire class when you feel the timing is right.
- If a student misses more than five items on the cumulative review, identify the areas of confusion, and find a way to reteach that task.



# Showing Proof of Mastery

By the end of your advanced maths course, you should be able to complete successfully the following 35 tasks. Note that each task is broken into its component skills. Showing that you have each of the skills and can complete the tasks is one way to show proof of mastery.

<p><b>Task</b></p> <p><b>1</b></p>	<p><b>Recognise and define numbers and number systems.</b></p> <p><i>You show that you can do this task when you:</i></p> <ul style="list-style-type: none"> <li>• Distinguish between different kinds of numbers and number systems.</li> <li>• Determine the absolute value of a number.</li> <li>• Determine the opposite of a number.</li> <li>• Identify the reciprocal of a number.</li> <li>• Distinguish between prime and composite numbers.</li> </ul>
<p><b>Task</b></p> <p><b>2</b></p>	<p><b>Compare and order numbers.</b></p> <p><i>You show that you can do this task when you:</i></p> <ul style="list-style-type: none"> <li>• Compare values of different kinds of numbers.</li> <li>• Order numbers according to their value.</li> <li>• Identify different ways to express the same value.</li> <li>• Use <math>&lt;</math>, <math>&gt;</math> or <math>=</math> signs to compare numbers.</li> </ul>
<p><b>Task</b></p> <p><b>3</b></p>	<p><b>Recognise and use properties of numbers and operations.</b></p> <p><i>You show that you can do this task when you:</i></p> <ul style="list-style-type: none"> <li>• Identify and use the commutative and associative properties for addition and multiplication.</li> <li>• Identify and use the distributive property.</li> <li>• Identify and use the additive and multiplicative identity properties.</li> <li>• Identify and use the additive and multiplicative inverse properties.</li> <li>• Identify and use properties to justify individual steps in the solution of problems.</li> <li>• Identify and use the multiplicative property of zero.</li> </ul>
<p><b>Task</b></p> <p><b>4</b></p>	<p><b>Recognise and use order of operations.</b></p> <p><i>You show that you can do this task when you:</i></p> <ul style="list-style-type: none"> <li>• Identify order for operations (PEMDAS).</li> <li>• Apply the order of operations to simplify or evaluate an expression.</li> <li>• Show how order of operations makes a difference in the answer.</li> <li>• Choose a grouping of elements to produce a specific answer.</li> </ul>
<p><b>Task</b></p> <p><b>5</b></p>	<p><b>Perform operations with positive and negative numbers.</b></p> <p><i>You show that you can do this task when you:</i></p> <ul style="list-style-type: none"> <li>• Add positive and negative numbers.</li> <li>• Subtract positive and negative numbers.</li> <li>• Multiply positive and negative numbers.</li> <li>• Divide positive and negative numbers.</li> <li>• Solve real-life problems with positive and negative numbers.</li> </ul>



## Recognise and define numbers and number systems.

Do you know it? Show it:

1

Isaiah estimated that his pet toad had this number of warts:  $\sqrt{289}$ .

Circle the number sets to which this number belongs.

rational    irrational    real    integers    natural

2

Find

- the absolute value of  $(-7)$
- the opposite of 12
- $|-7| + |4|$

3

Two frogs compete to see which one can hop to the most lily pads without stopping for a rest. The number of pads that Francis Frog manages to land on is equal to the smallest two-digit prime number. Frederica Frog's total is the smallest two-digit composite number.

Which frog wins the competition?

4

Write the reciprocal of each number.

- |                         |                 |                 |
|-------------------------|-----------------|-----------------|
| a. $1\frac{1}{2}$ _____ | c. $(-1)$ _____ | e. 1 _____      |
| b. 8 _____              | d. 4 _____      | f. $(-6)$ _____ |

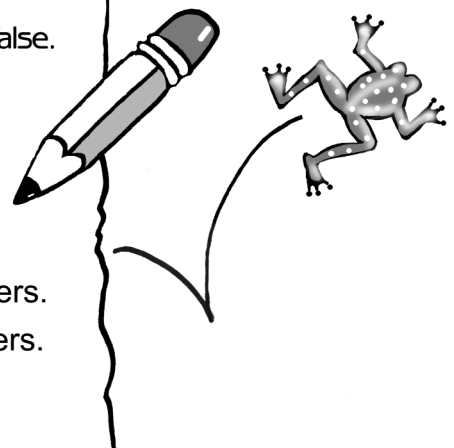
5

Eli has finished a question on a maths test. Did he get it right?

Circle the letters of any items that he answered correctly.

Write T or F to show that each statement is true or false.

- T  $\pi$  is a rational number.
- T Rational numbers are real numbers.
- T Integers are rational numbers.
- T Zero is a natural number.
- T All positive numbers are whole numbers.
- F Irrational numbers are not real numbers.
- F All fractions are rational numbers.
- F All decimals are integers.





## Perform operations with positive and negative numbers.

Do you know it? Show it:

1

While Adam S. Peere was building his hot air balloon business, he was constantly depositing money into, and removing money from, his savings account. Find the sum of the amounts that went through his account.

$$\$1500 + \$530 + (-\$750) + (-\$40) + \$1000 + (-\$1650) =$$

2

The difference between  $-30$  and  $-12$  is:

- $-42$                         $18$                         $-18$                         $42$

3

Circle the letters of any examples that have a solution of  $-14$ :

a.  $(-4)(7)(-\frac{1}{2}) =$

c.  $(-3.5)(-4) =$

b.  $\frac{1}{3}(3-6)(14) =$

d.  $(-\frac{1}{2})(-\frac{1}{3})(-84) =$



4

Evaluate the expressions. Circle the one with the greatest value.

A.  $\frac{-10+45}{6-13}$

B.  $(83-7) \div (-4)$

C.  $\frac{144}{-8}$

D.  $(-10^2) \div (-25)$

5

A hot air balloon rises 100 metres above the ground. Then it rises another 120 metres and sinks 36 metres. Later it rises 188 metres, followed by two losses of 30 metres. Shortly after that, the balloon rises three intervals, each of 60 metres. Now it is floating along steadily at an even altitude.

A. Which equation represents the current height of the balloon?

a.  $100 + 120 - (-36) + 188 + (-2)(-30) + 180$

b.  $100 + (-36) + 188 + 2(-30) + 3(60)$

c.  $100 + 120 + 188 + 60 - 36 - 30 - 30$

d.  $100 + 120 + (-36) + 188 + 2(-30) + 3(60)$

B. What is the height (above the ground) of the hot air balloon now?

492

558

564

372

# Advanced Maths End-of-Course Tasks

## Student Record Sheet

NAME \_\_\_\_\_

Task		Part <b>a</b> , date and # correct	Part <b>b</b> , date and # correct
1	Recognise and define numbers and number systems.		
2	Compare and order numbers.		
3	Recognise and use properties of numbers and operations.		
4	Recognise and use order of operations.		
5	Perform operations with positive and negative numbers.		
6	Identify elements of mathematical expressions.		
7	Read and write expressions.		
8	Simplify and evaluate expressions.		
9	Evaluate expressions with radicals and exponents.		
10	Perform operations with radicals and exponents.		
11	Recognise and use factors and multiples.		
12	Perform operations with fractions and decimals.		
13	Solve problems with percentages.		
14	Factor expressions and equations.		
15	Translate problems into equations.		
16	Solve equations using inverse operations.		
17	Solve equations with one variable and one step.		
18	Solve multi-step equations.		
19	Solve equations with rational numbers.		
20	Solve equations with radicals and exponents.		
21	Find rate, time and distance.		
22	Solve problems with ratio and proportion.		
23	Use ratios to show probability.		
24	Write, solve and graph inequalities.		
25	Solve equations with more than one variable.		
26	Compare geometric figures.		
27	Use formulas to find area and volume of figures.		
28	Recognise and use relationships in right-angled triangles.		
29	Graph number pairs on a coordinate grid.		
30	Plot transformations of figures on a grid.		
31	Identify and describe functions.		
32	Identify and graph linear equations.		
33	Determine features of linear equations.		
34	Identify and operate with polynomials.		
35	Use algebra to solve a variety of problems.		

Putting It All Together, Cumulative Review (pgs 86–91) Date \_\_\_\_\_ Score \_\_\_\_\_ of 65

# Advanced Maths End-of-Course Tasks, Class Record Sheet

Class \_\_\_\_\_

Teacher \_\_\_\_\_

Tasks: Write # of items correct for Part a and Part b of each task

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35					
Name	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a					
C.R. Score	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b				
Name	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a				
C.R. Score	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b			
Name	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a			
C.R. Score	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b		
Name	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a		
C.R. Score	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	
Name	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	
C.R. Score	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b

C.R. is Cumulative Review on pages 86–91, total score possible is 65.

Duplicate this chart as needed to include all students.



## Putting It All Together

For questions 1–20, compare the quantities given in A and B.

Circle A if the quantity represented by A is greater than ( $>$ ) the quantity represented by B.

Circle B if the quantity represented by B is greater than ( $>$ ) the quantity represented by A.

Circle E if the quantities are equal.

Circle N if there is not enough information for you to decide.

- 1**  $x$  and  $y$  are integers.

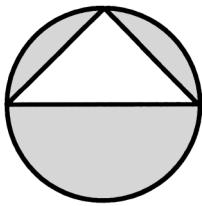
$$-4x + 6y = 48$$

A)  $x$

B)  $y$

E          N

**2**



A)  $2\frac{1}{2}$  times area of triangle

B) area of the circle

E          N

- 3** A) 45% of 32

B) 38% of 45

E          N

- 4** Train A travels 1037.5 km in 12.5 hours.  
Train B travels 581 km in 7 hours.

A) Train A's average speed (rate)

B) Train B's average speed (rate)

E          N

- 5** A)  $\frac{3}{5} \div \frac{4}{6}$

B)  $\frac{2}{3} \times \frac{4}{5}$

E          N

- 6** A cube has a side measuring 5 cm.  
A sphere has a diameter of 6 cm.

A) the cube's volume

B) the sphere's volume

E          N

- 7** A) slope of line:  $3y = -9x + 12$

B) slope of line:  $2y = -6x + 4$

E          N

- 8**  $x$  is a negative integer.

A)  $\frac{7}{9}x$

B)  $\frac{4}{5}x$

E          N

- 9** Factory X made 126 000 chocolate kisses in March. In April, there was a 280% increase in production.

Factory Z made 500 000 kisses in March and had a 15% product decrease in April.

A) number of kisses produced in April in Factory Z

B) number of kisses produced in April in Factory X

E          N

