Dawson College: Business Mathematics: 201-801-DW Group 14: Fall 2009 October 6, 2009

Name: SOLUTIONS

Student ID: _____

Test 1

No books are cell phones are allowed. You must show all your work, the correct answer is worth 1 mark, the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(1 marks)* Reduce the fraction $\frac{42}{112}$ to lowest terms.

$\frac{42}{112} = \frac{3}{8}$

Question 2. *(2 marks)* Write $\frac{3}{4}\%$ as a decimal and as a fraction.

$\frac{\frac{3}{4}}{100} = \frac{3}{4} \cdot \frac{1}{100} = \frac{3}{400} = 0.0075$

Question 3. *(3 marks)* Simplify the following. (Round your final answer to 2 decimal places)

$$3\left[\frac{4^2-(6+2)}{3(5-1)}\right]-6(6-2.387) = 3\left[\frac{16-(8)}{3(4)}\right] - 6(3.613)$$

$= 3\left(\frac{8}{12}\right) - 21.678 = 2 - 21.678 = -19.68$

Question 4. *(3 marks)* Simplify the following:

$(2x-3)(x-4)-2(x+4)(x-1)$ $= 2x^2-3x-8x+12$

$= (2x^2-3x-8x+12) - 2(x^2+4x-x-4)$

$= (2x^2-11x+12) - 2(x^2+3x-4)$

$= 2x^2-11x+12-2x^2-6x+8$

$= -17x+20$

Question 5. *(3 marks)* Expand the following:

$(3a+b)(2a^2-a+ab^2-5b)$ $= 6a^3 - 3a^2 + 3a^2b^2 - 15ab + 2a^2b - ab + ab^3 - 5b^2$

$= 6a^3 - 3a^2 + 2a^2b + 3a^2b^2 - 16ab + ab^3 - 5b^2$

Question 6. *(1 marks)* What is 18% of \$420?

$0.18(420) = \$75.60$

Question 7. *(1 marks)* 142% of what number is 809.40?

$1.42x = 809.40 \Rightarrow x = \frac{809.40}{1.42} = 570$

Question 8. *(2 marks)* Bring the fraction $\frac{0.25}{1.4}$ to higher terms to eliminate the decimals. Write the final answer in lowest terms.

$\frac{0.25}{1.4} = \frac{25}{140} = \frac{5}{28}$

Question 9. *(3 marks)* Simplify the following using positive exponents only:

$\frac{(ab)^{-2}a^4b}{(a^{-2}b^2)^2a^{-3}} = \frac{a^{-2}b^{-2}a^4b}{a^{-4}b^4a^{-3}} = \frac{a^4a^3a^4b}{a^2b^2b^4} = \frac{a^{11}b}{a^2b^6}$

$= \frac{a^9}{b^5}$

Question 10. *(1 mark)* Rewrite the exponential $3^{-4} = \frac{1}{81}$ as a logarithm.

$\log_3 \frac{1}{81} = -4$

Question 11. *(1 mark)* Rewrite the logarithm $\ln 1 = 0$ as an exponential.

$e^0 = 1$

Question 12. *(1 mark each)*
Evaluate the following to two decimal places:

1. $\sqrt{286} = 16.91$
2. $13^{\frac{4}{7}} = 4.33$
3. $\frac{8^{-1}+2}{13} = 0.16$
4. $\sqrt[5]{223.98} = 2.95$
5. $(17+339^{\frac{4}{5}})^0 = 1$

Question 13. *(2 marks)*
Let $x = 0.46$, $l = 12$, $s = \frac{5}{7}$. Solve for r to two decimal places:

$$\frac{x+2}{l} = 3r+5s$$

$$\frac{0.46+2}{12} = 3r + 5\left(\frac{5}{7}\right) \Rightarrow \frac{2.46}{12} - 5\left(\frac{5}{7}\right) = 3r$$

$$0.205 - 3.571428571 = 3r \Rightarrow \frac{-3.366428571}{3} = r$$

$$\therefore r = -1.12$$

Question 14. *(2 marks)*
Solve for t in the following equation:

$$Q = l(s+t) - q$$

$$Q+q = l(s+t)$$

$$\frac{Q+q}{l} = s+t$$

$$\frac{Q+q}{l} - s = t$$

Question 15. *(3 marks)*
Solve for x:

$3-3(x+5)+(4x-7)=3(x-5)-(x+2)$

$3-3x-15+4x-7=3x-15-x-2$

$x-19=2x-17$

$-x=-17+19$

$-x=2$

$x=-2$

Question 16. *(3 marks)*
Solve for x using the LCD. Express your final answer as a fraction:

$13-\frac{2}{7}x=\frac{3}{4}(x+6)-\frac{1}{2}(2x-5)$ LCD = 28

$28(13)-\cancel{28}^{4}\cdot\frac{2}{\cancel{7}}x=\cancel{28}^{7}\cdot\frac{3}{\cancel{4}}(x+6)-\cancel{28}^{14}\cdot\frac{1}{\cancel{2}}(2x-5)$

$364-8x=21(x+6)-14(2x-5)$

$364-8x=21x+126-28x+70$

$364-8x=-7x+196$

$-8x+7x=196-364$

$-x=-168$

$x=168$

Question 17. *(2 marks)*
Solve for x in the proportion to 2 decimal places: $4.366 : x = 984.25 : 16.99$

$\frac{4.366}{x}=\frac{984.25}{16.99}\Rightarrow(4.366)(16.99)=984.25x$

$x=\frac{(4.366)(16.99)}{984.25}=0.08$

Question 18. *(2 marks)*
Change the ratio 72 : 54 : 234 to lowest terms.

$72:54:234=\frac{72}{18}:\frac{54}{18}:\frac{234}{18}=4:3:13$

Question 19. *(4 marks)* Three bank tellers each worked $12\frac{1}{2}$ hours, $13\frac{1}{4}$ hours, $4\frac{3}{5}$ hours, and $17\frac{3}{7}$ hours. What was the total cost of labour if they were each paid \$11.25 per hour?

COST PER TELLER $= \left(12\frac{1}{2} + 13\frac{1}{4} + 4\frac{3}{5} + 17\frac{3}{7}\right)(11.25)$

$= \$537.51$

$\therefore$ TOTAL COST $= 3(537.51)$

$= \$1612.53$

Question 20. *(2 mark)* Evaluate the following to two decimal places:

$\ln\left(\frac{4e^8}{12}\right) = \ln 4e^8 - \ln 12 = \ln 4 + \ln e^8 - \ln 12$

$= \ln 4 + 8\ln e - \ln 12 = \ln 4 + 8(1) - \ln 12$

$= 6.90$

Question 21. *(3 marks)* A 552.60cm long piece if wood is to be cut into two pieces in the ratio 8 : 7. How long is each piece?

OF PARTS $= 8 + 7 = 15$

$\therefore$ FIRST PIECE $= 8\left(\frac{552.60}{15}\right) = 294.72\text{cm}$

SECOND PIECE $= 7\left(\frac{552.60}{15}\right) = 257.88\text{cm}$

Question 22. *(4 marks)* A company has received a government grant of $173 875 to research alternative fuel sources. The grant is to be divided among three departments, Research and Development, Administration, and Public Relations, in a ratio of $\frac{1}{3} : \frac{2}{5} : \frac{2}{7}$ respectively. How much does each department get?

$\frac{1}{3} : \frac{2}{5} : \frac{2}{7} = 105\left(\frac{1}{3}\right) : 105\left(\frac{2}{5}\right) : 105\left(\frac{2}{7}\right) = 35 : 42 : 30$

PARTS = $35+42+30 = 107$

$\therefore$ RESEARCH AND DEVELOPMENT GETS $= 35\left(\frac{173\,875}{107}\right) = \$56\,875$

ADMINISTRATION GETS $= 42\left(\frac{173\,875}{107}\right) = \$68\,250$

PUBLIC RELATIONS GETS $= 30\left(\frac{173\,875}{107}\right) = \$48\,750$

Question 23. *(4 marks)* A local grocery store is making a fruit salad in bulk to package and sell. To make the fruit salad they use 4 different fruits; they use 3kg of bananas for $1.99 per kg, 2kg of strawberries for $6.99 per kg, 1.5kg of raspberries for $9.00 per kg, and 4kg of apples for $.99 per kg. At what price (per kg) should they sell the fruit salad to realize the revenue they could make by selling the four fruits separately?

3 kg	OF BANANAS	@ $1.99	= $5.97
2 kg	OF STRAWBERRIES	@ $6.99	= $13.98
1.5 kg	OF RASPBERRIES	@ $9.00	= $13.50
4 kg	OF APPLES	@ $0.99	= $3.96
10.5 kg			$37.41

$\therefore$ PRICE $= \frac{\$37.41}{10.5\text{kg}} = \$3.56$ PER kg