

Name _____ points of 206
_____ %

Write answers and show all work on these sheets. Since partial credit will be given, show sufficient detail.
The number of points for each question is shown in parentheses after the number of the question.

1. (20) Simplify the compound fractions:

a. $\frac{\frac{1}{a+h} - \frac{1}{a}}{h} =$

b. $\frac{3(1+x)^{1/3} - x(1+x)^{-2/3}}{(1+x)^{2/3}} =$

2. (15) Solve for n: $S = \frac{n(n+1)}{2}.$

3. (10) Write in the form $a+bi$:

a. $(9-3i) - (-2-6i) =$

b. $(9-3i)(-2-6i) =$

4. (14) Write in the form $a+bi$:

a. $\frac{-2-6i}{9-3i} =$

b. $i^{73} =$

5. (40) Solve the equation:

a. $|2x+5| - 9 = 11$

b. $x^{4/3} - 5x^{2/3} + 6 = 0$

c. $x^3 - 5x^2 - 2x + 10 = 0$

d. $\sqrt{1 + \sqrt{x + \sqrt{2x+1}}} = \sqrt{5 + \sqrt{x}}$

6. (5) Solve the inequality: $|2x+5| - 9 \geq 11$.

7. (7) Solve the inequality: $x^2 + 5x + 6 > 0$.

8. (15) Solve the inequality: $\frac{x(x-1)}{(x+1)(x-2)^2} \leq 0$

In the remaining applied problems:

- a. List the quantities involved; indicate the values of those that are known, and indicate those which are sought. Alternatively, prepare a table of quantities.**
- b. Make a sketch and label it (if necessary).**
- c. Write in pseudocode any relationships among the quantities.**
- d. Assign a letter to one of the quantities and represent other quantities in terms of this letter (if needed).**
- e. Write an equation needed to solve the problem.**
- f. Solve the equation.**
- g. Check your answer by reference to the original problem; explain in complete sentences why your answer is correct.**

9. (20) An express train and a local train start out from the same point at the same time and travel in opposite directions. The express train travels 32 kilometers per hour faster than the local train. If after 3 hours they are 396 kilometers apart, what is the average speed of each train?

10. (20) A merchant blends tea that sells for \$3.00 a pound with tea that sells for \$2.75 a pound to produce 80 lb of a mixture that sells for \$2.90 a pound. How many pounds of each type of tea does the merchant use in the blend?

11. A plumber and his assistant work together to replace the pipes in an old house. The plumber charges \$45 per hour for his own labor and \$25 per hour for his assistant's labor. The plumber works twice as long as his assistant on this job, and the labor charge on the final bill is \$4025. How long did the plumber and his assistant work on this job?

12. (20) Henry and Irene working together can wash all the windows of their house in 1 h 48 min. Working alone, it takes Henry $1\frac{1}{2}$ h more than Irene to do the job. How long does it take each person working alone to wash all the windows?