Name: _____ Class: _____ Date: _____ ID: A

Review Key

Midterm Review Chapters 1 to 4

Multiple Choice
Identify the choice that best completes the statement or answers the question.

Ch 1

____ 1. Determine the future value of a simple interest investment with a 6-year term on a principal of $150 at 2.8%.

$A = P + Prt$
$= 150 + 150(0.028)(6)$

A. $180.50
B. $175.20 ✓
C. $402.00
D. $154.30

____ 2. Determine the future value of a simple interest investment where 3% interest paid quarterly for 3 years on $700.

$A = P + Prt$
$= 700 + 700(0.03)(3)$

A. $763.00 ✓
B. $728.00
C. $742.00
D. $805.00

____ 3. Patrick invested $4000 for 9 years. At the investment's maturity, its value was $5476. What was the annual simple interest rate?

$A = P + Prt$
$5476 = 4000 + 4000(r)(9)$
$r = 0.041$

or
$I = Prt$
$(5476 - 4000) = 4000(r)(9)$

A. 3.8%
B. 4.1% ✓
C. 6.2%
D. 5.3%

____ 4. Rosa invested $600 at 3.9% simple interest. At the investment's maturity, its value was $1302. How long was the money invested?

$1302 = 600 + 600(0.039)(t)$

$t = \frac{1302 - 600}{600(0.039)}$

A. 25 years
B. 30 years ✓
C. 35 years
D. 40 years

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____ 5. Jacob has $30 000 to invest for 5 years. Which investment option will earn him more interest? How much more interest?

A. 6.2% simple interest, paid monthly

B. 4.2% compound interest, paid annually

$I = Prt = 30000(0.062)(5) = 9300$

$A = P(1+\frac{i}{n})^{tn} = 30000(1+0.042)^5 = 36851.90$

$36851.90 - 30000 = 6851.90$

$9300 - 6851.90$

A. Option B: $488.30

B. Option A: $2448.10 ✓

C. Option B: $230.10

D. Option A: $2303.23

____ 6. How many compounding periods are there for $1000 invested for 6 years at 4.2% compounded semi-annually?

6×2

A. 6

B. 12 ✓

C. 42

D. 6000

____ 7. Determine the future value and the total interest earned for the investment.

Principal (P) ($)	Compound Interest Rate per Annum (%)	Compounding Frequency	Term
35 000	3.7	quarterly	7 years

$A = P(1+\frac{i}{n})^{tn}$

$= 35000(1+\frac{0.037}{4})^{28}$

A. $45 239.99; 10 239.99

B. $46 245.18; $11 245.18

C. $45 293.23; $10 293.23 ✓

D. $44 669.12; $9669.12

____ 8. Use the Rule of 72 to estimate the investment's doubling time.

Principal (P) ($)	Compound Interest Rate per Annum (%)	Compounding Frequency	Term
700	1.7	weekly	3.5 years

A. 200 years

B. 2 years

C. 42 years ✓

D. 412 years

$\frac{72}{1.7\%}$

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___ **9.** Determine the present value of a 3-year CSB with an interest rate of 3.9%, compounded semi-annually, if the future value is $2000.

$2000 = P\left(1 + \frac{0.039}{2}\right)^{6}$

A. $1786.43
B. $1814.49
C. $1779.51
D. $1781.18 ✓

___ **10.** A $6000 investment grows to $7351.81 in 5.5 years. If the investment has interest compounded monthly, determine the interest rate.

$7351.81 = 6000\left(1 + \frac{i}{12}\right)^{66}$

$\sqrt[66]{\frac{7351.81}{6000}} = 1 + \frac{i}{12}$ $\quad i = 0.037$

A. 3.7% ✓
B. 3.5%
C. 3.3%
D. 3.2%

___ **11.** Determine the term of a $39 000 investment with an interest rate of 2.06%, compounded quarterly, if the future value is $52 000.

$52000 = 39000\left(1 + \frac{0.0206}{4}\right)^{4t} \rightarrow \log\left(\frac{52000}{39000}\right) = 4t \log\left(1 + \frac{0.0206}{4}\right)$

$1.\overline{3} = (1.00515)^{4t}$

try the choices in

A. 14 years ✓
B. 15 years
C. 16 years
D. 17 years

___ **12.** This portfolio was started 5 years ago. What is the portfolio's current rate of return?
- Semi-annual deposits of $4000 into an account averaging 5.85%, compounded semi-annually
- A 5-year $19 000 bond earning 6.55%, compounded monthly

remember starts saving not deposit 5 yrs ago 1st dep. 4.5 yrs ago

$4000\left(1 + \frac{0.0585}{2}\right)^{2.0} = 4000(1.02925)^{2} = 4000$ now

2.0 = 4000
2.5 = 4117
2.1 = 4237.47
2.15 = 4361.37
2.2 = 4488.94
2.25 = 4620.24
2.3 = 4755.38
2.35 = 4894.48
2.4 = 5037.64
2.45 = 5184.99

$A = 19000\left(1 + \frac{0.0655}{12}\right)^{12.5}$

$= 26338.94$

45697.46 +

A. 22.38%
B. 22.10%
C. 21.90%
D. 22.54%

Ch3 ___ **13.** What is the meaning of *complement* in set theory?

rate of return $= \frac{A}{P} = \frac{72036.4}{59200} = 1.22$ ✓

A. all the elements in the universal set that are not identical
B. a set of elements that work well with a given set
✓ **C.** all the elements of a universal set that do not belong to a subset of it
D. all the elements that are the opposite of the elements in a given set

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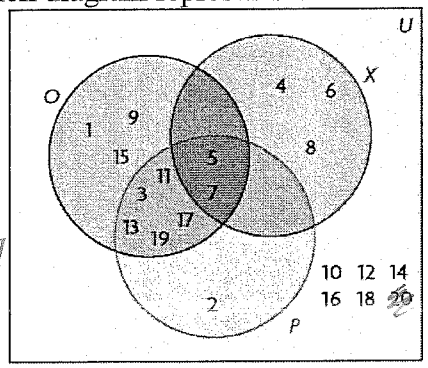
____ **14.** Given the following situation:

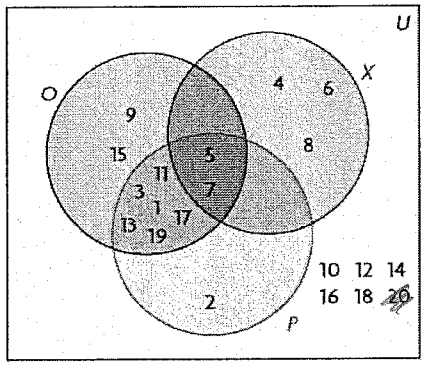
- the universal set U = {positive integers less than 20}
- X = {4, 5, 6, 7, 8}
- P = {prime numbers of U}
- O = {odd numbers of U}

Which diagram represents the situation?

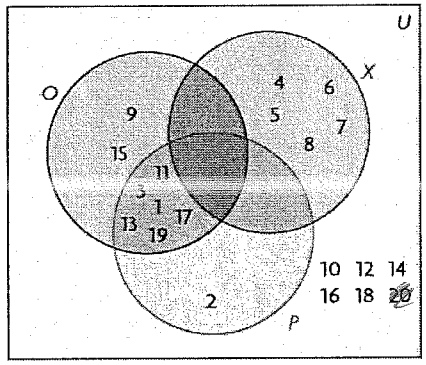
A.



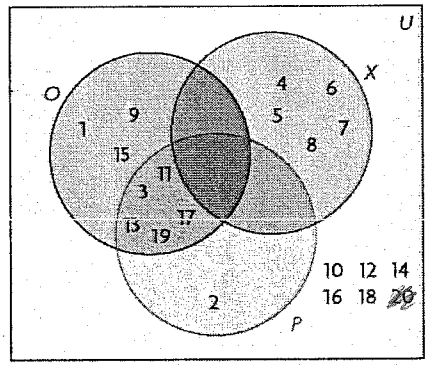
B.



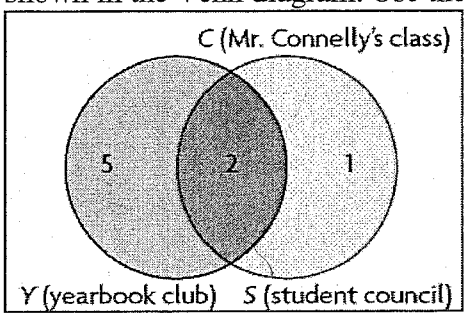
C.



D.



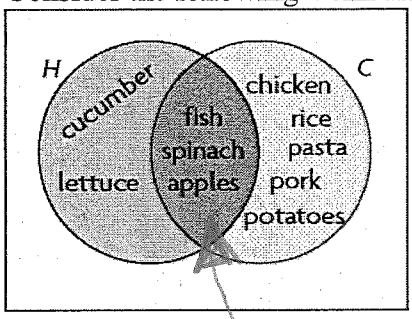
___ **15.** There are 28 students in Mr. Connelly's Grade 12 mathematics class.
The number of students in the yearbook club and the number of students on student council are shown in the Venn diagram. Use the diagram to answer the following questions.



How many students are in the yearbook club but not on student council?

A. 2
B. 5 ✓
C. 1
D. 7

___ **16.** Consider the following Venn diagram of foods we eat raw or cooked:

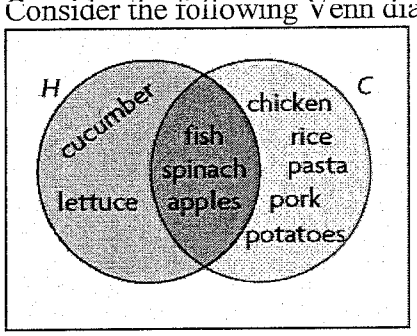


Determine $H \cap C$. intersection (overlap)

A. {fish, spinach, apples, cucumber, lettuce, chicken, pork, rice, pasta, potatoes}
B. {chicken, pork, rice, pasta, potatoes}
C. {cucumber, lettuce}
D. {fish, spinach, apples} ✓

Name: _____ ID: A

____ 17. Consider the following Venn diagram of foods we eat raw or cooked:



Determine $n(H \cup C)$.

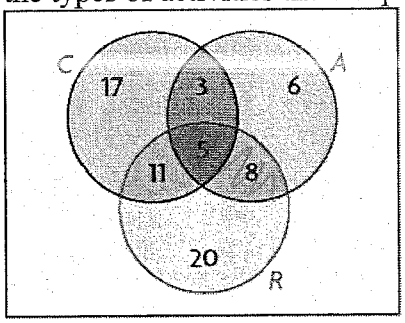
A. 2
B. 5
C. 10
D. 3

____ 18. Consider the following two sets:
- $C = \{-10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10\}$
- $B = \{-9, -6, -3, 0, 3, 6, 9, 12\}$

Determine $n(C \cap B)$.

A. 3
B. 8
C. 11
D. 19

____ 19. A summer camp offers canoeing, rock climbing, and archery. The following Venn diagram shows the types of activities the campers like.

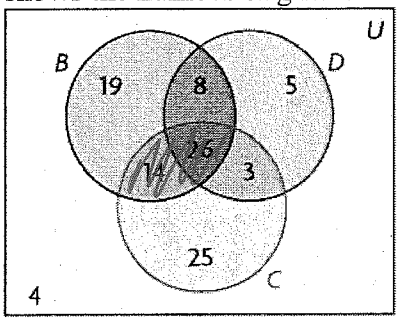


Use the diagram to determine $n((R \cap A) \setminus C)$.

A. 14
B. 5
C. 26
D. 8

Name: _____ ID: A

___ **20.** Some table games use a board, dice, or cards, or a combination these. The following Venn diagram shows the number of games that use these tools.



25+14+26+3=68

Use the diagram to determine $n(\overline{C}) - n(C \cap B)$.

68 − (14+26)

A. 39
B. 51
C. 25
D. 28

___ **21.** Which sentence is written as a conditional statement?

A. You can fool some of the people some of the time but you can't fool me.
B. If you are a farmer, then you live in the country.
C. If you can't beat them, join them.
D. You get wet if you stand in the rain.

___ **22.** Which sentence is the converse to the conditional statement below?
"If the milk is not refrigerated, then it will spoil."

swap hyp. + concl.

A. Unrefrigerated milk will spoil.
B. The milk is spoiled because it was not put in the refrigerator.
C. If the milk is spoiled, then it is not refrigerated.
D. The milk will spoil if it is not put in the refrigerator.

___ **23.** Which conditional statement is biconditional?

both conditional + converse are true

A. If you live in PEI, then you live in the smallest province.
B. If you bought a condominium, then you own your home.
C. If you live in Kelowna, then you live in British Columbia.
D. If you live in a house, then you have a backyard.

____ **24.** Which statement is the inverse of the conditional statement below?
"If tomorrow is Monday, then today is Sunday." add "nots" to the conditional

A. If tomorrow is Sunday, then today is not Monday.
B. If today is Sunday, then tomorrow is Monday.
C. If tomorrow is not Monday, then today is not Sunday. ✓
D. If today is not Sunday, then tomorrow is not Monday.

____ **25.** What is true about the conditional statement below?
"If a bird has wings, then the bird can fly." F some birds w wings can't fly

A. The converse and inverse are true but the statement and contrapositive are false. ✓
B. The statement and contrapositive are true but the inverse and converse are false.
C. The statement, converse, inverse, and contrapositive are all true.
D. The statement and inverse are true but the converse and contrapositive are false.

CH4 ____ **26.** A combination lock opens with the correct four-letter code. Each wheel rotates through the letters A to L. Suppose each letter can be used only once in a code. How many different codes are possible when repetition is not allowed?

$12 \times 11 \times 10 \times 9 = {}_{12}P_4 = \frac{12!}{8!}$

A. 20 736
B. 11 880 ✓
C. 1320
D. 8976

____ **27.** The lunch special at a sandwich bar offers you a choice of 6 sandwiches, 4 salads, 6 drinks, and 3 desserts. How many different meals are possible if you choose one item from each category?

$6 \times 4 \times 6 \times 3$

A. 432 ✓
B. 576
C. 646
D. 720

____ **28.** How many possible ways can you draw a single card from a standard deck and get an even number? → 2, 4, 6, 8, 10

5 per suit × 4 suits
= 20

A. 13
B. 20
C. 21
D. 26

Name: _____ ID: A

___ **29.** Evaluate.
$\frac{1001!}{999!}$

$\frac{1001 \times 1000 \times 999!}{999!}$

A. 1 000 000
B. 1 001 000 ✓
C. 10 100 100
D. 999 999

___ **30.** Identify the expression that is equivalent to the following:
$n(n-2)!$

A. $\frac{n!}{n-2}$
B. $\frac{n!}{n-1}$ = $\frac{n(n-1)(n-2)!}{(n-1)}$
C. n^2
D. $n!$

___ **31.** Solve for n, where $n \in \mathrm{I}$.
$5\left(\frac{(n+2)!}{n!}\right) = 100$

$\frac{(n+2)(n+1)(n)!}{n!} = 20$

$n^2 + 3n + 2 - 20 = 0$
$n^2 + 3n - 18 = 0$

$(n+6)(n-3) = 0$
$n = -6$ or $n = 3$

A. 3
B. 4
C. 5
D. 6

___ **32.** How many different permutations can be created when Anneliese, Becky, Carlo, Dan, and Esi line up to buy movie tickets, if Esi always stands immediately behind Becky?

B E | A C D
always stay, never switch

$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$

A. 48
B. 120
C. 720
D. 24 ✓

___ **33.** Evaluate.
${}_{14}P_7$

$\frac{14!}{7!}$

A. 17 297 280 ✓
B. 2 162 160
C. 121 080 960
D. 105 413 504

Name: _____ ID: A

____ **34.** Suppose a word is any string of letters. How many five-letter words can you make from the letters in KELOWNA if you do not repeat any letters in the word?

A. 78 125
B. 16 807
C. 2520 ✓
D. 1250

$_7P_5 = \frac{7!}{2!} = 7\times6\times5\times4\times3$

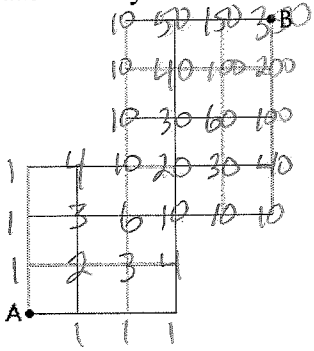
$_nP_r = \frac{n!}{(n-r)!}$

____ **35.** How many different arrangements can be made using all the letters in NUNAVUT?

A. 630
B. 1260 ✓
C. 2520
D. 5040

$\frac{7!}{2!2!}$ N U

____ **36.** How many different routes are there from A to B, if you only travel north or east?



A. 100
B. 250
C. 400
D. 350 ✓

____ **37.** There are 14 members of a student council. How many ways can 7 of the members be chosen to serve on the dance committee?

A. 1144
B. 1716
C. 3432 ✓
D. 17 297 280

$_{14}C_7 = \frac{14!}{7!7!}$

____ **38.** Evaluate. $\binom{9}{4}$

A. 130
B. 126 ✓
C. 122
D. 118

$\frac{9!}{4!5!}$

$_9C_4$

$_nC_r = \frac{n!}{r!(n-r)!}$

Name: _____ ID: A

___ **39.** Evaluate. ${}_6C_2$

$\frac{6!}{2!4!}$

A. 15 ✓
B. 18
C. 30
D. 36

___ **40.** Suppose that 10 teachers and 8 students volunteered to be on an environmental action committee. The committee must consist of 2 teachers and 2 students. How many different environmental action committees does the principal have to choose from?

${}_{10}C_2 \cdot {}_8C_2$

$\frac{10!}{2!8!} \cdot \frac{8!}{2!6!}$

A. 45
B. 73
C. 1260 ✓
D. 5040

___ **41.** Identify the term that best describes the following situation:
Determine the number of codes for a lock with three dials numbered 0 to 9.

A. permutations
B. combinations
C. factorial
D. none of the above

___ **42.** How many ways can the 6 starting positions on a hockey team (1 goalie, 2 defense, 3 forwards) be filled from a team of 2 goalies, 5 defense, and 10 forwards?

${}_2C_1 \times {}_5C_2 \times {}_{10}C_3$

$\frac{2!}{1!1!} \times \frac{5!}{2!3!} \times \frac{10!}{3!7!} = 2 \times 10 \times 120$

A. 1200
B. 2400 ✓
C. 4800
D. 9600

___ **43.** Euchre is played with a deck of 24 cards that is similar to a standard deck of ~~52~~ playing cards, but with only the ace, 9, 10, jack, queen, and king for all four suits.
How many different five-card hands are there with at least three clubs?

$\frac{18 \cdot 17 \cdot 16!}{2 \cdot 1 \cdot 16!}$

Hands with
3 clubs: ${}_6C_3 {}_{18}C_2 = \frac{6!}{3!3!} \times \frac{18!}{2!16!} = 3060$
+
4 clubs: ${}_6C_4 {}_{18}C_1 = \frac{6!}{4!2!} \times \frac{18!}{1!17!} = 270$
+
5 clubs: ${}_6C_5 {}_{18}C_0 = \frac{6!}{5!1!} \times \frac{18!}{0!18!} = 6$ add

3336

A. 375
B. 926
C. 3336 ✓
D. 10 626