MIDTERM 1 REVIEW PROBLEMS

Main topics on midterm1: basic algebra, solving equations, inverse function, unit conversion, car problems, mixing problems, express-in-terms-of problems, proportionality, summation notation, change of a function, limits, equation of a line

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You should do the practice problems on the course webpage, review problems on the homework, and do the practice midterms in the back of the textbook.

Additional Midterm Review Problems:

1. The Earth travels in a circle around the sun once every year. The radius of the circle is 98 million miles. What is the speed of the Earth in miles per hour?

2. Car A leaves Sancramento at noon travelling at 60mph on a road 560 miles long to Los Angeles. Car B leaves Los Angeles at 2pm traveling at constant speed along the same road to Sacramento. They meet at 6pm. What was the speed of Car B?

3. Solution A contains 5% salt. Solution B contains 20% salt. How much solution A do you combine with 3 liters of solution B to obtain a result containing 10% salt?

4. A square has 7 times the area of a circle of radius R. Express the perimeter of the square in terms of R.

5. A sports field is to have the shape of a rectangle with semi-circles on the two ends. It must have a perimeter of 1000m. Express the area enclosed in terms of the diameter of the semi-circular ends.

6. The cost of moving rubble is proportional to the product of mass of the rubble with the distance the rubble is moved. If it costs \$50 to move 1 ton of rubble 1 mile, how much does it cost to move 30 tons 20 miles?

7. Express the sum of the first 10 odd positive integers using a summation notation.

8. What is the change in $f(x) = x^2 + 1$ when x is increased from $x = 2$ to $x = 2 + h$? What if you let $h \to 0$?

9. Find

$$\lim_{x\to 10}(x^3 + \frac{1}{x}),\ \lim_{h\to 0}\frac{(x+h)^3 - x^3}{h},\ \lim_{x\to\infty}\frac{2x+1}{4-x},\ \lim_{x\to\infty}\frac{4x+1}{x^2+1}.$$

10. Find the equation of the line through the point $(3, 1)$ and is perpendicular to $y = 2x + 1$.
