

1. (10 pts) Solve $x^2 - 5x + 4 = 0$ by factoring.

2. (10 pts) Solve $x^2 - 5x + 4 = 0$ by completing the square.

3. Compute the discriminant for each of the following. By this, tell me what kind of solutions there are, and how many there are.

a. (5 pts) $4x^2 - 5x - 9 = 0$

b. (5 pts) $4x^2 - 5x + 9 = 0$ (Anything special about this one?)

c. (5 pts) $4x^2 - 12x - 9 = 0$ (Anything special about this one?)

4. (10 pts) Solve the equation $2.5x^2 + 7.3x - 12.1 = 0$ correct to 4 decimal places.
5. (5 pts) Jill can finish the paint job by herself in 12 hours and Jack can finish the paint job by himself in 9 hours. How long will it take Jack and Jill to finish the paint job, if they work together?
6. (5 pts) Follow-up to the previous problem. Suppose Jill gets a late start, and shows up to work at 10 a.m., and Jack has been there since 7 a.m. What time will they finish the job?

7. (10 pts) Joe wants to mix 15% alcohol with 10 gallons of 25% alcohol, to obtain a mixture of 22% alcohol. How much 15% alcohol should he use, and what is the volume of the final mixture?

8. (10 pts) Solve $\frac{x-12}{3-x} = \frac{x+16}{x+5}$.

9. (5 pts) Solve the compound inequality $2x - 3 > 5$ or $5 - 3x > 11$. State the final answer in set-builder and interval notation.

Solve the absolute value inequalities. State answer in set-builder and interval notation.

10. (5 pts) $|7x + 2| > 5$

11. (5 pts) $|7x + 2| \leq 5$

Solve the degenerate cases. If you run out of room, you're doing it wrong.

12. (5 pts) $|2 - 7x| > -3$

13. (5 pts) $|2 - 7x| < -3$