

Summer MA 15200 Lesson 12 Section 1.5 (part 2), Appendix E and F

I Applied Problems

Ex 1: Three times a negative number subtracted from the square of the number equals 9. Find the number.

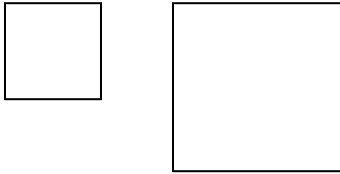
Ex 2: The formula $P = 0.006A^2 - 0.02A + 120$ models a man's normal systolic blood pressure given his age in years. Find the age, to the nearest tenth of a year, for a man whose normal systolic blood pressure is 123.

The Pythagorean Theorem relates the 3 sides of a right triangle. If the two legs, or shorter sides, are represented by a and b and the hypotenuse, or longest side, is represented by c , then $a^2 + b^2 = c^2$.

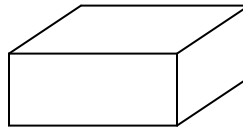
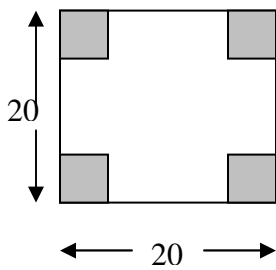
Ex 3: A right triangle has one leg 45 cm long and the longest side, the hypotenuse is 60 cm long. Approximate the length of the remaining leg to the nearest tenth of a cm.

Ex 4: A rectangle has a length 4 inches more than its width. If the area of the rectangle is 117 square inches, find its width and length.

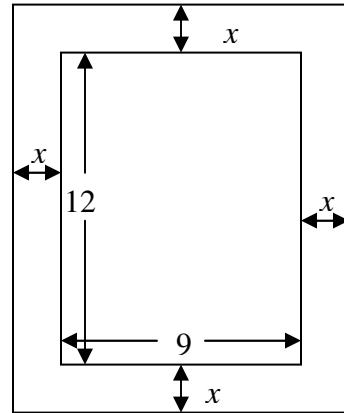
Ex 5: The side of a square is 4 centimeters shorter than the side of a second square. If the sum of their areas is 106 square centimeters, find the length of one side of the larger square.



Ex 6: A piece of thick cardstock, 20 inches per side, is to have four equal squares cut from its corners as shown. If the edges are then to be folded up to make an open topped box with a bottom area of 256 square inches, find the depth of the box.



Ex 7: A picture showing through a picture frame is 9 inches by 12 inches. The frame around the picture is of uniform width. (See picture below.) If the area of the picture plus the frame is 208 square inches, find the width of the frame.



II Uniform motion problems

***Always let x represent an unknown question of the problem.**

You will need a calculator to approximate some homework problems of this lesson.

Always factor out a GCF before choosing your method to solve the equation.

Ex 8: A boat travels 8 miles upstream and 10 miles downstream in a total time of 12 hours. The speed of the stream is 1 mile per hour. Approximate the speed of the boat in still water rounded to the nearest hundredth.

	Distance	Rate	Time
upstream			
downstream			

Ex 9: Larry paddled his canoe 18 miles on the first part of a trip at a certain speed. He continued another 16 miles, traveling at a speed 2 miles per hour slower than the first part of the trip. The total time for the trip was 7 hours. Find his speed on each part of the trip.

	Distance	Rate	Time
1 st part of the trip			
2 nd part of the trip			

III Job or Work Problems

Remember the format for these problems: $\text{rate}(\text{time}) + \text{rate}(\text{time}) = 1 \text{ job}$

Ex 10: A janitorial service provides two people to clean an office building. Working together, the two can clean the building in five hours. One person, new to the job, would take 2 hours longer than the employee would take who has been there longer, if he cleaned the building alone. How long would it take the less experienced worker to clean the building alone? Round to the nearest tenth of an hour.

Let x = time for the more experienced worker

$x + 2$ = time for the less experienced worker

Ex 11: Bob can wax his car in 2 hours. When he works together with Jim, they can wax the car in 20 minutes. How long would it take Jim by himself to wax the car?

***Note: On a homework problem similar to this one, a suggestion is made to convert all time units to minutes. If you do that, the final answer should be converted back to hours.**

IV Pythagorean Theorem problems

Ex 12: Two cars left the same parking lot at the same time, one traveling due north and the other due east. After a period of time, they were 100 miles apart and the north-bound car had traveled 20 more miles than the east-bound car. How far had each car traveled from the parking lot?

Ex 13: A small garden plot of land is in the shape of a right triangle with the larger leg 7 feet longer than the shorter leg and the hypotenuse 8 feet longer than the shorter leg. Find the lengths of all three sides.

V Projectile Problems

Ex 14: A ball is tossed vertically upward from the ground. Its distance in feet from the ground is given by $s = -16t^2 + 48t$. After how many seconds will the ball be 32 feet above the ground?