Dawson College: **Business Mathematics**: 201-801-DW Group 10: Winter 2008

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Test 2

This test is graded out of 60 marks. No books, notes or 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 mark each)* Evaluate and round solutions to two decimal places.

a. $\sqrt[4]{234} \overset{\circ}{=} 3.91$

b. $1.0292^{\frac{49}{9}} \overset{\circ}{=} 1.17$

c. $\ln 231 \overset{\circ}{=} 5.44$

d. $-1^0 = -1$

e. $(-1)^0 = 1$

Question 2. *(3 marks)* Solve for x.

$\frac{4}{3}(x-\frac{1}{2})-(x-\frac{1}{3})=\frac{1}{5}+10x$ LCD 15

$15\left(\frac{4}{3}\right)(x-\frac{1}{2})-15(x-\frac{1}{3}) = 15\frac{1}{5} + 15(10x)$

$20(x-\frac{1}{2})-15x+\frac{15}{3} = 3 + 150x$

$20x-\frac{20}{2}-15x+5 = 3+150x$

$20x-10-15x+5 = 3+150x$

$-8 = 145x$

$x = \frac{-8}{145}$

Question 3. *(3 marks)* Expand and simplify.

$(x-2)^2-(x-3)(x-4)$

$= [x^2-4x+4]-[x^2-4x-3x+12]$

$= x^2-4x+4-x^2+7x-12$

$= 3x-8$

Question 4. *(3 marks)* Simplify.

$$\frac{(3x^2y^{-3})^4}{(2x^{\frac{1}{2}}y^5)^{-2}} = \frac{3^4(x^2)^4(y^{-3})^4}{2^{-2}(x^{\frac{1}{2}})^{-2}(y^5)^{-2}}$$

$$= \frac{3^4 x^8 y^{-12}}{4^{-1} x^{-1} y^{-10}}$$

$$= \frac{324x^9}{y^2}$$

Question 5. *(3 marks)* Isolate i.

$$FV = PV(1+i)^n$$

$$\frac{FV}{PV} = (1+i)^n$$

$$\sqrt[n]{\frac{FV}{PV}} = 1+i$$

$$\sqrt[n]{\frac{FV}{PV}} - 1 = i$$

Question 6. *(4 marks)* Karl has a gross salary for the week of \$538.38. He receives a base salary of \$300 and has 7.2% commission on his net sales with a quota of \$3 000. What were his net sales for the week?

Portion of salary that is from commission = 538.38 − 300

= 238.58

$$\text{net sales} = 3000 + \frac{238.58}{0.072}$$

$$= \$6313.61$$

Question 7. *(2 marks)* The City of Atwater has announced that this year's mill rate has been set at 55.38. Noam has a property assessed at $320 000, what amount will he pay this year in property taxes?

$$\text{Property tax} = \frac{\text{Mill rate}}{1000} \times (\text{assessed value})$$

$$= \frac{55.38}{1000}(320\,000)$$

$$= \$\,17\,721.60$$

Question 8. *(3 marks)* Solve for x.

$3 : 8 = 21 : x$

$$\frac{3}{8} = \frac{21}{x}$$

$$3x = 21(8)$$

$$x = \frac{21(8)}{3}$$

$$x = 7(8)$$

$$x = 56$$

Question 9. *(4 marks)* The componenent cost to make an OGG Vorbis player is four-seventh of the total cost, and labour is one-third of the component cost. If cost of labour is $11 what is the total cost of the OGG Vorbis player.

$$\frac{\text{components}}{\text{Cost}} = \frac{4}{7}$$

$$\frac{\text{labour}}{\text{component}} = \frac{1}{3}$$

$$\frac{11}{\text{component}} = \frac{1}{3}$$

$$\$\,33 = \text{component}$$

$$\text{Cost} = \frac{7\,\text{component}}{4}$$

$$= \frac{7(33)}{4} = \$\ 57.75$$

Question 10. *(2 marks)* What is 35% of $233?

Percentage = base x rate
= 233 (0.5)
= $81.55

Question 11. *(2 marks)* $300 is 15% of what amount?

Percentage = base x rate
300 = base (0.15)
$2000 = base

Question 12. *(2 marks)* If $124.24 is the amount after GST, what was the amount before GST?

1.05 (before GST) = after GST

$$\text{before GST} = \frac{124.24}{1.05}$$

= $118.32

Question 13. *(4 marks)* A computer is sold to a retailer for $399.99 less 25%, 15%, 5%. What is the net price? What is the total discount? What is the single rate of discount?

$n = (1-d_1)(1-d_2)(1-d_3)L$
$= (1-0.25)(1-0.15)(1-0.05)\ 399.99$
= $242.24

Total discount = 399.99 - 242.24
= $157.75

Single rate of discount $= 1 - [(1-d_1)(1-d_2)(1-d_3)]$
$= 1 - [(1-0.25)(1-0.15)(1-0.05)]$
$= 39.44\ \%$

Question 14. *(4 marks)* An invoice for $1 000 dated June 13th with terms 5/15 E.O.M. is received with the goods on June 17th. What amount must paid on July 11th to reduce the debt to $500.

Since July 11th is within the discount period

500 (0.95) = $475

must be paid.

Question 15. *(4 marks)*
The Pink Book Store sells the book Das Kapital for $43.33. The markup is 10% of the cost. What is the cost of the book? What is the rate of markup based on selling price?

$S = C + M$
$43.33 = C + 10\% \text{ of } C$
$43.33 = C + 0.1C$
$43.33 = 1.1C$
$\$39.39 = C$

rate of markup based on selling price $= \frac{S-C}{S}$
$= \frac{43.33 - 39.39}{43.33}$
$= 9.09\%$

Question 16. *(6 marks)*
The Kunming DVD Store paid $0.55 for a DVD. Expenses are 33% of selling price and the required profit is 11% of the selling price. The older DVDs are marked down 30%. What is the regular selling price of a DVD? What is the selling price of a marked down DVD? What is the operating loss or profit on the older DVDs?

$S = C + E + P$
$S = 0.55 + 33\% \text{ of } S + 11\% \text{ of } S$
$S = 0.55 + 0.33S + 0.11S$
$S = 0.55 + 0.44S$
$0.56S = 0.55$
$S = \$0.98$

Sale price $= (1 - 0.30)\,0.98$
$= \$0.69$

Total Cost $= C + E$
$= 0.55 + 0.33$
$= 0.55 + 0.33(0.98)$
$= \$0.87$

Profit = Sale price − Total Cost
$= 0.69 - 0.87$
$= \$ -0.18$

∴ an operating loss of $\$ -0.18$

Question 17. *(6 marks)*

The local camera store paid $1 700.00 for a Nikon lens less 30%, 10% and 5%. Overhead expenses are 15% of the regular selling price and profit is 5% of the regular selling price. During a sale the lens was sold at a markdown of 15%. What was the operating profit or loss on the sale?

$C = N = (1-d_1)(1-d_2)(1-d_3)L$

$= (1-30\%)(1-10\%)(1-5\%)\,1700.00$

$= (0.70)(0.90)(0.95)\,1700.00$

$= \$1017.45$

$S = C + E + P$

$S = 1017.45 + 15\%\text{ of } S + 5\%\text{ of } S$

$S = 1017.45 + 0.15S + 0.05S$

$0.8S = 1017.45$

$S = \$1271.81$

Sale price $= (1-15\%)\,1271.81$

$= \$1081.04$

Total Cost $= C + E$

$= 1017.45 + 0.15S$

$= 1017.45 + 190.77$

$= \$1208.22$

Profit = Sale price − Total Cost

$= 1081.04 - 1208.22$

$= \$127.18$

∴ an operating loss of −127.18.

Bonus Question *(2 marks)*

Find 3 consecutive integers such that 3 times the smallest less 10 is 9 more than the sum of the other two.

first integer → x

second integer → x+1

third integer → x+2

$3x - 10 = [(x+1) + (x+2)] + 9$

$3x - 10 = [2x + 3] + 9$

$3x - 10 = 2x + 12$

$x = 22$

∴ The 3 consecutive integers are 22, 23, 24