

Do your own work. SHOW your work. When in doubt about how stupid I am, assume the worst.

1. Solve the following equations and inequalities. For equations, give the solution as a set. For inequalities, give the solution in set-builder notation and interval notation.

a. (10 pts)  $3x - 2 \geq 5x + 8$

b. (10 pts)  $|3x - 2| = 4$

c. (10 pts)  $|2 - 3x| \geq 4$

d. (10 pts)  $\left| \frac{2}{3}x - 2 \right| < \frac{7}{10}$

e. (5 pts)  $\left| \frac{12}{39}x + \frac{9}{7} \right| \leq -4$

f. (5 pts)  $\left| \frac{12}{39}x + \frac{9}{7} \right| > -4$

2. Solve the following equations:

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

b. (5 pts)  $x^2 - 10x + 25 = 0$

c. (5 pts)  $10x^2 - 63x - 90 = 0$

3. (5 pts) Solve  $s = -\frac{1}{2}gt^2 + vt + h$  for  $v$ .

4. (10 pts) Combine into one fraction in lowest terms:  $\frac{5}{24} + \frac{7}{30}$

5. Simplify. Assume all variables represent nonzero real numbers. Your final answer should contain only positive exponents.

a. (10 pts)  $(x^2 y^8)^3 (x^{-5} y^2)^{-7}$

b. (10 pts)  $\frac{(14^2 x^2 y^3)^2}{(35^3 x^{-2} y^{-5})^4}$

Answer up to 3 bonus questions for up to 15 points. I will grade the first 3 you do work on, unless you tell me to omit them.

1. (5 pts) Consider the equation  $ax^2 + bx + c = 0$ . Write the discriminant.



2. (5 pts) What's the solution of the equation  $ax^2 + bx + c = 0$ ?

3. (5 pts) Factor  $420x^2 - 332x - 1155$  into the product of two binomials.
4. (5 pts) Factor  $24x^3 + 375y^6$
5. (5 pts) Use Pascal's triangle to expand  $(3x - 2y)^4$
6. (5 pts) Factor  $x^2 - 20x - 10$  (It doesn't factor over the rationals! Your 'ac' method won't work!).