Kelly

Parade

Advanced Mathematical Decision Making
Final Exam Review Unit 1
Fall Semester

(3) 1. Given that an average of 18 people can fit inside a square measuring 5 feet by 5 feet, estimate the size of a crowd that is 10 feet deep on both sides of the street standing along a 1-mile section of a parade route. (1 mile = 5,280 ft)

5,280ft | 10ft $A = (10)(5280) = 52{,}800\,ft^2$

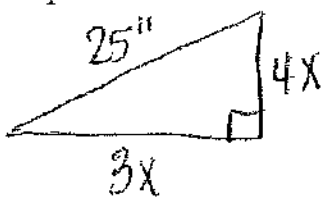
Parade

5,280ft | 10ft

$\frac{18 \text{ people}}{25\,ft^2} \cdot 52{,}800\,ft^2 = 38{,}016(2)$

76,032 people

(6) 2. The size of a television is the length of the diagonal of its screen in inches. The aspect ratio of the screens of older televisions is 4:3, while the aspect ratio of newer wide-screen televisions is 16:9. Find the width and height of an older 25-inch television whose screen has an aspect ratio of 4:3.



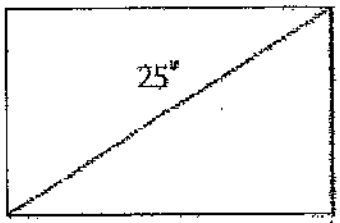
$4x^2 + 3x^2 = 25^2$

$16x^2 + 9x^2 = 625$

$25x^2 = 625$

$x^2 = 25$

$x = 5$



$4x = 4(5) = 20$ in

$3x = 3(5) = 15 = w$

Use the following information for questions #6 – 7

Consider two grading systems for determining your final class average. Each system is a weighted average of measures that include test grades, final exam grade, homework, and class participation.

Grading System I	Grading System II
Test average – 40%	Test average – 60
Final Exam Grade – 25%	Final Exam Grade – 15%
Homework – 25%	Homework – 15%
Class Participation – 10%	Class Participation – 10%

(10) 3. If your values are the following, which grading system do you prefer and why?

- Test average = 84
- Final exam grade = 68
- Homework = 90
- Class participation = 95

$95(.40) + 90(.25) + 68(.25) + 84(.40) = 82.6$ Sys I

$84(.6) + 68(.15) + 90(.15) + 95(.10) =$ 83.6 Syst II

78 exam

(11) 4. If you score 10 points higher on the final exam, how does your final grade average change under each system?

Same as #3; both avg = (85.1)

(24) 5. How many 3 letter arrangements of the word CHEMISTRY are possible?

$_9P_3 = 504$ order matters

6. How many different 3 person committees can be formed from a group of 15 people?

$_{15}C_3 = 455$ order no matter

Use the following information to answer questions 7-8:

Actual mileage: k * odometer reading (mileage)

Actual speed: k * speedometer reading (miles per hour)

Where k = Circumference of bigger tire / Circumference of factory-installed tire

7. If the odometer reading is 40,000 miles on your car and you have tires with a circumference of 105 inches, you have actually traveled _____ miles. (factory installed tires circumference is 95 inches.)

$k = \frac{105}{95} = 1.11\ (40{,}000) = 44{,}400$

8. If the speedometer reading is 75 mph on your car and you have tires with a circumference of 125 inches, you are actually traveling _____ mph. (factory installed tires circumference in 90 inches).

$k = \frac{125}{90} = 1.4(75) = 105$ mph

(5) 9. A new concert venue just opened in downtown Houston and they are in the process of deciding how many tickets they can sell for each show. The venue has three levels, two general admission that only have standing room, and one level with 150 seats. The first level of standing room is a square with one side measuring 75'. The second level, also standing room, is a rectangle measuring 100' by 50' ft. The third level has 150 seats. The venue thinks each person will occupy 2.25 square feet. How many tickets should they sell?

150 people → 150

$100 \times 50 = 5000 \div 2.25 = 2222$

$75 \times 75 = 5625 \div 2.25 = 2500$

4872 tickets

(20) 10. Some information on a tire reads P230/60R16. What is the diameter in inches?

~~1 mm = 24.5 inches~~

1in = 25.4mm

$A = \frac{h}{w}$

$D = 2h + rim$

$.60 = \frac{h}{230}$ (60 of rim)

$h = \frac{138\text{mm}}{25.4\text{mm}} = 5.43\text{in} = h$

$2(5.43) + 16 = 26.86\text{in} = d$

11. Recall slugging percentage is found by using the formula below

$$SLG = \frac{(1 \cdot S) + (2 \cdot D) + (3 \cdot T) + (4 \cdot HR)}{AB}$$

Find the SLG for a player with 52 doubles, 31 singles, 2 triples, 61 homeruns, and 335 at bats.

Plug in formula 1.15

12. Determine the check digit for the UPC number 612300324516. Recall the check digit is chosen so that the calculation below has 0 for the final digit when a_1 through a_{11} are the first 11 digits of the UPC and d is the check digit.

$3a_1 + a_2 + 3a_3 + a_4 + 3a_5 + a_6 + 3a_7 + a_8 + 3a_9 + a_{10} + 3a_{11} + d$

$3(6) + 1 + 3(2) + 3 + 3(0) + 0 + 3(3) + 2 + 3(4) + 3(1) + d$

$59 + d = 60$

$d = 1$

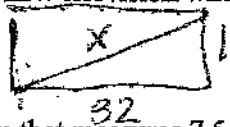
13. Use the information below to find your nine week grade in AMDM.

- test grades 50% of nine weeks grade
- daily grades 25% of nine weeks grade
- group presentation grades 25% of nine weeks grade

Your test scores were {85, 57, 82}. Your daily grades were {75,86,98,97,65,79, 85}. Your group presentation grades were {86, 87,65,91}.

78.79 avg

14. Which size would you see on the box for a new television whose screen measures 32 inches wide by 18 inches high?



$18^2 + 32^2 = x^2$

$x = 37''$

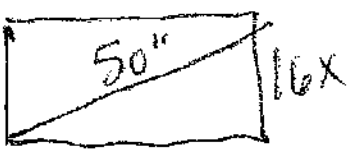
15. Find the aspect ratio for a computer screen that measures 7.5 inches high by 13.5 inches wide.

$A = \frac{h}{w} = \frac{7.5}{13.5} = 0.56$

16. If your speedometer reading is 53 mph, but your tires are larger than factory-installed tires, how fast is your SUV actually moving? The circumference of the factory-installed tires should be 77.1 inches, but your tires are 81.4 inches around.

$k = \frac{81.4}{77.1} = 1.1(53) = 58.3$ mph

17. Find the width and height of an older 50-inch television whose screen has an aspect ratio of 16:9. Find the area of the screen. Make a drawing and justify your answer.



$(16x)^2 + (9x)^2 = 50^2$

$256x^2 + 81x^2 = 2500$

$\frac{337x^2}{337} = \frac{2500}{337}$

$x^2 = 7.42$

$x = 2.72$

$W = 9(2.72) = 24.48$

$h = 16(2.72) = 43.52$

$A = 1065.4$

Answer each of the following Fermi Questions to the best of your ability. Please list all of your assumptions, in addition to all steps used to complete the problem.

(1) 18. If Bill Gates' net worth was doled out to him by the minute, how much is his time worth per minute? (Bill Gates' current net worth is $54 billion and he was born on October 28, 1955)

(2) 19. How many text messages will you send and receive in your lifetime?

make assumptions

w h rim

(25) 20. For tire size P225/45R17, give the following:

a. Width(mm): 225 mm
b. Aspect Ratio (%): 45%
c. Height (in.): 4.13in
d. Diameter (in): 25.72in
e. Circumference (in.): 79.26in

$A = \frac{h}{w}$ $C = \pi d$ $d = 2h + rim$

$.45 = \frac{h}{225} = \frac{101.25\,mm}{25.4\,mm/in} = 3.98\,in = h$

$2(3.98) + 17 = 24.96\,in$

$\frac{25.72}{24.96}\,\pi = 79.26\,in$

78.41in