



Math Olympiad and Problem Solving Programs  
E130 - Honors Geometry Problem Solving  
Problem Set 10.1 - Algebra

Name:

Date:

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1.  $\boxed{96}$
2.  $\boxed{19}$
3. Since  $x^2 - 5x = -7$ ,  $x^4 - 10x^3 + 25x^2 - 9 = (x^2 - 5x)^2 - 9 = (-7)^2 - 9 = \boxed{40}$ .
4.  $\frac{P}{A} = \frac{3 \times 12}{4 \times 12^2} = \boxed{\frac{1}{16}}$ .
5. Set  $2x - 1 > 0$ . Thus,  $x > a = \boxed{\frac{1}{2}}$ .
6.  $\boxed{324}$
7.  $x^2 + 15x - 54 = (x + 18)(x - 3) = 0$ . Thus,  $x = \boxed{3}$ .
8. Plug  $3m$  and  $m$  into the equation, we get  $(3m)^2 + 12 = 3(m^2 + 12)$ . Simplify the equation yields  $6m^2 = 24$  and  $m^2 = 4$ . Take the positive solution of  $m$  to get  $m = \boxed{2}$ .
9. Let the price of the total expense be 1. Then  $\frac{\frac{1}{16} - \frac{1}{20}}{\frac{1}{20}} = \frac{1}{4} = \boxed{25\%}$ .
10.  $\boxed{7}$