Name: Date:
Teacher: Class/Period:

1) Richard has 5 shirts, 6 pairs of jeans, and 3 vests. How many different outfits, each composed of a shirt, a pair of jeans, and a vest, can he make?

A. 6

B. 14

C. 33

D. 90

2) Guests at a wedding reception must choose 1 food item from each of these 3 categories.

Main Dish Entreé: steak, fish, chicken

Vegetable: carrots, green beans, potatoes

Salad: garden, Caesar

How many different dinner combinations are possible?

A. 8

B. 18

C. 56

D. 336

3) A company assigns passwords to each of its 2000 employees. Each password consists of 3 distinct letters (no repeating letters) and 3 distinct digits. The company assigns a new password to each employee at the beginning of each month. To the nearest year, for how many years will the company be able to supply unique passwords?

A. 468

B. 732

C. 5,616

D. 8,788

4) A math teacher has 20 students. She randomly selects the names of 3 different students. The first student explains the first homework problem, the second student explains the second problem, and the third student explains the third problem. In how many ways can the teacher assign these 20 students to the 3 problems?

A. $\frac{20!}{3!}$

B. $\frac{20!}{17!}$

C. $\frac{20!}{(17!)3!}$

D. $\frac{20!}{17!+3!}$

5) This chart shows the number of students, by gender, in each grade at a local high school. The principal will randomly select one student to meet the governor.

	9th	10th	11th	12th
Female	80	95	75	80
Male	75	100	75	70

Let A = {choosing a female} and B = {choosing a ninth grader}. What is $P(B|A)$?

A. $\frac{8}{65}$

B. $\frac{31}{66}$

C. $\frac{16}{31}$

D. $\frac{8}{33}$

6) Ten students will participate in a spelling contest. How many outcomes for first, second, and third place are possible?

A. 30

B. 90

C. 120

D. 720

7) The yearbook staff includes 8 photographers. One photographer needs to cover a dance, and another needs to cover a basketball game. In how many ways can photographers be assigned to these events?

A. 16

B. 28

C. 56

D. 64

8) A high school's enrollment is 27% juniors and 31% seniors. What is the probability that a student chosen at random from this high school will be a junior or a senior?

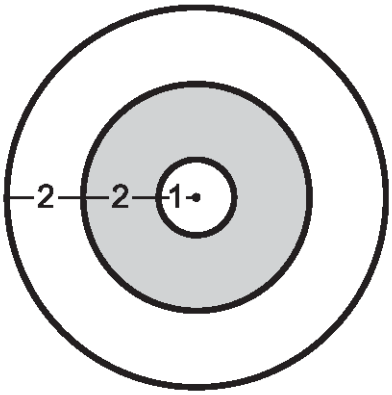
A. $\frac{1}{25}$

B. $\frac{2}{25}$

C. $\frac{29}{50}$

D. $\frac{87}{100}$

9) When a dart hits a random point on this dartboard, what are the odds that it hits the shaded area?



A. 8:17

B. 8:25

C. 9:16

D. 2:3

10) Box A contains marbles: 12 red, 16 blue, 11 green, and 5 yellow. Box B contains chips: 8 red, 7 green, 11 blue, and 1 yellow. If you randomly pick one item from each box, what is the probability that both items will be blue?

A. $\frac{1}{10}$

B. $\frac{4}{27}$

C. $\frac{19}{50}$

D. $\frac{77}{100}$

11) After several rounds of a card game, a deck of playing cards contains 10 red-suited cards and 15 black-suited cards. Terry draws cards from this deck without replacement until she has either two red cards or two black cards. To the nearest tenth of a percent, what is the probability that Terry draws two red cards?

A. 15.0%

B. 16.0%

C. 30.8%

D. 34.6%

12) Karen's class has collected 96 small plastic animals offered as prizes in cereal boxes. Karen observes that 1 prize in 6 is a plastic horse. Her friend Conrad notices that 1 prize in 4 is red. If it can be determined, how many prizes are either red or a horse (or both)?

A. 36

B. 40

C. 48

D. The probability cannot be determined from this information.

13) A standard deck of playing cards has 52 cards. The deck has the same number of black and red cards and has 4 Jacks, two red and two black. What is the probability of randomly picking a Jack or a red card from a standard deck?

A. $\frac{30}{52}$

B. $\frac{28}{52}$

C. $\frac{4}{52}$

D. $\frac{2}{52}$

14) The Channel 9 weather forecast for next week lists the following chances of rain:

Day	Tues	Wed	Thurs	Fri	Sat	Sun	Mon
Chance of rain	20%	0%	40%	0%	40%	0%	20%

Assume that the probability for rain each day is independent of the probability for rain on other days of the week. According to the forecast, what is the probability that rain will fall exactly 3 days next week?

A. 0.64%

B. 2.86%

C. 7.04%

D. 22.50%

15) Yi has a bag of 15 stones: 8 blue and 7 purple and randomly chooses 3 stones from the bag. If Yi picks 2 blue stones and does not return them to the bag, what is the probability that she will pick a purple stone next?

A. $\frac{7}{15}$

B. $\frac{6}{15}$

C. $\frac{7}{13}$

D. $\frac{6}{13}$

16) Molly wants to know the probability of Event *B*, given that Event *A* has occurred. What is the correct format for writing this conditional probability?

A. $P(B|A)$

B. $P(A|B)$

C. $P(A) + P(B)$

D. $P(A) \times P(B)$

17) Javier has 10 marbles in a bag: 5 blue labeled B_1, B_2, B_3, B_4, and B_5; 3 green labeled G_1, G_2, and G_3; and 2 red labeled R_1 and R_2. Javier chooses 2 marbles from the bag randomly, one at a time, without putting the chosen marbles back in the bag.

A. How many combinations exist for these 2 marbles given that the order they are chosen does not matter? Show your work using the Fundamental Counting Principle, and explain why you used the numbers that you did.

B. List all of the combinations for these 2 marbles in an organized list using the labels listed in the stimulus. Explain how you know you have all the possible combinations.

Please use the space below to write your response(s) to the writing assignment provided by your teacher. If there are multiple tasks to the question, please clearly label the number or letter of each task in the column to the left of your answers. If you need additional pages for your response, your teacher can provide them.

Please write the name of the writing assignment here: _____

Task

QualityCore™

Reference Sheet for the QualityCore™ **Algebra II End-of-Course Assessment**

Equations of a Line

Standard Form	$Ax + By = C$	A, B, and C are constants with A and B not both equal to zero.
Slope-Intercept Form	$y = mx + b$	(x_1,y_1) is a point. m = slope b = y-intercept
Point-Slope Form	$y - y_1 = m(x - x_1)$	

Quadratics

Standard Form of a Quadratic Equation	$ax^2 + bx + c = 0$	a, b, and c are constants, where $a \neq 0$.
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	

Conic Sections

Circle	$(x - h)^2 + (y - k)^2 = r^2$	center (h,k) r = radius	
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ directrix $y = k - \frac{1}{4a}$	vertex (h,k) focus $\left(h, k + \frac{1}{4a}\right)$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ directrix $x = h - \frac{1}{4a}$	vertex (h,k) focus $\left(h + \frac{1}{4a}, k\right)$
Ellipse	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 - b^2$, center (h,k)	
Ellipse	$\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 - b^2$, center (h,k)	
Hyperbola	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 + b^2$, center (h,k)	
Hyperbola	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 + b^2$, center (h,k)	

Lines and Points

Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	(x_1,y_1) and (x_2,y_2) are 2 points. m = slope M = midpoint d = distance
Midpoint	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

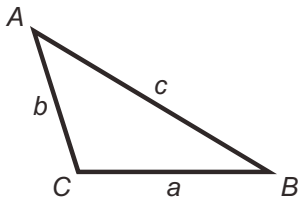
continued

Miscellaneous

Distance, Rate, Time	$D = rt$	D = distance r = rate t = time I = interest p = principal A = amount of money after t years n = number of times interest is compounded annually
Simple Interest	$I = prt$	
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	
Pythagorean Theorem	$a^2 + b^2 = c^2$	a and b = legs of right triangle c = hypotenuse

Laws of Sines and Cosines

Law of Sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Law of Cosines	$a^2 = b^2 + c^2 - 2bc \cos A$



Sequences, Series, and Counting

Arithmetic Sequence	$a_n = a_1 + (n - 1)d$	$a_n = n^{\text{th}}$ term n = number of the term d = common difference s_n = sum of the first n terms r = common ratio k = number of objects in the set m = number of objects selected
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$	
Geometric Sequence	$a_n = a_1(r^{n-1})$	
Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$	
Combinations	${}_kC_m = C(k,m) = \frac{k!}{(k-m)!\,m!}$	
Permutations	${}_kP_m = P(k,m) = \frac{k!}{(k-m)!}$	

Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$	A = area b = base h = height r = radius C = circumference d = diameter V = volume B = area of base $\pi \approx 3.14$
Parallelogram	$A = bh$	
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$	
Circle	$A = \pi r^2$ $C = \pi d$	
General Prism	$V = Bh$	
Right Circular Cylinder	$V = \pi r^2 h$	
Pyramid	$V = \frac{1}{3}Bh$	
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	
Sphere	$V = \frac{4}{3}\pi r^3$	

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Answer Key

1) D
2) B
3) A
4) B
5) D
6) D
7) C
8) C
9) A
10) B
11) D
12) D
13) B
14) C
15) C
16) A

Scoring Criteria:

17)

A 4-point response may include, but is not limited to, the following points:

A. **Correct number of combinations:** 45

Appropriate work needed to find the answer:

$$\frac{10(9)}{2}$$

Explanation of how the answer was found: I multiplied the number of marbles by one less than the number of marbles because once I choose one of the 10 marbles, there will only be 9 marbles left from which to choose for the second marble. I then divided this number by 2 since the order in which the marbles is chosen does not matter.

Note: An examinee could also give an explanation of using the formula for combinations.

B. **Correct list:**

B_1B_2, B_1B_3, B_1B_4, B_1B_5, B_2B_3, B_2B_4, B_2B_5, B_3B_4, B_3B_5, B_4B_5

B_1G_1, B_1G_2, B_1G_3, B_2G_1, B_2G_2, B_2G_3, B_3G_1, B_3G_2, B_3G_3, B_4G_1, B_4G_2, B_4G_3, B_5G_1, B_5G_2, B_5G_3

B_1R_1, B_1R_2, B_2R_1, B_2R_2, B_3R_1, B_3R_2, B_4R_1, B_4R_2, B_5R_1, B_5R_2

G_1G_2, G_1G_3, G_2G_3

G_1R_1, G_1R_2, G_2R_1, G_2R_2, G_3R_1, G_3R_2

R_1R_2

Explanation of how the answer was found: I started with the first blue marble and paired it with each other blue marble. Then, I went through the same process starting with the 4 remaining blue marbles. I got 10 combinations. Next, I paired each blue marble with each green marble. I got 15 combinations. Then, I paired each blue marble with each red marble. I got 10 combinations. Next, I paired the 3 green marbles among themselves. I got 3 combinations. Then, I paired each green marble with each red marble. I got 6 combinations. Finally, I paired the red marbles together. I got 1 combination.

Rubric:

4 **A response at this level provides evidence of thorough knowledge and understanding of the subject matter.**

- The response addresses all parts of the question or problem correctly.
- The response demonstrates efficient and accurate use of appropriate procedures.
- The explanation of strategies used in the response shows evidence of a good understanding of mathematical concepts and principles, and it does not contain any misconceptions.
- The explanation in the response is clear and coherent.

3 **A response at this level provides evidence of competent knowledge and understanding of the subject matter.**

- The response addresses most parts of the question or problem correctly.
- The response includes some minor errors but generally uses appropriate procedures accurately.
- The explanation of strategies used in the response shows some evidence of a good understanding of mathematical concepts and principles, and it contains few, if any, misconceptions.
- The explanation in the response is mostly clear and coherent.

2 **A response at this level provides evidence of a basic knowledge and understanding of the subject matter.**

- The response addresses some parts of the question or problem correctly.
- The response includes a number of errors but demonstrates some use of appropriate procedures.
- The explanation of strategies used in the response shows a little evidence of understanding of mathematical concepts and principles, but it may contain some evidence of misconceptions.
- The explanation in the response is partially clear, but some parts may be difficult to understand.

1 **A response at this level provides evidence of minimal knowledge and understanding of the subject matter.**

- The response addresses a few parts of the problem correctly, but the response is mostly incorrect.
- The response includes inappropriate procedures or simple manipulations that show little or no understanding of correct procedures.
- The explanation of strategies used in the response shows little or no evidence of understanding of mathematical concepts and principles, and it may contain evidence of significant misconceptions.
- Many parts of the explanation are difficult to understand.

0 **A response at this level is not scorable.** The response is off-topic, blank, hostile, or otherwise not scorable.