

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. If you need more space for your answer use the back of the page.

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

1. $(-3)^4 = 81$
2. $\sqrt[3]{0.3608} = 0.71$
3. $\ln 28 = 3.33$
4. $-35970^0 = -1$
5. $(\frac{3}{2})^2 = \frac{9}{4} = 2.25$

Question 2. (1 mark) 36% of what number is 345.96.

LET THE NUMBER BE X

$$0.36x = 345.96 \Rightarrow x = 961$$

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

$$\frac{2}{7}(x+2) - \frac{1}{8}(2x-1) = \frac{2}{3} - 3x \quad \text{LCD} = 168$$

$$168\left(\frac{2}{7}\right)(x+2) - 168\left(\frac{1}{8}\right)(2x-1) = 168\left(\frac{2}{3}\right) - 168(3x)$$

$$48(x+2) - 21(2x-1) = 112 - 504x$$

$$48x + 96 - 42x + 21 = 112 - 504x$$

$$6x + 117 = 112 - 504x$$

$$5 = -510x$$

$$\frac{-5}{510} = x$$

$$\frac{-1}{102} = x$$

Question 4. (3 marks) Caroline earned a gross salary of \$435.55 for the week at her sales job. She earns a base salary of \$275 and receives 6.8% commission on net sales over \$2800. What were her net sales for the week?

COMMISSION EARNED = $435.55 - 275 = \$160.55$

LET X BE SALES OVER \$2800

$$160.55 = 0.068x \Rightarrow x = 2361.03$$

$$\therefore \text{NET SALES} = 2800 + 2361.03 = \$5161.03$$

Question 5. (3 marks) Simplify the following:

$$\frac{(a^3b^{-2})^3b^3}{a^{-3}b^7a} = \frac{a^9b^{-6}b^3}{a^{-3}b^7a} = \frac{a^9b^{-3}}{a^{-2}b^7}$$
$$= a^{9-(-2)}b^{-3-7} = a^{11}b^{-10} = \frac{a^{11}}{b^{10}}$$

Question 6. (3 marks) Calculate the property tax on a warehouse in Ottawa that has been assessed at \$236000 if the mill rate is 18.753.

$$\text{PROPERTY TAX} = (236000)(0.001)(18.753)$$
$$= \$4425.71$$

Question 7. (3 marks) Simplify the following:

$$16 - 3 \left[\frac{2^3(3) - (1-4)}{4(5-2) - 4^2} \right] = 16 - 3 \left[\frac{8(3) - (-3)}{4(3) - 16} \right]$$
$$= 16 - 3 \left[\frac{24 + 3}{12 - 16} \right] = 16 - 3 \left[\frac{27}{-4} \right]$$
$$= 16 + \frac{81}{4} = 36.25$$

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

$$\ln\left(\frac{e^3}{4}\right) = \ln e^3 - \ln 4 = 3 \ln e - \ln 4$$
$$= 3(1) - \ln 4$$
$$= 1.61$$

Question 9. (3 mark) An invoice of \$1375 with terms 8/15 n/30 R.O.G. was dated for September 15th and was received on September 24. If the invoice is paid on October 3rd how much should be paid?

OCTOBER 3rd IS WITHIN THE DISCOUNT PERIOD

$$\begin{aligned} N &= (1-d)L = (1-0.08)(1375) \\ &= (0.92)(1375) \\ &= \$1265 \end{aligned}$$

Question 10. (3 mark) Simplify the following:

$$\begin{aligned} &(x-5)(2x-3) - (x+5)^2 \\ &= (2x^2 - 10x - 3x + 15) - (x+5)(x+5) \\ &= (2x^2 - 13x + 15) - (x^2 + 5x + 5x + 25) \\ &= 2x^2 - 13x + 15 - (x^2 + 10x + 25) \\ &= 2x^2 - 13x + 15 - x^2 - 10x - 25 \\ &= x^2 - 23x - 10 \end{aligned}$$

Question 11. (3 marks)

Solve the proportion:

$$\frac{1}{3} : x = \frac{2}{5} : \frac{3}{7}$$

$$\frac{\frac{1}{3}}{x} = \frac{\frac{2}{5}}{\frac{3}{7}}$$

$$\frac{1}{3} \cdot \frac{3}{7} = \frac{2}{5} x$$

$$\frac{1}{7} = \frac{2}{5} x$$

$$\frac{5}{2} \cdot \frac{1}{7} = x$$

$$x = \frac{5}{14} = 0.36$$

$$= \frac{5}{14} = 0.36$$

Question 12. (3 marks)

The Agrarian bike shop originally sells Mavic bike wheels for \$450. They do not sell very well so they mark them down to \$315. What is the rate of markdown?

$$\text{MARKDOWN} = 450 - 315 = \$135$$

$$\text{RATE OF MARKDOWN} = \frac{135}{450} = 0.3 = 30\%$$

Question 13. (5 marks)

Talk Smart cellular phone store buys the new touch screen phone for \$530 less 20%, 15%, and 9%. Expenses are 33% of the cost and they want to make a profit of 20% of the regular sales price. What is the regular sales price? The store offers a promotion where if customers sign a 3 year cell phone contract the store will offer a 30% discount on the touch screen phone. What is the operating loss or profit realized on the sale of a phone during this promotion.

$$C = (1 - 0.2)(1 - 0.15)(1 - 0.09)530 \\ = \$327.96$$

$$S = C + E + P$$

$$S = 327.96 + (33\% \text{ OF } 327.96) + (20\% \text{ OF } S)$$

$$S = 327.96 + (0.33)(327.96) + 0.2S$$

$$0.8S = 436.19$$

$$S = \$545.24 \text{ REGULAR SALES PRICE}$$

$$\text{SALE PRICE} = (1 - 0.3)545.23 = \$381.67$$

$$P = (\text{SALE PRICE}) - (\text{TOTAL COST})$$

$$= 381.66 - (327.96 + 0.33(327.96))$$

$$= 381.66 - 436.19$$

$$= -54.53 \text{ OPERATING LOSS}$$

Question 14. (2 marks)

\$1340 was invested for 13 months in a simple interest scheme with an interest rate of 4.7% p.a.
How much interest is earned?

$$\begin{aligned} I &= Prt \\ &= (1340)(0.047)\left(\frac{13}{12}\right) \\ &= \$68.23 \end{aligned}$$

Question 15. (2 marks)

High Definition Projectors are listed at \$1200 less 19%. The price is reduced by a second discount to \$865.05. What is the additional rate of discount?

$$\begin{aligned} 865.05 &= (1 - 0.19)(1 - d)1200 \\ 865.05 &= (1 - d)972 \\ 0.8849691358 &= 1 - d \\ -0.1100308642 &= -d \\ \boxed{d = 0.11 = 11\%} \end{aligned}$$

Question 16. (3 marks)

How many weeks must \$2315 be invested to earn \$416.70 when invested at a rate of 12% p.a.?

$$t = \frac{I}{Pr} = \frac{416.70}{(2315)(0.12)} = 1.5 \text{ YEARS} = 78 \text{ WEEKS}$$

Question 17. (2 marks)

What is the present value of a debt of \$718.91 362 days before it is due at an interest rate of 9%?

$$P = \frac{S}{1 + rt} = \frac{\$718.91}{1 + (0.09)\left(\frac{362}{365}\right)} = \$660.00$$

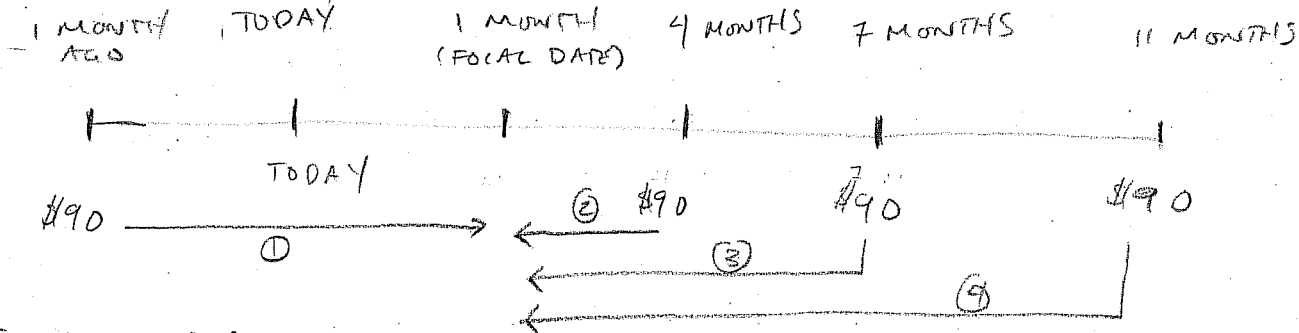
Question 18. (2 marks)

What is the future value of a debt of \$377 in 1.2 years at an interest rate of 12%?

$$S = P(1+rt) = 377(1+(0.12)(1.2))$$
$$= \$431.29$$

Question 19. (5 marks)

Steve's yearly internet charges are split into 4 bills of \$90 each. One bill was due 1 month ago, one is due in 4 months, one is due in 7 months and the last is due in 11 months. If Steve wants to pay his bills in one payment 1 month from now what is the payment that he has to make given that interest is 8% (the focal date is 1 month from now)?



EQUIVALENT VALUES:

$$\textcircled{1} S = P(1+rt)$$
$$= 90(1+0.08(\frac{2}{12}))$$
$$= \$91.20$$

$$\textcircled{2} P = \frac{S}{1+rt}$$
$$= \frac{90}{1+(0.08)(\frac{3}{12})}$$
$$= \$88.24$$

$$\textcircled{3} P = \frac{S}{1+rt}$$
$$= \frac{90}{1+0.08(\frac{6}{12})}$$
$$= \$86.54$$

$$\textcircled{4} P = \frac{S}{1+rt}$$
$$= \frac{90}{1+0.08(\frac{10}{12})}$$
$$= \$84.38$$

$$\text{PAYMENT} = 91.20 + 88.24 + 86.54 + 84.38$$
$$= \$350.36$$