Exam 2

Prob.	1	2	3	4	5	6	7	8	9	10	EC	
Value	21	8	5	8	8	8	12	12	8	10	4	100
Points												

Show all work for credit. Answers with little or no supporting work will receive little or no credit.

1. Short answer.

   (a) Complete the square: $x^2 - 42x + 16$

   (b) Simplify to a single appearance of x: $\dfrac{(4x)^6}{(2x)^9}\, x^2$

   (c) Solve for p: $x^4 x^p = x^7 x^8$

   (d) How many local minima must a sixth degree polynomial have if it has three local maxima?

   (e) Give the end-behavior model of $(x+4)^3(5x^2+7)$

   (f) Give the slope of a line parallel to $y = (\pi/3)x + e$

   (g) What is the maximum number of roots that the polynomial $ax^4 + bx^3 + cx^2 + dx + e$ can have?

2. True or false (circle one).

   (a) (T) (F) $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$

   (b) (T) (F) The area of a square is proportional to its side length.

   (c) (T) (F) $(x-5)^2(x+2)$ and $16(x-5)^2(x+2)$ have the same roots.

   (d) (T) (F) $(ab)^2 = a^2b^2$.

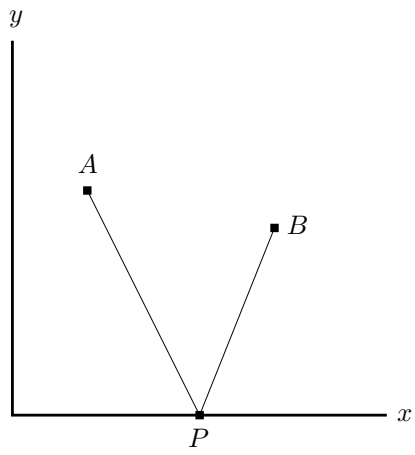
3. Suppose f is a quadratic and has a root at the origin and a maximum at $(7, 3)$. What is its other root?

4. Find the equation of the polynomial that passes through the points $(0, 0)$, $(3, 0)$, $(-2, 0)$, and $(2, 1)$

5. Solve algebraically: $6x^4(x-7)^3 - 12x^4(x-7)^5 = 0$

6. Find the center and radius of the circle $x^2 - 6x + y^2 = 12$
   Center =
   Radius =

7. Light coming from a light source at $A = (3, 12)$ reflects off the x-axis at an unknown point P and goes through $B = (8, 7)$. P is located so the total distance from A to P to B is minimized. Find P.



8. A rental car costs \$40 a day and comes with 100 free miles. Every mile after the first 100 costs 25 cents. You rent the car for one day, and find that you paid an average of 30 cents per mile. How many miles did you drive?

9. Find the point on the graph of $f(x) = -x^4 + 5x^2$ that is closest to the point $(1, 6)$

10. Let $f(x) = x^2 + 7x$. Simplify $\dfrac{f(x+h) - f(x)}{h}$

11. (Bonus 4 points) Solve for y: $y = xy^2 + 14y - 6 + x^4$.