Dawson College: Business Mathematics: 201-801-DW

Name: SOLUTIONS
Student ID: _____

Test 1

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. *(2 marks)* Write the percent 0.4% into a fraction and into a decimal.

$0.4\% = 0.004 = \frac{1}{250}$

Question 2. *(1 mark)* Reduce the fraction $\frac{63}{81}$ to lowest terms.

$\frac{63}{81} = \frac{7}{9}$

Question 3. *(1 mark)*
63% of what number is 2898?

$2898 = (.63)x \Rightarrow x = \frac{2898}{0.63} = 4600$

Question 4. *(1 mark)* Bring the fraction $\frac{13.5}{0.85}$ to higher terms to eliminate the decimals (write your final answer in lowest terms).

$\frac{13.5}{0.85} = \frac{1350}{85} = \frac{270}{17}$

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

$$22+5\left[\frac{3^2-(2-4)}{(6)(2)-1}\right] = 22 + 5\left[\frac{9-(-2)}{12-1}\right]$$

$$= 22 + 5\left[\frac{11}{11}\right] = 22+5 = 27.00$$

Question 6. *(3 marks)* Simplify the following:

$4(3x+2)(x-6)-(2-x)(x+1)$

$= 4(3x^2-18x+2x-12)-(2x+2-x^2-x)$

$= 4(3x^2-16x-12)-(-x^2+x+2)$

$= 12x^2-64x-48+x^2-x-2$

$= 13x^2-65x-50$

Question 7. *(2 marks)* Expand the following:

$(a-b)(2a^2-a+3b+1)$

$= a(2a^2-a+3b+1) - b(2a^2-a+3b+1)$

$= 2a^3 - a^2 + 3ab + a - 2a^2b + ab - 3b^2 - b$

$= 2a^3 - a^2 + a + 4ab - 2a^2b - 3b^2 - b$

Question 8. *(3 marks)* Simplify the following:

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

$$= \frac{x^9y^4}{x^3y^9} = \frac{x^6}{y^5}$$

Question 9. *(2 mark)* Evaluate the following to two decimal places:

$$\ln\left(\frac{e^8}{253}\right) = \ln e^8 - \ln 253 = 8\ln e - \ln 253$$

$$= 8(1) - \ln 253 = 2.47$$

Question 10. *(1 mark)* Rewrite the exponential $6^{-3} = \frac{1}{216}$ as a logarithm.

$$\log_6 \frac{1}{216} = -3$$

Question 11. *(1 mark each)*
Evaluate the following to two decimal places:

1. $\sqrt{421} = 20.52$
2. $68^{\frac{3}{4}} = 23.68$
3. $\frac{2-6^{-1}}{4} = 0.46$
4. $\sqrt[3]{21} = 2.76$

Question 12. *(4 marks)*
Let $r = 0.045$, $P = 2245$, and $t = 1104$. Evaluate S to two decimal places:

$$S = P\left[1 - \frac{rt}{365}\right] = 2245\left[1 - \frac{(0.045)(1104)}{365}\right]$$

$$= 2245\left[1 - \frac{49.68}{365}\right]$$

$$= 2245\left[1 - 0.136109589\right]$$

$$= 2245(0.863890411) = 1939.43$$

Question 13. *(2 marks)*
Solve for a in the following equation:

$$S = \frac{n}{2}(a+2d) \Rightarrow 2S = n(a+2d) \Rightarrow \frac{2S}{n} = a + 2d$$

$$\Rightarrow \frac{2S}{n} - 2d = a$$

Question 14. *(4 marks)*
Solve for x and check your answer:

$$3(x+1) - (6-x) - (x+1) = 6(x-2) - 1$$

$$3x + 3 - 6 + x - x - 1 = 6x - 12 - 1$$

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

$$-3x = -9$$

$$x = 3$$

CHECK:

$LS = 3(3+1) - (6-3) - (3+1)$

$= 3(4) - (3) - (2)$

$= 12 - 5 = 7$

$RS = 6(3-2) + 1 = 6(2) + 1$

$= 7$

$LS = RS$ ✓

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

$\frac{3}{7}(2x+3)-x=\frac{1}{2}(5x-2)+\frac{7}{6}$ LCD = 42

$42\left(\frac{3}{7}\right)(2x+3)-42(x)=42\left(\frac{1}{2}\right)(5x-2)+42\left(\frac{7}{6}\right)$

$18(2x+3)-42x=21(5x-2)+49$

$36x+54-42x=105x-42+49$

$-6x+54=105x+7$

$47=111x$

$\frac{47}{111}=x$

Question 16. *(2 marks)*
Change the ratio 36 : 48 : 72 to lowest terms.

$36:48:72=(36\div12):(48\div12):(72\div12)=3:4:6$

Question 17. *(2 marks)*
Solve the proportion $5 : x = 15 : 24$.

$\frac{5}{x}=\frac{15}{24} \Rightarrow (5)(24)=15x \Rightarrow \frac{120}{15}=x \Rightarrow 8=x$

Question 18. *(4 marks)*
An ice cream shop is making an inventory of it's ice cream cones. Since waffle cones are more popular, there are 7 times the amount of sugar cones as waffle cones. How many waffle cones does the shop have if they have 208 cones in total?

LET x = # OF SUGAR CONES.

THEN $7x$ = # OF WAFFLE CONES.

TOTAL # OF CONES = (# OF SUGAR CONES) + (# OF WAFFLE CONES)

$208 = x + 7x$

$208 = 8x$

$26 = x$

$\therefore 7x = 7(26) = 182$

THE SHOP HAS 182 WAFFLE CONES.

Question 19. *(4 marks)*
Frank opens a savings account with zero interest at a bank. He makes an initial deposit of \$4 000 on January 1st, he withdraws \$1 500 on May 1st, he deposits \$600 on August 1st, he deposits \$1 000 on November 1st. What was Frank's average monthly balance of his savings account for the year?

BALANCE	# OF MONTHS
\$4 000	4
\$2 500	3
\$3 100	3
\$4 100	2

AVERAGE MONTHLY BALANCE

$$= \frac{(4)(4000) + 3(2500) + 3(3100) + 2(4100)}{12}$$

$$= \frac{41000}{12} = \$3416.67$$

Question 20. *(4 marks)*
An electrician and her apprentice worked together for a $3\frac{1}{2}$, $7\frac{1}{4}$, and $5\frac{3}{4}$ hours respectively. What was the cost of labour if the electrician charges \$54.25 per hour and the apprentice charges \$16.75 per hour?

TOTAL # OF HOURS WORKED $= 3\frac{1}{2} + 7\frac{1}{4} + 5\frac{3}{4} = 16.5$ HOURS

COST OF LABOUR FOR ELECTRICIAN $= (16.5)(54.25) = \$895.13$

COST OF LABOUR FOR APPRENTICE $= (16.5)(16.75) = \$276.38$

$\therefore$ TOTAL COST OF LABOUR $= \$895.13 + \$276.38 = \$1171.51$

Question 21. *(4 marks)*
An investor makes \$14 960 from three stocks in the ratio 5 : 4 : 3. How much did he get from each stock?

$5 + 4 + 3 = 12$ PARTS

EACH PART: $\frac{\$14960}{12} = 1246.6\dot{6}$

THE INVESTOR GETS:

$(5)(1246.6\dot{6}) = \$6233.33$ FROM THE FIRST STOCK.

$(4)(1246.6\dot{6}) = \$4986.67$ FROM THE SECOND STOCK

$(3)(1246.6\dot{6}) = \$3740.00$ FROM THE THIRD STOCK