1practice2012

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The University of Sydney
School of Mathematics & Statistics
MATH1902 Practice for Quiz 1.

Family Name : .....

Other Names : .....

Day/time/room : .....

Signature : .....

The real quiz (15 questions) lasts 40 minutes and tests material covered in Exercises for Weeks 2, 3, 4 and 5.

These practice questions should take about 20 to 25 minutes and are similar to the first eight questions of the real quiz.

Calculators are permitted but not needed.

Use a blue or black pen.

Marks are awarded only for what is written in the answer boxes. Your working is not marked.

Answer Box for Question 1	*Answer Box for Question 2*

Answer Box for Question 3	*Answer Box for Question 4*	*Answer Box for Question 5*

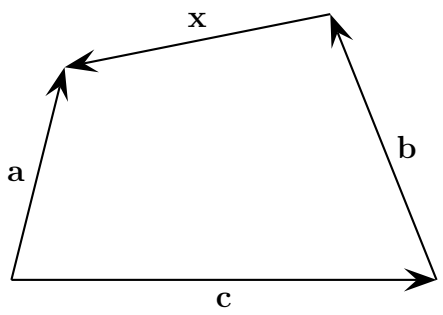
Answer Box for Question 6	*Answer Box for Question 7*	*Answer Box for Question 8*

Questions 9, 10, 11, 12, 13, 14, 15 on the real quiz will be multiple choice.

PRACTICE QUESTIONS FOR MATH1902 QUIZ 1

When you have finished, write your answers into the answer boxes on the front. Take care when transcribing your answers. Note that your working will NOT be marked. Use any blank spaces for rough working. Your answers should be exact, using surds if necessary. Do not make numerical approximations using your calculator. Where relevant, vector answers should be expressed in terms of unit vectors $\mathbf{i}$, $\mathbf{j}$ and $\mathbf{k}$.

1. Find the vector $\mathbf{x}$ in terms of the vectors $\mathbf{a}$, $\mathbf{b}$, $\mathbf{c}$.



2. Given that $\mathbf{a} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$ and $\mathbf{b} = \mathbf{i} + \mathbf{j} + 4\mathbf{k}$, find $|\mathbf{a} + \mathbf{b}|$.

3. If $\mathbf{u} = \mathbf{i} + 2\mathbf{k}$ and $\mathbf{v} = \mathbf{i} + \mathbf{j} + \mathbf{k}$, find the cosine of the angle between $\mathbf{u}$ and $\mathbf{v}$.

4. If $\mathbf{u} = \mathbf{i} + 2\mathbf{k}$ and $\mathbf{v} = \mathbf{i} + \mathbf{j} + \mathbf{k}$, find $\mathbf{u} \times \mathbf{v}$.

5. Given that $\mathbf{a} \times \mathbf{b} = \mathbf{i} + 2\mathbf{j}$ and $\mathbf{b} \times \mathbf{c} = \mathbf{j} - \mathbf{k}$, find $\mathbf{b} \times (2\mathbf{a} + \mathbf{b} + \mathbf{c})$.

6. Let A, B, C be the points $(1, 2, -5)$, $(3, -2, -4)$, $(0, 4, 1)$ respectively. Find the volume of the parallelopiped that has OA, OB, OC as three of its sides where O is the origin.

7. If $\mathbf{u} = 2\mathbf{i} + 3\mathbf{j} - \mathbf{k}$ and $\mathbf{v} = \mathbf{i} - \mathbf{j} + 2\mathbf{k}$, find the vector component of $\mathbf{u}$ orthogonal to $\mathbf{v}$.

8. Given that $\mathbf{u} = \mathbf{i} + 4\mathbf{j} - 3\mathbf{k}$ and $\mathbf{v} = 2\mathbf{j} - \mathbf{k}$, find a vector $\mathbf{w}$ of length 2 that is perpendicular to both $\mathbf{u}$ and $\mathbf{v}$ and such that the triple $(\mathbf{w}, \mathbf{v}, \mathbf{u})$ forms a left-handed system.