# Integrated Math 3 FR Midterm REVIEW

Here are the topics on the free response midterm exam and some suggested problems from your text to help your review: *(note: some of these may have been previously assigned for homework)*

Geometric Probability: M2 (p. 1468-1472) & 20.5 HW and Quiz

1) Find the geometric probability of a dart thrown randomly landing in the shaded region of the figure.

5 in.

15 in.

15 in.
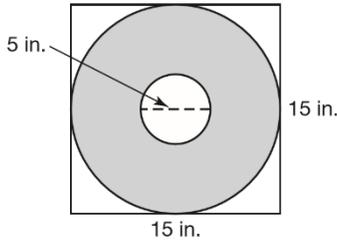
2) Benjamin rolls a six-sided number cube 12 times. How many of the outcomes do you expect to result in number greater than 2?

Normal Distribution Curves & Emperical Rule: IM3 (p. 10-22) & 1.1/1.2 HW & Quiz

3. Calculate each probability. The mean amount of time a customer waits in line at a local bank is 16 minutes with a standard deviation of 3.2 minutes.

a. Use the mean and standard deviation to label the intervals on the horizontal axis of the normal curve. Include 3 standard deviations above and below the mean.

b. Determine the probability that a randomly selected customer will wait in line for less than 10 minutes..

c. Determine the probability that a randomly selected customer will wait in line for more than 17 minutes.

d. Determine the probability that a randomly selected customer will wait in line between 12.8 and 19.2 minutes.
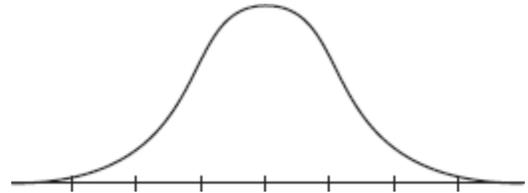
4. Determine each percentile using a graphing calculator. The scores on the ACT test are normally distributed with a mean of 20.9 and a standard deviation of 4.8.

a. Determine the 85 th percentile for the ACT scores.

b. Determine the score separating the lowest 8% of scores from the rest.

c. A university only considers admitting students who scored in the top 20%. Determine the cutoff score that the university uses to consider students for admission.

Calculating z-scores and using them to find percentages: IM3 (p. 24-38) & 1.3/1.4 HW & Quiz

5) The birth weight of an African lion is 3.6 pounds with standard deviation of 0.4 pounds.

a. Calculate the z-score for newborn African lions weighing less than 3 pounds.

b. Explain the meaning of this z-score that you found in part a.

c.) What percent of newborn African lions weigh more than 3.8 pounds?

d. What percent of newborn African lions weigh between 2.7 and 3.7 pounds.

Write a Quadratic Function using Reference Points: IM3 (p. 268-271) & 4.5 HW & Quiz

6) Write a quadratic function given two x-intercepts (-7, 0) and (5, 0) and one point (-4, -9).

7) Mitzu shoots an arrow from an initial height of 2 meters. The arrow reaches its maximum height of 20 meters after it has flown a distance of 60 meters. Write a quadratic function to represent the height of the arrow as a function of its distance.

8) Create a system of equations and use algebra to write a quadratic equation for this set of three points that lie on a parabola: (2, 12), (-2, 32), (1, 8).

Write and use cubic functions for real-world problems: IM3 (p. 316-326) & 5.1 HW & Quiz

9) A teacher distributes sheets of construction paper to her class so that they can create open nets of rectangular prisms. She instructs her students to cut squares from each of the four corners of the construction paper, and then fold up the remaining sides to form a box without a lid. Each sheet of construction paper is 26 inches long by 14 inches wide. a. Let x represent the side length of a corner square in inches.

a.) Write a function V(x) to represent the volume of a box in terms of x

I. As a product of three linear equations

II. In the form $f(x) = ax^3 + bx^2 + cx + d$

b) What height yields the maximum volume?

c. State the volume

d. What are the dimensions of that box? Include the unit of measurement.

10) If the volume v(x) of a box is defined by the function $V(x) = x(12-3x)(20-4x)$, where each factor represents a dimension of the box. What is the domain of the function for this problem situation?

11) A company makes different sizes of boxes. The widest box has a width w of 30 inches, a depth d of 12 inches, and a height h of 9 inches. Other boxes the company makes decrease in width by increments of 4 inches. For each decrease of 4 inches in width, however, both d and h increase by 2 inch.

Write a function that represents the volume of each box the company makes?

Rational Root Theorem/Factoring & Solving Polynomial Functions:

IM3(p. 473-478) & 6.5 HW & Quiz

12) Use the Rational Root Theorem to determine the possible rational roots for the polynomial. Then, solve completely.

$x^4 + 4x^3 - 21x^2 - 36x + 108 = 0$

   a)   List all the possible roots   b) Solve completely by finding all the roots. Show all your work!

2.3

13) Determine a range of values for each population proportion. Use a 95% confidence interval.

A survey of 500 schools reports that 87% lock all their doors after the first bell.

14) Determine a range of values for each population mean. Use a 95% confidence interval.

A sample of 150 professionals responded to a survey about the amount of time they spend in meetings each day. The sample mean was 3.5 hours and the sample standard deviation was 0.25 hours.

14B) 20.3Based on past results, a batter knows that the opposing pitcher throws a fastball 75% of the time and a curveball 25% of the time. Suppose the batter sees 8 pitches during a particular at-bat. Determine each probability. Round your answers to the nearest tenth of a percent if necessary.

a. *P*(5 fastballs and 3 curveballs)   b) *P*(5 curveballs and 3 fastballs)

20.2

Results

Treatment		Significant improvement	Moderate Improvement	No Improvement	Total
	Medicine Cream	21	10	4	35
	Placebo	9	14	12	35
	Total	30	24	16	70

15) Determine the conditional probabilities below.

    a.) P(medicine cream | moderate improvement)   b.) P(significant improvement | medicine cream)

16) Determine the conditional probability. Then determine whether these events are independent or dependent. Explain.

Given $P(A) = \frac{5}{6}$, $P(B) = \frac{1}{2}$, and $P(A \text{ and } B) = \frac{1}{12}$, determine $P(B \mid A)$.

4.6

17. i^{43} 18. i^{56} 19. $(3- 5i)(4 + i)$

Vocabularies:

2.2

20. Convenience sample   21. Subjective sample   22) volunteer sample

23) Simple random   24) sample stratified   25) random sample

26) cluster sample
Observational Studies,   27) cluster systematic   28) Sample Surveys,

29) Experiments Survey/Treatments of an experiments

19.2

30) Independent Events: 31) Dependent Events: 32) Disjointed Sets

33) Intersecting Sets   34) Uniform Probability model vs non-uniform probability models

19.6

35) Experimental and theoretical probability