

Test 2

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 the following to two decimal places:

1. $\sqrt{326} \approx 18.06$

2. $\ln(481) \approx 6.18$

3. $(-2)^2 = 4.00$

4. $-1^0 = -1.00$

5. $(2.67891)^{\frac{1}{3}} \approx 1.39$

Question 2. (3 marks) Simplify the following:

$$\begin{aligned} & (x+5)^2 - (x-2)(x-3) \\ &= (x+5)(x+5) - (x-2)(x-3) \\ &= (x^2 + 10x + 25) - (x^2 - 5x + 6) \\ &= x^2 + 10x + 25 - x^2 + 5x - 6 \\ &= 15x + 19 \end{aligned}$$

Question 3. (3 marks)

Simplify the following:

$$\begin{aligned} \frac{(3x^{-2}y^2)^3}{(2xy^2)^{-2}} &= (3x^{-2}y^2)^3 (2xy^2)^2 = (3)^3 (x^{-2})^3 (y^2)^3 (2)^2 (x)^2 (y^2)^2 \\ &= 27x^{-6}y^6 \cdot 4x^2y^4 = \frac{108x^2y^6y^4}{x^6} \\ &= \frac{108y^{10}}{x^4} \end{aligned}$$

~~Handwritten scribbles~~

Question 4. (4 marks) Franz is a salesperson for Tube-Town TV Shop. He receives a commission of 6% on sales up to \$6500, 9½% on the next \$5000 and 12¼% on any additional sales during the month. If Franz sold \$14600 last month what was his gross commission for the month?

$$\text{COMMISSION ON THE FIRST } \$6500 = (0.06)(6500) = \$390$$

$$\text{COMMISSION ON THE NEXT } \$5000 = (0.095)(5000) = \$475$$

$$\text{COMMISSION ON SALES OVER } \$11500 = (0.1275)(3100) = \$395.25$$

$$\begin{aligned} \text{GROSS COMMISSION} &= 390 + 475 + 395.25 \\ &= \$1244.75 \end{aligned}$$

Question 5. (3 marks) Simplify the following (round your final answer to two decimal places):

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

$$= \frac{1}{3} + \frac{5}{2} - 16 \left[\frac{12}{5-24} \right] = \frac{1}{3} + \frac{5}{2} - 16 \left(\frac{12}{-19} \right)$$

$$= \frac{1}{3} + \frac{5}{2} + \frac{192}{19} = \frac{38}{114} + \frac{285}{114} + \frac{1152}{114} = \frac{1475}{114} \approx 12.94$$

Question 6. (3 marks) Calculate the property taxes on a house in Toronto that has been assessed at \$198 000 if the mill rate is 19.625.

$$\begin{aligned} \text{PROPERTY TAX} &= \text{MILL RATE} \times 0.001 \times \text{ASSESSED VALUE OF PROPERTY} \\ &= (19.625)(0.001)(198\,000) \\ &= \$3885.75 \end{aligned}$$

Question 7. (3 marks) The list price of an item is reduced by discounts of 8% and 6% resulting in a net price of \$562.12. What is the list price?

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

$$562.12 = (1 - 0.08)(1 - 0.06)L$$

$$562.12 = (0.92)(0.94)L$$

$$L = \frac{562.12}{(0.92)(0.94)} = \$650$$

Question 8. (3 marks)

An invoice of \$1200 with terms 7/15 n/30 E.O.M. was dated September 14. If the invoice is paid on October 9th how much is to be paid?

OCTOBER 9th IS WITHIN THE DISCOUNT PERIOD

$$\text{AMOUNT TO BE PAID} = (1 - 0.07)(1200)$$

$$= (0.93)(1200)$$

$$= \$1116$$

Question 9. (4 marks)

The Agrarian bike shop buys helmets from the wholesaler for \$54.75 and sells them at a markup of 25% of the selling price. What is the selling price? What is the rate of markup based on cost?

$$S = C + M$$

$$S = 54.75 + 25\% \text{ OF } S$$

$$S = 54.75 + 0.25S$$

$$S - 0.25S = 54.75$$

$$0.75S = 54.75$$

$$S = \$73$$

$$\text{MARKUP} = 73 - 54.75$$

$$= \$18.25$$

$$\text{RATE OF MARKUP BASED ON COST} = \frac{18.25}{54.75}$$

$$= 33.3\%$$

Question 10. (3 mark) Solve for x:

$$\frac{1}{7}(4x+5) - \frac{2}{5}(15x-2) = 13-x+5 \quad \text{LCD} = 35$$

$$35\left(\frac{1}{7}\right)(4x+5) - 35\left(\frac{2}{5}\right)(15x-2) = 35(13-x+5)$$

$$20x+25 - (210x+28) = 630-35x$$

$$-190x+53 = 630-35x$$

$$-155x = 577$$

$$x = \frac{-577}{155}$$

Question 11. (3 marks)

A company sells snowboards for \$360. If the company wants to markdown the snowboard to a price of \$298. What is the rate of markdown?

$$\text{MARKDOWN} = 360 - 298 = \$62.$$

$$\text{RATE OF MARKDOWN} = \frac{62}{360} = 17.2\%$$

Question 12. (3 marks)

Solve for x:

$$3(2x-1)+6=19-(4x+5)-1$$

$$6x-3+6=19-4x-5-1$$

$$6x+3=13-4x$$

$$10x=10$$

$$x=1$$

Question 13. (5 marks)

Cumpu-global-tec Computer store buys laptop computers listed at \$670 less 15%, 12% and 6%. Expenses are 40% of the regular selling price and they want to make a profit of 10% of the cost. What is the regular selling price? One weekend the store decides to have a sale, selling the laptops with a 25% discount. What is the operating loss or profit realized on the sale of a laptop?

$$\begin{aligned}\text{NET PRICE} &= (1-d_1)(1-d_2)(1-d_3)(\text{LIST PRICE}) \\ &= (1-0.15)(1-0.12)(1-0.06)(670) \\ &= \$471.09 \checkmark\end{aligned}$$

$$S = C + E + P$$

$$S = 471.09 + 40\% \text{ OF } S + 10\% \text{ OF } 471.09$$

$$S = 471.09 + 0.4S + (0.1)(471.09)$$

$$S = 471.09 + 0.4S + 47.11$$

$$0.6S = 518.20$$

$$S = 863.67$$

Question 14. (3 marks)

\$3560 was invested for 272 days in a simple interest scheme with an interest rate of 3.5% p.a.. How much interest is earned in 272 days.

$$\begin{aligned}I &= Prt \\ I &= (3560)(0.035)\left(\frac{272}{365}\right)\end{aligned}$$

$$= \$92.85$$

Question 15. (3 marks)

How many months must \$1260 be invested in a simple interest scheme at 5% in order to earn \$315 interest.

$$I = Prt$$

$$t = \frac{I}{Pr} = \frac{315}{(1260)(0.05)} = 5 \text{ YEARS}$$

$$5 \text{ YEARS} = 60 \text{ MONTHS}$$

$$\begin{aligned}\text{SALE PRICE} &= (1-0.25)(863.67) \\ &= \$647.75\end{aligned}$$

$$\begin{aligned}\text{EXPENSES} &= (0.4)(863.67) \\ &= \$345.47\end{aligned}$$

$$\begin{aligned}\text{PROFIT} &= \left(\frac{\text{SALE PRICE}}{\text{PRICE}}\right) - C - E \\ &= 647.75 - 471.09 - 345.47 \\ &= -168.81\end{aligned}$$

OPERATING LOSS OF
\$168.81 ON THE SALE.

Question 16. (3 marks)

What is the future value of \$826 over 7 months at $4\frac{1}{4}\%$?

$$\begin{aligned} S &= P(1+rt) \\ &= (826)\left(1 + (0.0425)\left(\frac{7}{12}\right)\right) \\ &= \$ 846.48 \end{aligned}$$

Question 17. (3 marks)

Compute the present value of a debt of \$463.08, 125 days before it is due at an interest rate of 8.3% p.a..

$$\begin{aligned} P &= \frac{S}{1+rt} \\ &= \frac{463.08}{1 + (0.083)\left(\frac{125}{365}\right)} \\ &= \$ 450.28 \end{aligned}$$

Question 18. (2 marks)

Solve the proportion $2 : 3 = x : 41$.

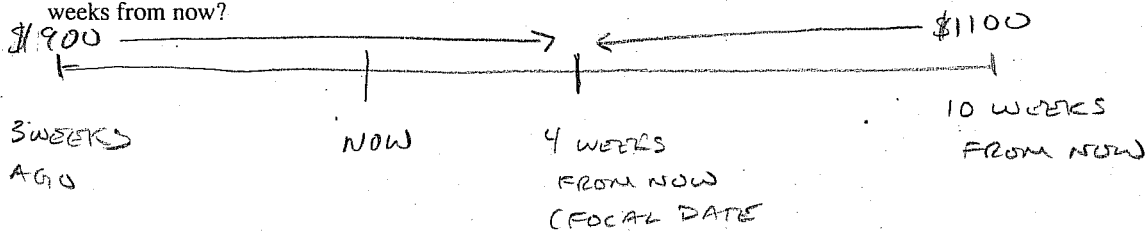
$$\frac{2}{3} = \frac{x}{41}$$

$$82 = 3x$$

$$\frac{82}{3} = x$$

Question 19. (4 marks)

A loan payments of \$900 was due 3 weeks ago and another payment of \$1100 is due 10 weeks from now. What single payment 4 weeks from now will pay off the two debts if the interest rate is 7% and the agreed focal date is 4 weeks from now?



EQUIVALENT VALUE OF \$900 IN 4 WEEKS

$$S = P(1 + r t) = 900(1 + (0.07)\left(\frac{7}{52}\right)) = \$908.48$$

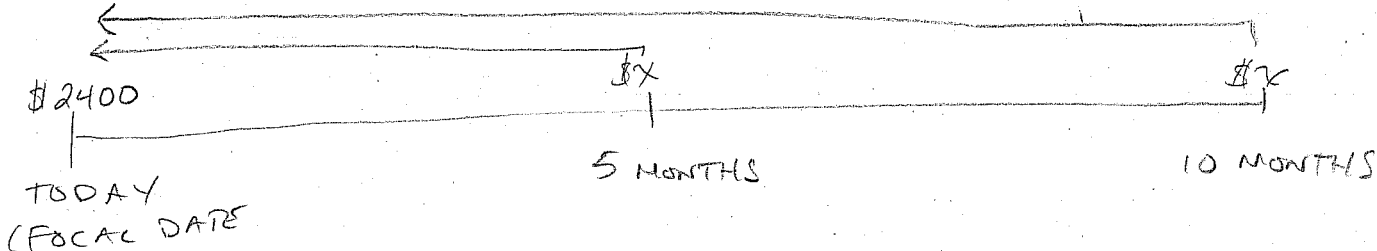
EQUIVALENT VALUE OF \$1100 IN 4 WEEKS

$$P = \frac{S}{1 + r t} = \frac{1100}{1 + (0.07)\left(\frac{6}{52}\right)} = \$1091.19$$

SINGLE PAYMENT IN 4 WEEKS = $908.48 + 1091.19 = \$1999.67$

Question 20. (5 marks)

Don buys a big screen TV from Tube-Town TV Shop for \$2400 today and agrees to pay for it in 2 equal payments. At 12% interest, the first payment is to be made in 5 months and the second payment is to be made in 10 months. What is the size of the equal payments given that the focal date is today?



EQUIVALENT VALUE OF FIRST PAYMENT (TODAY)

$$P = \frac{S}{1 + r t} = \frac{x}{1 + (0.12)\left(\frac{5}{12}\right)} = 0.9523809524x$$

EQUIVALENT VALUE OF SECOND PAYMENT (TODAY)

$$P = \frac{S}{1 + r t} = \frac{x}{1 + (0.12)\left(\frac{10}{12}\right)} = 0.90909091x$$

AND SO

$$2400 = 0.9523809524x + 0.90909091x$$

$$2400 = 1.861471861x$$

$$1289.30 = x$$

THE PAYMENTS ARE \$1289.30 EACH