MATH 1115 - Fundamental Mathematics for the General Sciences I

ASSIGNMENT 2 (GROUP 1) [1]

- To be submitted by **4 p.m.** on **Thursday, 6th. October, 2016** in the Department of Mathematics and Statistics (**BOX labelled MATH 1115 G1**). Late assignments will be deducted 50% of achieved mark. **Assignments submitted more than 24 hours late will be awarded a mark of zero.**
- On your script, please include in the following order: **Course code and Group number, Assignment number, Name, ID number and Instructor's name (Ms. L Addison)**. For example, Math 1115 G4, Assignment #2, Jane Doe, 81009672, Ms. L. Addison.
- Please ensure that you submit your script in the appropriate box FOR YOUR GROUP labelled Math 1115 in the department.
- Attempt ALL questions, showing ALL working where applicable.
- Note that a selection of questions will be marked.

For questions 1-2, answer each question with ONE appropriate choice.

1. Simplify as much as possible: $\left(\frac{25}{4}\right)^{-\frac{1}{2}}$

   (a) $\frac{2}{5}$

   (b) $\frac{5}{2}$

   (c) $-\frac{5}{4}$

   (d) $\left(\frac{25}{4}\right)^{2}$

2. Which of the following is a surd?

   (a) $\sqrt{\frac{9}{4}}$

   (b) $\sqrt{\frac{3}{2}}$

   (c) $\sqrt{4}$

   (d) $\sqrt{25}$

[1] For soft-copy of this assignment visit: http://tinyurl.com/js44qrv (check the 'Resources' tab)

3. Simplify the following showing relevant working:

   (a) $\left(-\frac{5}{6} \div \left(\frac{216}{25}\right)^{\frac{1}{3}}\right) \times \left(\frac{5}{6}\right)^{-1}$

   (b) $\left(-\frac{22}{9} \times \left(\frac{9}{4}\right)^{\frac{3}{2}}\right) \div \frac{11}{2}$

4. Solve for x in the following equations:

   (a) $9^{(1-2x)} = 27^{-(\frac{x}{3})}$

   (b) $\dfrac{2^{3x+7}}{4^{2x-2}} = \dfrac{8^{x-3}}{32^{5-x}}$

5. Use the method of "rationalising" the denominator in the following: [i.e. Remove the surds from the denominator]:

   (a) $\frac{5+\sqrt{6}}{\sqrt{3}-\sqrt{2}}$

   (b) $\frac{1}{2+\sqrt{2}}$

   Interesting fact: Surds assist in improving operations in careers which require very accurate numbers, for instance, a heart surgeon may require a patient to have surgery exactly $10+\sqrt{2}$ cm from the heart. $\sqrt{2}$ would be approximately 1.41421356... Without surds, rounding this number to 1 or 1.4 can cause problems in the surgery .

6. The World Health Organization reduced its maximum recommended concentration for arsenic in drinking water from $50\,\mu g\ L^{-1}$ to $10\,\mu g\ L^{-1}$ in 1993. Convert $10\,\mu g\ L^{-1}$ into a value:

   a) $\mu g\, mL^{-1}$

   b) $mg\, cm^{-3}$

   Hint: 1 ml is equivalent to $1\,cm^3$

7. Convert a density of $10.49\,g\,cm^{-3}$(the density of silver) into a value in the SI units of $kg\,m^{-3}$.

8. Convert the following measurements into m^3 and then express in scientific notation:

   (a) 350 cm^3

   (b) 25 $\times 10^{-6}\,\mu L$ Hint: 1 mL is equivalent to $1\,cm^3$

   (c) 12.2 $\times 10^{7} mm^3$

END OF ASSIGNMENT