Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

MATH6000—ESSENTIAL MATHEMATICAL SKILLS

ASSESSMENT 2

October 24th 2012

Instructions:

1. Write your name, your student number, your programme and your lecturer's name in the spaces provided below.
2. Attempt all questions. Marks are as indicated. The total number of marks is 50.
3. Show your work in the space provided. You may use the back of the each sheet of this paper for rough work. If required, you may obtain more rough work paper from the invigilator, but all rough work must be handed up at the end of the exam.
4. You may not leave the Examination Centre until the time allocated has elapsed.

Name: _____

Student Number: _____

Programme: _____

Lecturer: _____

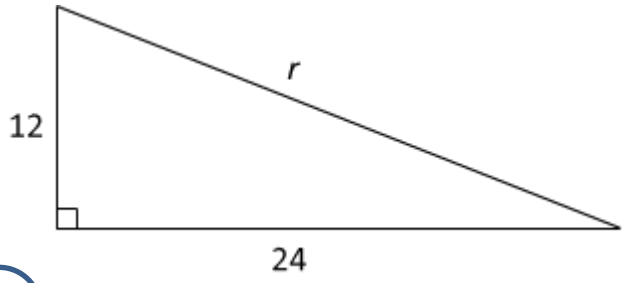
NB: This paper must not be taken from the Examination Centre.

In each of questions 1 to 6, please circle the correct answer.

1. Find the value of $\frac{\cos(45^\circ)+\sin(62^\circ)}{\tan(32^\circ)}$ correct to 3 decimal places. [4 marks]

(a) 1.203 (b) 2.644 (c) 2.545 (d) 1.93

2. Calculate the value of *r* correct to 3 significant figures: [4 marks]



(a) 26.8 (b) 26.9 (c) 20.8 (d) 20.7

3. Convert 46°42' to radians. [4 marks]

(a) 12.62 (b) 0.7525 (c) 0.3217 (d) 0.8151

4. A student has received the following grades on the first four of five tests: 87, 95, 76, and 88. She wants an overall average of 85 or better. What is the minimum grade that she must achieve on the final test in order to achieve that average? [4 marks]

(a) 78 (b) 79 (c) 82 (d) 84

5. What is the median of the numbers 75, 83, 69, 56, 71, 80, 65, 67, 77 and 44. [4 marks]

(a) 70 (b) 71 (c) 72.5 (d) 75.5

6. A dealer estimated your monthly car payment to be €315. The actual car payment turned out to be €300. Calculate the percentage error in the estimate payment relative to the actual payment, correct to one decimal place.

[4 marks]

(a) 95.2% (b) 105.0% (c) 4.8% (d) 5.0%

In each of question 7 to 10, please write your solution in the space provided below the question.

You must show full workings.

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7. Use your calculator to find the value of $\dfrac{26.58\times 0.00161}{2.1^2+0.4^2}$, correct to four significant figures.

[6 marks]

$$\frac{26.58\times 0.00161}{2.1^2+0.4^2}=\frac{0.042794}{4.41+0.16}$$
$$=\frac{0.042794}{4.57}$$
$$=0.009364 \text{ correct to 4 significant figures}$$

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8. The volume V of a cylinder is given by $V=\pi r^2 h$, where r is the radius and h is the height. A particular cylinder has a radius of 40 mm and a height of 100 mm. If the radius is increased by 4%, what is the resultant percentage increase in the volume of the cylinder? [7 marks]

$V=\pi r^2 h$

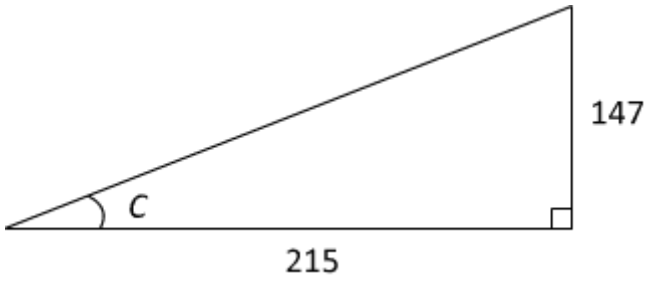
$V_{\text{old}}=\pi(40)^2\times 100=160000\pi \text{ mm}^3$

$V_{\text{new}}=\pi(41.6)^2\times 100=173056\pi \text{ mm}^3$

$\text{Change}=13056\pi \text{ mm}^3$

$\text{Percentage change}=\dfrac{13056\pi}{160000\pi}\times 100=8.16\%$

9.



Find the value of *C*, correct to the nearest degree. [6 marks]

$$\tan(C) = \frac{147}{215}$$

Therefore

$$C = \tan^{-1}\left(\frac{147}{215}\right) = 34.36^\circ = 34^\circ, \text{ correct to nearest degree.}$$

10. The times (in minutes) taken for 5 students to complete a standard task have been recorded as

42, 37, 61, 55, 45

Calculate the standard deviation of the data. Full workings must be shown. [7 marks]

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
42	-6	36
37	-11	121
61	13	169
55	7	49
45	-3	9
240		384

$$\bar{x} = \frac{\sum x_i}{n} = \frac{240}{5} = 48 \text{ (also } \mu = 48\text{)}$$

Either

$$s = \sqrt{\frac{(x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{384}{4}} = 9.80 \text{ min}$$

Or

$$\sigma = \sqrt{\frac{(x_i - \mu)^2}{n}} = \sqrt{\frac{384}{5}} = 8.76 \text{ min}$$