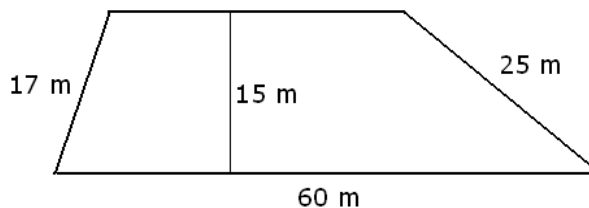


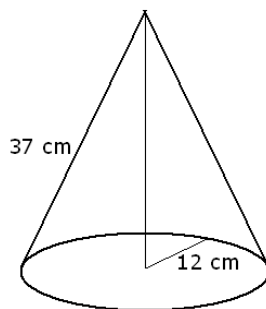
Exam 2 will cover the following sections from the textbook: Chapter 2: 2.1, 2.2, 2.3; Chapter 7: 7.1, 7.2, 7.3; Chapter 9: 9.1, 9.2, 9.3; Chapter 11: 11.1, 11.2; Chapter 12: 12.1, 12.2, 12.3.

Handouts to study: lecture notes on Basic Percent Problems, and on the Pythagorean theorem, Exam 1 Review, Exam 2 Review, and Problem Sets 1, 2, 3, 4, and 5. Further practice is available on Blackboard: see reviews for Quiz 1, 2, 3, 4, and 5.

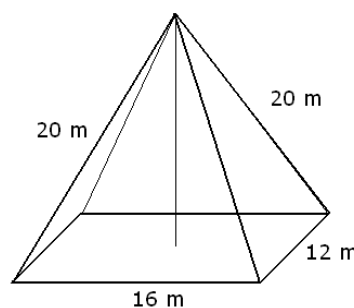
1. Consider the trapezoid shown on the picture below.



- a) Compute the perimeter of the trapezoid. Include units in your computation and answer.
 - b) Compute the area of the trapezoid. Include units in your computation and answer.
 - c) The base of a solid is this trapezoid. Compute its volume if its height 10 m. Include units in your computation and answer.
 - d) The base of a pyramid is this trapezoid. Compute its volume if its height 10 m. Include units in your computation and answer.
2. Include units in your computation and answer. Present both the exact value and approximate value of all answers.
 - a) Find the volume of a cylinder with a height of 5 in and with a circular base with a radius of 4 in.
 - b) Find the volume of a cone with a height of 5 in and with a circular base with a radius of 4 in.
 3. Find the volume for each of the following objects shown on the figure below. Include units in your computation and answer. Present both the exact value and approximate value of all answers.



a)

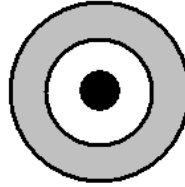


b)

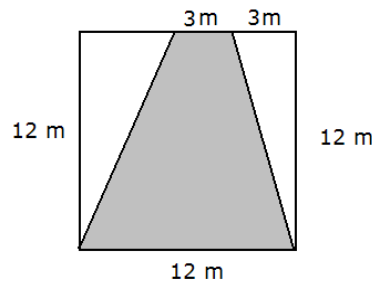
4. The supplement of an angle is 8° less than three times the angle. Find the angle.
5. a) Find the measure of an inner angle in a regular polygon of 18 sides.
b) How many sides does a regular polygon have if its inner angle measures 165° ? Set up an equation and solve it to find the answer.

6. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{2, 3, 4, 5, 8\}$, $B = \{1, 3, 4, 6\}$, and $C = \{1, 3, 5, 7, 10\}$.
- Draw a Venn diagram depicting these sets.
 - Find $(B \cup C) \cap A$
 - Find $B \cup (C \cap A)$
 - Find $(A \cap \overline{B}) \cup (B \cap \overline{A})$
 - Find $(A \cup \overline{B}) \cap C$
 - Find $\overline{A \cup \overline{B}} \cap \overline{C}$
 - List all subsets of C .
 - How many 5-element subsets does U have? (You don't have to list these sets.)
 - We randomly select an element of A . What is the probability that the number selected is also an element of B ?
 - We randomly select an element of B . What is the probability that the number selected is also an element of A ?
 - We randomly select an element of A . What is the probability that the number selected is not an element of B ?
 - We randomly select an element of A . What is the probability that the number selected is not an element of $B \cap C$?
 - We randomly select an element of A . What is the probability that the number selected is not an element of $B \cup C$?
 - We randomly select an element of $A \cup B$. What is the probability that the number selected is also an element of $A \cap B$?
 - We randomly select an element of $A \cap B$. What is the probability that the number selected is also an element of $A \cup B$?
 - We randomly select an element of A . What is the probability that the number selected is also an element of \overline{A} ?
 - We randomly select a subset of $A \cup B$. What is the probability that this set has 3 elements?
7. We asked 120 students about their courses. 67 take math, 51 take chemistry, and 45 take physics. 23 take math and chemistry, 20 take math and physics, and 19 take chemistry and physics. 11 take all three.
- Draw a Venn diagram depicting these sets.
 - How many people study math and chemistry, but not physics?
 - How many people study math or chemistry, but not physics?
 - We randomly pick a student. What is the probability that he studies math?
 - We randomly pick a student. Turns out, we picked someone who studies physics. What is the probability that she also studies math?
 - We randomly pick a student. Turns out, we picked someone who studies math. What is the probability that she also studies physics?
8. We have borrowed \$2000 for two years, with a simple annual interest rate of 5%. After a year, we make a partial payment of \$800. After 7 additional months, we make another partial payment of \$800. How much do we have to pay at the end of the two years?
9. We placed \$2000 into a bank account with an annual compound interest rate of 7%. How much money is in the account after 15 years if interest is compounded
- annually
 - semi-annually
 - quarterly
 - monthly
 - daily
10. a) We wish to buy a used car for \$8000. The dealership has a finance plan of \$1000 down payment and 7% APR for 36 months. Find the monthly payment under this plan.
- b) We wish to buy a used car for \$5000. The dealership has a finance plan that includes a down payment of \$1000, and then 30 payments of \$143.01. Find the APR that the dealership charges.

11. The population of a town has decreased from 600 000 to 450 000.
- What percent of a change does this represent?
 - The leadership of the town plans to get its population back to 600 000. What percent of an increase would this represent?
12. The three circles have radii 1 ft, 2 ft, and 3 ft long. Suppose we randomly drop a small object on the figure.

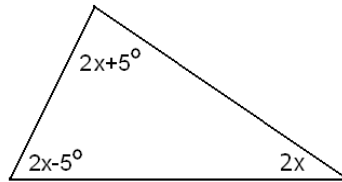


- What is the probability that it lands on the black region?
 - What is the probability that it lands on the white region?
 - What is the probability that it lands on the grey region?
13. The figure below shows a trapezoid drawn into a square. We randomly throw a small object on the square. Find the probability of the object landing on the shaded region.

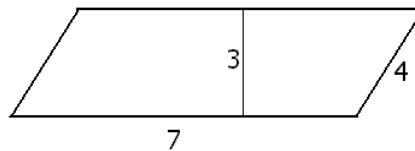


14. Find the distance between the points given.
- $(14, -1)$ and $(2, -6)$
 - $(3, -4)$ and $(8, 3)$
15. Three cards are drawn from a deck of 52 cards, without replacement.
- What is the probability that we draw three hearts?
 - What is the probability that we draw three hearts, given that no clubs was drawn?
16. We throw a coin seven times. What is the probability that the outcome is
- exactly 5 heads
 - at least 5 heads
17. We pull two cards from $\{1, 2, \dots, 10\}$, with replacement. Find each of the probabilities.
- We pull the same number twice.
 - We pull two numbers that are different.
 - None of the numbers pulled is 6.
 - (At least) one of the numbers pulled is 6.
 - The sum of the two numbers pulled is 15.
 - The sum of the two numbers pulled is 14.
 - The product of the two numbers pulled is 8.
 - The sum of the two numbers pulled is even.
 - The product of the two numbers pulled is even.
 - The first number pulled is less than the second number pulled.
 - The difference between the two numbers pulled is 3.
 - The product of the two numbers pulled is less than 70.

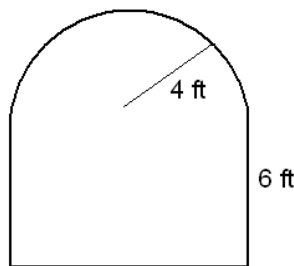
18. Susan is a member of a 16–member club. The club is to elect a four-person committee. What is the probability that Susan will be selected to be on the committee?
19. Find x based on the picture below.



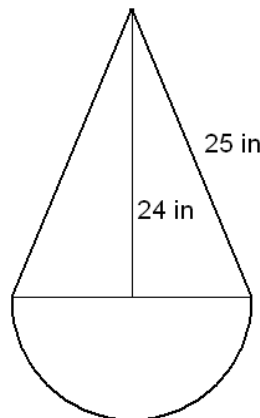
20. Find the perimeter and area of the parallelogram shown below. Dimensions are in meters.



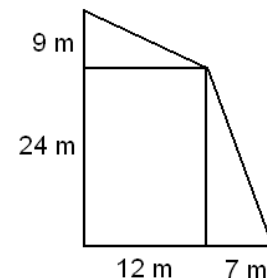
21. We have a bag with 10 marbles, 6 red, 3 blue, and 1 yellow. We randomly pull a marble. Find each of the following probabilities.
- We pull a red marble.
 - We pull a marble that is red or blue.
 - We pull a marble that is not blue.
22. Compute the area of a triangle with sides 10 cm, 10 cm, and 16 cm. Include units in your computation and answer. Present both the exact value and approximate value of all answers.
23. We randomly select a five-digit number.
- What is the probability that none of the digits of the selected number is 3?
 - What is the probability that none of the digits of the selected number is 0?
24. Find the perimeter and area of each of the figures shown below. Angles that look like right angles are right angles. The arcs are semicircles.



a)



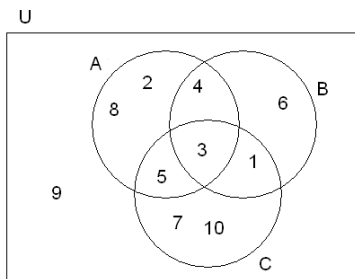
b)



c)

Answers

- 1.) a) $P = 134\text{ m}$ b) $A = 690\text{ m}^2$ c) $V = 6900\text{ m}^3$ d) $V = 2300\text{ m}^3$
 2.) a) $V = 80\pi\text{ in}^3 \approx 251.3274123\text{ in}^3$ b) $V = \frac{80}{3}\pi\text{ in}^3 \approx 83.7758041\text{ in}^3$
 3.) a) $V = 1680\pi\text{ cm}^3 \approx 5277.875658\text{ cm}^3$ b) $V = 64\sqrt{300}\text{ m}^3 \approx 1108.512517\text{ m}^3$
 4.) 47° 5.) a) 160° b) 24
 6.) a) see below b) $\{3, 4, 5\}$ c) $\{1, 3, 4, 5, 6\}$ d) $\{1, 2, 5, 6, 8\}$ e) $\{3, 5, 7, 10\}$ f) $\{6\}$



g) all subsets of C :

$$\emptyset, \quad \{1\}, \{3\}, \{5\}, \{7\}, \{10\}$$

$$\{1, 3\}, \{1, 5\}, \{1, 7\}, \{1, 10\}, \{3, 5\}, \{3, 7\}, \{3, 10\}, \{5, 7\}, \{5, 10\}, \{7, 10\}$$

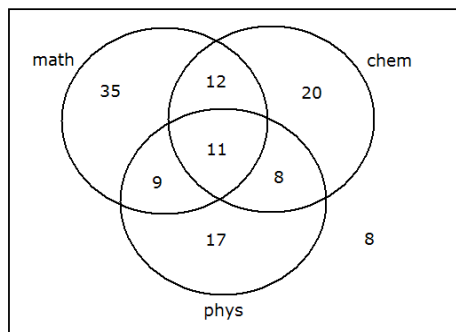
$$\{1, 3, 5\}, \{1, 3, 7\}, \{1, 3, 10\}, \{1, 5, 7\}, \{1, 5, 10\}, \{1, 7, 10\}, \{3, 5, 7\}, \{3, 5, 10\}, \{3, 7, 10\}, \{5, 7, 10\}$$

$$\{1, 3, 5, 7\}, \{1, 3, 5, 10\}, \{1, 3, 7, 10\}, \{1, 5, 7, 10\}, \{3, 5, 7, 10\}$$

$$\{1, 3, 5, 7, 10\}$$

h) 252 i) $\frac{2}{5}$ j) $\frac{1}{2}$ k) $\frac{3}{5}$ l) $\frac{4}{5}$ m) $\frac{2}{5}$ n) $\frac{2}{7}$ o) 1 p) 0 q) $\frac{\binom{7}{3}}{2^7} = \frac{35}{128}$

7.) a) see below b) 12 c) 67 d) $\frac{67}{120}$ e) $\frac{4}{9}$ f) $\frac{20}{67}$



8.) \$549.12 9.) a) \$5518.06 b) \$5613.59 c) \$5663.63 d) \$5697.89 e) \$5714.72

10.) a) \$216.144 b) 5.5% 11.) a) 25% decrease b) 33.33% increase 12.) a) $\frac{1}{9}$ b) $\frac{1}{3}$ c) $\frac{5}{9}$ 13.) $\frac{5}{8}$

14.) a) 13 units b) $\sqrt{74}$ units 15.) a) $\frac{\binom{13}{3}}{\binom{52}{3}} = \frac{11}{850}$ b) $\frac{\binom{13}{3}}{\binom{39}{3}} = \frac{22}{703}$ 16.) a) $\frac{21}{128}$ b) $\frac{29}{128}$

17.) a) $\frac{1}{10}$ b) $\frac{9}{10}$ c) $\frac{81}{100}$ c) $\frac{19}{100}$ d) $\frac{3}{50}$ e) $\frac{7}{100}$ f) $\frac{1}{25}$ g) $\frac{1}{2}$ h) $\frac{3}{4}$ i) $\frac{9}{20}$

j) $\frac{7}{50}$ k) $\frac{91}{100}$ 18.) $\frac{\binom{15}{3}}{\binom{16}{4}} = \frac{1}{4}$

19.) 30 20.) $P = 22 \text{ m}, A = 21 \text{ m}^2$ 21.) a) $\frac{6}{10} = \frac{3}{5}$ b) $\frac{9}{10}$ c) $\frac{7}{10}$ 22.) 48 cm^2

23.) a) $\frac{8 \cdot 9^4}{9 \cdot 10^4} = \frac{729}{1250}$ b) $\frac{9^5}{9 \cdot 10^4} = \frac{6561}{10000}$

24.) a) $P = (4\pi + 20) \text{ ft} \approx 32.566371 \text{ ft}$ $A = (8\pi + 48) \text{ ft}^2 \approx 73.13274123 \text{ ft}^2$

b) $P = (50 + 7\pi) \text{ in} \approx 71.991149 \text{ in}$ $A = \left(\frac{49}{2}\pi + 168\right) \approx 244.96902 \text{ in}^2$ c) $P = 92 \text{ m}$ $A = 426 \text{ m}^2$