TEST 6 WITH VARIATIONS

Q#1: Variation of this question is changing numbers.

Live Test 6:Test 5A

Math Skills for Business –Test 5A
Total Marks: 50
Time: 105 minutes
Aids: Calculators are permitted.

GENERAL:
1. In all points a) b) c) answer should exists, NO option Indeterminate
2. if we have -1p or 1p it should be -p or p without -1 or 1 at the beginning

Instructions: Write full solutions in the spaces provided. If more room is required, you may write on the back of the page.

1. a) Solve: $3(x-3)-5(x+3)=x$ (3)

Here it is important to have before at least one pair brackets number less than zero example:
-3(x - 2) + 5 (x + 3) = x

b) Solve for x and y: (4)

$$4x-3y=-5$$
$$3x-4y=-2$$

None of number(before parameters (here x or y) or on right side of equations) should be zero

c) Solve for p: (3)

$$\frac{3p-2}{5}=\frac{p+2}{3}$$

all number in the equation should be different from zero

Q#2

2. In a certain company, people make either $20 per hour or $12 per hour. The ratio of those paid at the higher rate to those paid at the lower rate is 3:10.
a) If the total amount paid out each hour to all employees is $2160, find the total number of employees in the company. (3)

b) The following year everyone was given a raise of $4 per hour. Assume that nobody is promoted, hired, or released. Find the percentage increase in the total paid out each hour to all employees. Round your answer to the nearest percent. (2)

Q#2: VARIATION

2 a) variation

2. An investor wants to keep the amount she has invested in bonds to the amount she invests in stocks to be in the ratio 5:3. If she has $60 000 more invested in bonds than she does in stocks, how much does she have invested in total? (3)

$$\frac{5}{3}=\frac{x+60000}{x}$$

$$2x=180000$$

$$x=90000$$

She has $150000+$90000=$240000 invested in total

2 b) variation

3. It is known that the ratio of hits on a website to people who actually place an order from the website is 9:2. The average purchase per order is $80. If a total of 4203 hits are recorded next month on the website, determine the predicted total value of the orders next month. (3)

Let x represent the number of people who make a purchase

$$\frac{9}{2}=\frac{4203}{x}$$

$$9x=8406$$

$$x=934$$

$$Total=80(934)=\$74720$$

Q#3

3. The table below represents some data concerning my investment account over time. (Calculated on Dec. 31st of each year)

2007	2008	2009	2010	2011 (projected)
$240 000	$210 000		$300 000	

This table is not interactive tale it is only information for the students from they will take data

a) Find the percentage decrease in my investment account from 2007 to 2008 (answer as a percent, to one decimal place) (2)

b) My account is projected to increase by 12% from 2009 to 2010. What was my current amount at the end of 2009? (Rounded to the nearest cent) (2)

c) The amount projected to be in the account at the end of 2011 was based a prediction of an average increase of 7% compounded annually, based on my account at the end of 2007. Find the amount projected for the end of 2011. (round to the nearest cent) (2)

Q#3: VARIATION

3 a) b) c) variation

4. The table below represents some data collected from participants in a study done each year. Some data is missing. The total number of participants polled each year is the same.

	2008	2009	2010	2011 (projected)
employed	424	477		462
unemployed				

This table is not interactive table, it is only information

a) If the percentage of those polled who were unemployed was 20% in 2008, find the total number of participants polled. (2)

Let x represent the number of people polled.

$0.8x = 424$

$x = 530$

530 were polled

b) If the number employed increases to 477 in 2009, find the percentage increase in those employed from 2008 to 2009. (2)

$\%increase = \frac{477 - 424}{424} \times 100 = 12.5\%$

c) The percentage increase in the projection for those employed in 2011 is projected to be 5%. How many people were employed in 2010? (2)

$1.05x = 462$

$x = \frac{462}{1.05} = 440$

440 were employed in 2010

Q#4

4. The relationship between amount of money spent on advertising ($\$x$) and resulting total revenue ($\$y$) is assumed to be linear. That is, it can be expressed in the form y=mx+b. The chart below provides some information.

x	y
\$10 000	\$20 000
\$12 500	\$24 000

a) Use this information to predict the equation in the form $y=mx+b$ (3)

b) Assuming the company does not advertise, what does the formula predict for total revenue? (1)

c) It turns out that this model fails once the revenue reaches \$400 000. Find the maximum amount that is spent on advertising (before the model fails). (2)

d) is missing, It should be a random point (once we can ask about interpretation of y-intercept or interpretation of slope (as a text answer)

Q#4: VARIATION 1

4 abcd Variation1

4. The relationship between amount of money spent on advertising ($x) and resulting total revenue ($y) is assumed to be linear. That is, it can be expressed in the form y=mx+b. The chart below provides some information.

x	y
$10 000	$20 000
$12 500	$24 000

a) Use this information to predict the equation in the form $y=mx+b$ (3)

$m=\frac{4000}{2500}=1.6$ or $\frac{8}{5}$

$y=1.6x+b$

$20000=1.6(10000)+b$

$b=4000$

$y=1.6x+4000$ or $y=\frac{8}{5}x+4000$

b) Assuming the company does not advertise, what does the formula predict for total revenue? (1)

Let x=0. It predicts $4000 of revenue

c) It turns out that this model fails once the revenue reaches $400 000. Find the maximum amount that is spent on advertising (before the model fails). (2)

$400000=1.6x+4000$

$396000=1.6x$

$x=247500$

predicts $247500 of advertising

d) State the slope and what it represents in this problem (2)

The slope is 1.6 and it represents $1.60 increase in revenue for every $1 increase in advertising spending

Q#4: VARIATION 2

4 abcd Variation 2

5. The relationship between amount of money spent on the total monthly salaries for emloyees (**$x**) and resulting monthly profit (**$y**) is assumed to be linear. That is, it can be expressed in the form y=mx+b. The chart below provides some information.

x	*y*
$125000	$18 000
$150000	$24 000

a) Use this information to predict the equation in the form $y=mx+b$ (3)

$$m=\frac{6000}{25000}=0.24 \text{ or } \frac{6}{25}$$

$$m=\frac{6000}{25000}=0.24 \text{ or } \frac{6}{25}$$

$$y=0.24x+b$$

$$18000=0.24(125000)+b$$

$$b=-12000$$

$$y=0.24x-12000$$

b) Based on this formula, how much money does the company lose monthly if they don't hire any employees? (1)

they lose $12000 (let x=0)

c) Find the total monthly salary amount which predicts the company will break-even (that is, neither make nor lose any money) (1)

Let y=0
0=0.24x-12000
x= $50000

d) Find the monthly profit if the monthly salaries are known to be exactly five times the monthly profit. (3)

Let x=5y
y=0.24(5y)-12000
y=1.2y-12000
-0.2y=-12000
y=60000
This means that the monthly profit will be $60000 when this happens

Q#5

5. a) I invest $80 000 at a certain rate of interest, compounded annually and I end up with $100 000 at the end of a three-year period. Find the annual rate of compound interest. Answer as a percent, to one decimal place. (3)

Variation in this question are changing context and numbers

b) My friend invests $80 000 with an advisor. The adviser charges a fixed amount of $3 000 per year to manage the account at the end of each year. The value of the account increases by 10% compound interest per year and only then is the $3000 deducted.. Determine the value of my friend's account at the end of a three-year period. (3)

Q#6

6. The value of the Canadian dollar, is valued today at $0.97 in US funds today. The Canadian dollar is predicted to increase in value by 15% simple interest this year relative to the U.S. dollar. After how many days does this model predict the Canadian dollar will be worth the same as a U.S. dollar? (answer to the nearest day) (3)

Q#6: VARIATION 1

6 Variation 1

7. The value of the Euro, in Canadian dollars, is valued today at $1.30 Canadian today. The Euro is predicted to decrease in value by 20% simple interest this year against the Canadian dollar. After how many days will I be able to purchase a Euro for less than $1.15 Canadian? (Answer to the nearest day) (2)

$1.3 - 1.3(0.2)t = 1.15$

$0.26t = 0.15$

$t \text{ (in years)} = \dfrac{0.15}{0.26}$

$t \text{ (in days)} = \dfrac{0.15}{0.26} \times 365 = 210.58$

$\therefore$ 211 days

Q#6: VARIATION 2

6 Variation 2

3. In the state of Texas, a certain I-Pod cost $250 in U.S. dollars. In Ontario, the same I-Pod cost $350 in Canadian dollars. Prices quoted do not include tax. At the time of purchase, a U.S. dollar was worth 20% more than a Canadian dollar. Also, taxes in Texas were 5% compared to 13% in Ontario. How much could have been saved, in Canadian dollars, by purchasing the I-Pod in Texas?

US total price in Canadian dollars = $250(1.05)(1.2) = \$315 canadian$

Canadian price = $350(1.13) = \$395.50$

Amount saved in Can. dollars $395.50 - 315 = \$80.50$

Q#7

7. There are two fares for transit users. One is for students and the second is the regular adult fare. A family with two adults and three students costs $10.85. A group consisting of one adult and four students costs $9.80. Find the cost of a regular adult transit fare. (5)

Q#7: VARIATION 1

7 Variation 1

8. The regular pay for a server at a restaurant is $80 per day. The expectation is that in addition to this, the server makes an additional $110 per day in tips on a busy day and $40 per day in tips on a normal day. This past month, the server worked a total of 20 days in all and the total amount made came to a total of $2820. Determine the number of normal days worked. (5)

Let x represent the number of normal days.

$20 - x$ is the number of busy days.

$$2820 = 80(20) + 40x + 110(20 - x)$$

$$1220 = 40x + 2200 - 110x$$

$$70x = 980$$

$$x = \frac{980}{70}$$

$$x = 14$$

$\therefore$ 14 normal days

Q#7: VARIATION 2

7 Variation 2

7. With the money I have in my pocket, I can buy either twelve notebooks or seven pens. A pen costs 25 cents more than a notebook. How much money is in my pocket?

Let the price of a notebook be n cents

Let the price of a pen cost $n + 25$ cents

$12n = 7(n + 25)$

$12n = 7n + 175$

$5n = 175$

$n = 35$

The money in my pocket is 12(35)= 420 cents

or $4.20

Q#8

8. The formula used to calculate the *annual increase (y)* in the website sales of an internet company is given by the formula $y = 10\sqrt{x}$ where x represents the current website sales at the beginning of the year.

a) Find the annual increase in website sales if the current website sales are $22 500. (1)

b) Find the percentage increase in the website sales (round percent to one decimal) (2)

c) Project the increase for the following year. Will the percentage increase in website sales be greater in year 1 or year 2? (2)

Q#8: VARIATION

8 Variation: IN VARIATION WE HAVE ONLY POINT a) and b) (c) do not exist) !!

(5)

8. The *weekly income ($W)* a person earns depends upon the number of hours worked *(h)* and the number of years *(y)* they have worked for the company according to the formula $W = 9h\left(\frac{y+1}{2}\right)$

a) Find the number of hours worked by Georgia, who receives a weekly income of $1741.50 and has worked for the company for 8 years. (2)

$174150 = 9h(4.5)$

$1741.50 = 40.5h$

$h = 43$

Georgia works 43 hours

b) Two people each work 40 hours each week. Sam has been working for the company for 11 years. Bettina has been there longer and makes 20% more weekly. How long has Bettina being working there? (answer in years to one decimal place)

(Sam's pay)(1.2) = *Bettina's* pay

$9(40)(6)(1.2) = 9(40)\left(\frac{y+1}{2}\right)$

$7.2 = \left(\frac{y+1}{2}\right)$ (dividing by 9(40))

$y+1 = 14.4$

$y = 13.4$

Bettina has been working for 13.4 years.

There are many simpler ways of working this out.

Q#9

9. A game of cards is played with 5 cards. Three of these cards has the number 10 written on one side only. The other two cards are blank on both sides. Cards are initially number side face down. Two cards are randomly selected and turned over. Find:

a) the probability that both cards turned over show the number 10. (2)

b) the probability that when both cards are turned over exactly one of the two will still be blank. (2)

Q#9: VARIATION 1

9 abc Variation 1 : IN VARIATION WE HAVE MORE POINTS a) b) and c) (was a) and b))!!!!

9. Data in the chart below represents the results of previous games between various countries. The number in a **row** represents the number of games won by that country against the country shown in the **column**. Note: Each game results in a win or a loss. **There are no ties.**

Country	Brazil	Holland	Germany
Brazil	----------	12	18
Holland	4	----------	8
Germany	12	12	----------

Using this information only to predict future results, determine the probability, expressed as a percent, that:

a) Germany will win its next game versus Brazil (1)

P(Germany beats Brazil)= $\frac{12}{30}$ =40%

b) Brazil will lose its next game versus Holland (1)

P(Brazil loses to Holland)= $\frac{4}{16}$ =25%

c) Germany will lose its next game played against both Brazil and Holland. (2)

P(Germany loses to both)= $\left(\frac{18}{30}\right)\left(\frac{8}{20}\right)$ = 24%

Q#9: VARIATION 2

9 abc Variation 2: IN VARIATION are a) b) c) in the main question was a) b) !!!!!

6-2. 25% of all TRSM students spend 2 hours or more per day on FACEBOOK. 60% of all students who spend 2 hours per day or more on FACEBOOK have GPA's below 3.0. At TSRM, 40% of all students have GPA's below 3.0.

a) Use the information shown above to complete the chart below:

All in %	<2h Facebook	≥2h Facebook	Total
GPA <3.0	0.25	.6(.25)=0.15	0.4
GPA ≥ 3.0	0.5	0.1	0.6
Total	0.75	0.25	1

Here empty interactive table: That student will full fill all cells with numbers

b) Determine the probability that a student achieves a GPA of 3.0 or higher, given that they use FACEBOOK for 2 hours or more per day.

c) Determine the probability that a student is on FACEBOOK less than 2 h given that they have a GPA of 3.0 or more.

b). $P(GPA \geq 3 \mid FB \geq 2) = \frac{0.1}{0.25}$

$= 0.4$

c). $P(FB < 2 \mid GPA \geq 3) = \frac{0.5}{0.6}$

$= 0.8\overline{3}$