Grade 12 Essential

Quiz Week 7

24-05-16

Solutions Debrief

MrF

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GRADE 12 ESSENTIALS
WEEKLY QUIZ – WEEK 7 - 240516

Name:_____
Date: _____

SHOW WORK! It ensures you are doing the correct method, it is easier for you to check, and the teacher can award part marks.

Time Limit: 60 mins

Some students too 75', some never finished!

Closed book. But allowed your Study Notes ['cheat sheet'] and teacher's cheat sheet

It is possible to get 120% on this quiz with the bonuses.

Round all decimal values and percents to the nearest 0.01.

Mostly recent re-cycled questions!
An easy 120 % [?]

1. Brad and Janet's home is assessed at $227,750.
   - Their property taxes are based on the residential portion percentage of 45% of the assessed value.
   - The Mill Rate is 10.75 for municipal taxes and 13.95 for school-division taxes.
   - Brad and Janet qualify for a property Tax Credit of $750.

Determine the resulting annual property taxes on their home.

Portioned Assesment = Property Value • Portion %
= 227,750 • 45/100 = $102,487.50

Prop Tax = Portioned Assessment • Mill Rate(s)
= $102,487.50 • 24.70/1,000 = $2,531.44

2,531.44 Taxes
− 750.00 Credit
($1,781.44) Annual Taxes Due

10.75
+ 13.95
24.70 mR

Property Tax

Portioned Assessment = Property Assessment *Portion Percentage

Property Tax = Portioned Assessment * Mill Rate(s) + [Special Levies + Frontage Levies]

Mill Rate = $\frac{City\ Revenue\ Required}{Total\ portioned\ value\ of\ Properties} * 1000$, a Mill is a per thousand

Cheat Sheet

2. What happens to the amount of interest you pay on a mortgage loan when you increase the down payment? Explain in a complete grammatically correct sentence or example.

If I increase the down payment then I do not need as large a loan. I will pay less interest (carrying charge) on a smaller loan.

Example a loan of 200K at 4% for 20 years would cost:

$(\$6.04 \cdot 200)/_{month} \cdot 240$ months $= 289,920$ Total Payment.

Extra $25K down $\Rightarrow$ A loan for $175K @ 4% for 20 years would cost:

$(\$6.04 \cdot 175)/_{month} \cdot 240$ months $= \$253,680$ Total

$289,920 - 253,680 = \$36,240$ Interest saved by putting extra $25K down

3. Karen wants to buy a house worth $209,000.
   - She will make a down payment of $25,000.
   - Annual property taxes are $2,850; and
   - heating costs are $195 per month.

} Loan $184,000

Determine Karen's Gross Debt Service Ratio (GDSR) if her gross monthly income is $3,200 and her bank is offering 4.25% over 20 years.

$$GDSR = \frac{(\text{Mortgage} + \text{Prop Tax} + \text{Heat})}{\text{Gross Income}} \cdot 100 \qquad \leq 0.32 \leq 32\%$$

$$= \frac{[\$1135.28 + \$237.50 + \$195]}{\$3,200}$$

$$= \frac{1567.78}{3200} = 48.98\%$$

No way can she afford this!!

$3850/yr \cdot \frac{1\ yr}{12\ mon} = \$237.50/mon$

Interest Rate	5 years	10 years	15 years	20 years
4.00%	$18.40	$10.11	$7.38	$6.04
4.25%	18.51	10.23	7.50	6.17

$$GDSR = \frac{\text{Monthly Mortgage} + \text{Monthly Property Taxes} + \text{Monthly Heating Cost}}{\text{Gross Monthly Income}} * 100; \quad \text{max } 32\%$$

Mortgage Payments

$6.17 \cdot 184,000/1000$

$= 6.17 \cdot 184$

$= \$1,135.28/month$

4. A company wishes to advertise a new type of breakfast cereal by sending out small samples through the mail to potential customers. There is a 5% chance that a potential customer will like the cereal and buy a full box for $7.50.

a. Calculate the expected value for the company if the samples cost $0.40 each to produce and distribute.

b. Justify [explain in a proper sentence] whether the company should try this form of advertising based on your answer above.

a) $EV = P(\text{WIN}) \cdot \text{Net Gain} - P(\text{Lose}) \cdot \text{Loss}$

$= \frac{5}{100} \cdot (\$7.50 - \$0.40) - \frac{95}{100} \cdot \$0.40$

$= \frac{5}{100} \cdot \$7.10 - \frac{95}{100} \cdot \$0.40 = -\$0.25/\text{sample}$

b) They will lose 25 cents per sample!!!
Not a good plan!!!

EV = P(win)*$Net Gain – P(lose)*$Loss; if negative you lose that amt *on average* every play.

6. The **Odds in Favour** of Fabian's dog doing a trick successfully is 5:3

a. State the **Odds Against** the dog doing the trick successfully.

b. Determine the **Probability**, as a fraction and as a percent, of Fabian's dog doing the trick successfully.

5 : 3 ⟵ Odds in favour

↑ Success ↖ Not success

a) Odds against ⇒ 3 : 5

Not success : Success

b) Prob(Success) $= \frac{\#\text{ of Successes}}{\#\text{ of Tries}} = \frac{5}{8}$

$= 62.5\%$

7. **Problem Solve**. Solve using a table (or any other method you choose)

You and eight friends are driving west for a Sun Dance in Calgary. You are taking two cars. Your friends start an hour earlier than you at 9 am and travel at a speed of 100 km/hr. You depart (the hour later at 10 am) and travel at a speed of 110 km/hr.

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a. Determine how many km apart are the two cars after six hours;

b. At what **time** will you catch up with the first car?

Here is the format of a table you *may* want to use.

Time	09:00	10:00	11:00	12:00	13:00	14
Distance First car	0	100	200	300	400	500
Distance Your Car		0	110	220	330	440

+100 +100 +100 +110 +110 +110

their six hours? our six hours?

6 hours

15 16 17 18 19 20 21 22

Distance First car: 600 700 800 900 1000 1100 1200 1300

Distance Your Car: 550 660 770 880 990 1100 1210 1320

50 km

a) Car #1 has travelled 600 km, car #2 has travelled 550 km. They are 50 km apart.

b) We catch up to each other 1100 km down the road at 20:00 (8PM) but of course we crossed a time zone so really 7PM mountain time

BONUSES

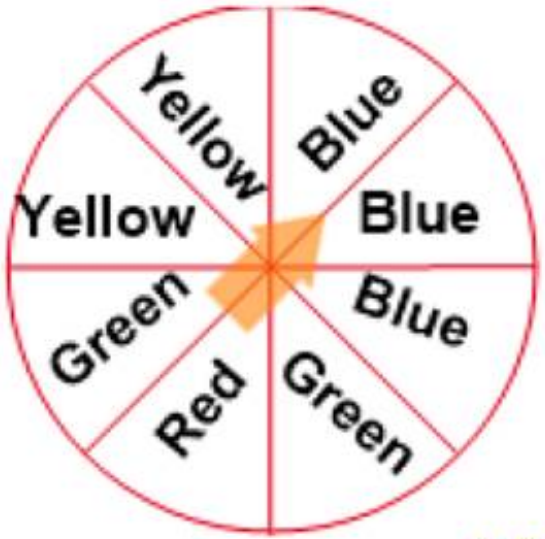
Another very Familiar Question!!

BONUS 1. Expected Value. It costs $5.00 per play for every spin of the fair spinner. If a player gets **BLUE** then they win a prize of $12.

a. determine the probability of spinning a Blue, express as a percent. [P(BLUE)]

b. Determine the **Expected Value** (EV) per play.

c. If the player plays 50 times determine how much they can expect, *on average*, to *likely* gain or lose overall.



a) $P(\text{SPIN BLUE}) = \frac{\#\text{ of Blue}}{\#\text{ Possible outcomes}}$

$= \frac{3}{8} = 37.5\%$

b) $EV = P(\text{WIN}) \cdot \text{Net Gain} - P(\text{Lose}) \cdot \text{Loss}$

$= \frac{3}{8} \cdot (\$12 - \$5) - \frac{5}{8} \cdot \$5$

$= \frac{3}{8} \cdot \$7 - \frac{5}{8} \cdot \$5 = -\$0.50/\text{play}$

c) $-\$0.50/\text{play} \cdot 50 \text{ plays} = -\$25.00$

Can expect to lose, on average, $25.00

Problem Solve. Three years ago Josh was half his mom's age. The difference in their ages is 27 years. Determine how old Josh is **now**.

Guess and check, graph?, algebra?

Another classic! Have done dozens of these

Josh now	Josh 3yr ago	Josh mom 3yr ago	Josh mom Now	Difference in age	
× 25?	22	44	47	22	← 44-22 or 47-25 × BEST
× 28?	28-3 25	25·2 50	50+3 53	25	50-25 or 53-28 × BEST
30? ✓	27	54	57	27 ✓ Yes!	

Josh is 30 his mom is 27 years older age 57 ✓
& 3 years ago when he was 27 he was half his mom's age; she was 54!

See a possible 27 pattern...

It all checks!

Josh is 30 years old now!

Check the end of the movie Will show the fancier ways of doing simple problems like this

of course you might organize your thoughts a bit differently!

That was it.

Seven basic questions plus two bonus questions in 60 mins.

(well 75)

All recyled questions from recent worksheets or reviews or warmups

Many of the questions we had done a DOZEN times!

Class average was 44%

I was expecting more than 100%

This is not looking good for several students!!!

If you have ~40% now you need 80% on Final Exam!