

Name: SOLUTIONS
Student ID: _____

Test 2

No books 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.

Question 1. (1 mark each) Evaluate each of the following to 2 decimal places:

1. $-2^4 = -16$

2. $\sqrt[3]{0.3092} = 0.79$

3. $(-34)^0 = 1.00$

4. $\ln 16.3 = 2.79$

5. $(\frac{16}{3})^2 = 28.44$

Question 2. (1 mark) 12% of what number is 42.6.

$$0.12x = 42.6 \Rightarrow x = \frac{42.6}{0.12} = 355$$

Question 3. (3 mark) Use the LCD to solve for x .

$$\frac{5}{6}(3x+2) - \frac{1}{4}(x-5) = 2x - \frac{2}{5} \quad \text{LCD} = 60$$

$$60 \cdot \frac{5}{6}(3x+2) - 60 \cdot \frac{1}{4}(x-5) = 60(2x) - 60 \cdot \frac{2}{5}$$

$$50(3x+2) - 15(x-5) = 120x - 24$$

$$150x + 100 - 15x + 75 = 120x - 24$$

$$135x + 175 = 120x - 24$$

$$15x = -199$$

$$x = -\frac{199}{15}$$

CHRIS

Question 4. (4 marks) Chris and Frank both work 40 hours per week. ~~Bill~~ Chris makes 12% straight commission on all sales. Frank makes a wage of 9\$ per hour plus a commission of 2% of all sales. If they both sold \$3000 this week how much did they each make?

$$\text{CHRIS MAKES } (0.12)(3000) = \$360$$

$$\text{FRANK MAKES } (40)(9) + (0.02)(3000) = \$420$$

Question 5. (3 marks) Simplify the following expressing your final answer with positive exponents only:

$$\frac{(x^5y^{-3})^2y^2}{x^2y^2} = \frac{x^{10}y^{-6}y^2}{x^2y^2} = \frac{x^{10}y^{-4}}{x^2y^2} = \frac{x^{10}}{x^2y^2y^4}$$

$$= \frac{x^8}{y^6}$$

Question 6. (3 marks) Calculate the property tax on an apartment complex in Toronto that has been assessed at \$725000 if the mill rate is 21.631.

$$\text{PROPERTY TAX} = (21.631)(0.001)(725000)$$

$$= \$15682.48$$

Question 7. (3 marks) Simplify the following (round to 2 decimal places):

$$23 - 3 \left[\frac{(2)4^3 - (5+1)}{4^2 - 4(6-\$)} \right] = 23 - 3 \left[\frac{128 - 6}{16 - 4(5)} \right] = 23 - 3 \left[\frac{122}{-4} \right]$$

$$= 23 - 3(-30.5) = 114.50$$

Question 8. (3 mark) Evaluate the following to two decimal places:

$$\ln\left(\frac{4}{e^6}\right) = \ln 4 - \ln e^6 = \ln 4 - 6 \ln(e)$$

$$= \ln 4 - 6(1) = \ln 4 - 6 = -4.61$$

Question 9. (3 mark) An invoice of \$5672 with terms 7/15 n/30 R.O.G. was dated for October 10th and was received on October 25. If the invoice is paid on November 2nd how much should be paid?

NOVEMBER 2nd IS WITHIN THE DISCOUNT PERIOD.

$$\begin{aligned}\therefore \text{AMOUNT TO BE PAID} &= (1 - 0.07)(5672) = (0.93)(5672) \\ &= \$5274.96\end{aligned}$$

Question 10. (3 mark) Simplify the following:

$$(3x-5)(2x-1) - 4(x-7)(x+2) =$$

$$= (6x^2 - 10x - 3x + 5) - 4(x^2 - 7x + 2x - 14)$$

$$= (6x^2 - 13x + 5) - 4(x^2 - 5x - 14) = 6x^2 - 13x + 5 - 4x^2 + 20x + 56$$

$$= 2x^2 + 7x + 61$$

Question 11. (1 marks)

Express $3^{-7} = \frac{1}{2187}$ ~~the following~~ in logarithm: FORM.

$$\log_3 \frac{1}{2187} = -7$$

Question 12. (3 marks)

The Agrarian bike shop originally sells salsa bike stems for \$43. They do not sell very well so they mark them down to \$27. What is the rate of markdown?

$$\text{MARKDOWN} = 43 - 27 = \$16$$

$$\text{RATE OF MARKDOWN} = \frac{16}{43} = 37.2\%$$

Question 13. (5 marks)

Sport Shack sporting goods store buys hockey jerseys for \$114 less 10%, 8.5%, and 6%. Expenses are 29% of the regular selling price and they want to make a profit of 19% of the regular selling price. What is the regular selling price? After the local hockey team loses in the playoffs the store has a sale where they sell the jerseys at a 30% discount on the regular selling price. What is the operating loss or profit realized on the sale of the jerseys.

$$\text{COST} = (1 - 0.10)(1 - 0.085)(1 - 0.06)(114) = \$88.25$$

$$S = C + E + P$$

$$S = 88.25 + 0.29S + 0.19S$$

$$0.52S = 88.25$$

$$S = \$169.71 \leftarrow \text{REGULAR SELLING PRICE}$$

$$\text{SALE PRICE} = (1 - 0.30)(169.71) = \$118.80$$

$$\text{TOTAL COST} = C + E = 88.25 + 0.29(169.71) = \$137.47$$

$$\text{PROFIT} = 118.80 - 137.47 = -18.67$$

∴ OPERATING LOSS OF \$18.67

Question 14. (2 marks)

\$2392 was invested for 13 months in a simple interest scheme with an interest rate of 2.6% p.a.. How much interest is earned?

$$\begin{aligned} I &= Prt \\ &= (2392)(0.026)\left(\frac{13}{12}\right) \\ &= \$67.37 \end{aligned}$$

Question 15. (3 marks)

How many weeks must \$3454 be invested to earn \$267.02 interest when invested at a rate of 6.7% p.a.?

$$\begin{aligned} I &= Prt \Rightarrow t = \frac{I}{Pr} = \frac{267.02}{(3454)(0.067)} = 1.15384283 \text{ YEARS} \\ &= 60 \text{ WEEKS} \end{aligned}$$

Question 16. (2 marks)

High definition televisions are listed at \$1350 less 12%. The price is reduced by a second discount to \$1116.72. What is the additional rate of discount?

$$\begin{aligned} 1116.72 &= (1 - 0.12)(1 - x)(1350) \\ 1116.72 &= (1 - x)(1188) \\ 0.94 &= 1 - x \\ -0.06 &= -x \\ x &= 0.06 = \boxed{6\%} \end{aligned}$$

Question 17. (2 marks)

What is the present value of a debt of \$433 463 days before it is due at an interest rate of 7%?

$$\begin{aligned} P &= \frac{S}{1+rt} = \frac{433}{1+(0.07)\left(\frac{463}{365}\right)} = \frac{433}{1.088794521} \\ &= \$397.69 \end{aligned}$$

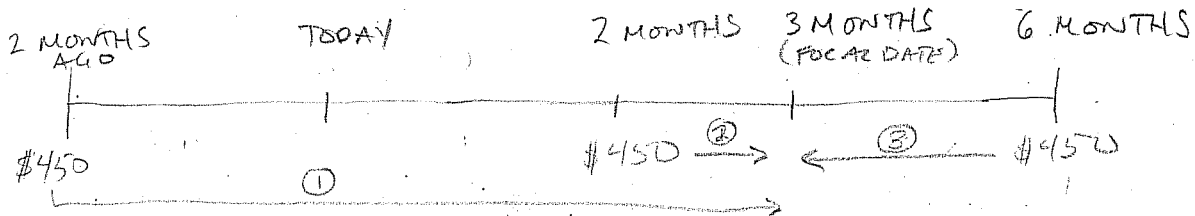
Question 18. (2 marks)

What is the future value of a debt of \$1294 in 13 months ~~year~~ at an interest rate of 13%?

$$S = P(1+rt) = 1294 \left(1 + 0.13 \left(\frac{13}{12}\right)\right) \\ = \$1476.24$$

Question 19. (4 marks)

Kim's yearly electricity bills charges are split into 3 bills of \$450 each. One bill was due 2 month ago, one is due in 2 months, ~~one is due in 2 months~~ and one is due in 6 months. If Kim wants to pay her bills in one payment 3 months from now what is the payment that he has to make given that interest is 6% (the focal date is 3 months from now)?



$$\textcircled{1} S = P(1+rt) = 450 \left(1 + 0.06 \left(\frac{5}{12}\right)\right) = \$461.25$$

$$\textcircled{2} S = P(1+rt) = 450 \left(1 + 0.06 \left(\frac{1}{12}\right)\right) = \$452.25$$

$$\textcircled{3} P = \frac{S}{1+rt} = \frac{450}{1 + 0.06 \left(\frac{3}{12}\right)} = \$443.35$$

$$\text{PAYMENT} = 461.25 + 452.25 + 443.35 \\ = \$1356.85$$

BONUS! $e^{3x} e^{15} = 1$

$$e^{3x+15} = 1$$

$$\ln e^{3x+15} = \ln(1)$$

$$(3x+15)(\ln e) = 0$$

$$3x+15 = 0$$

$$3x = -15$$

$$x = -5$$