

Exam 2

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|--------|----|---|---|---|---|---|----|----|---|----|----|-----|
| 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) How many distinct local maxima can a cubic have?

(b) Give the end-behavior model of the polynomial $P(x) = (x + 2)(4x^3 - 3x)$.

(c) Simplify to a single power of x : $\frac{(x^4x^3)^2}{x^5}$.

(d) Complete the square of the following expression: $x^2 - 18x$.

(e) Give the slope of a line perpendicular to the line $y = \frac{-x}{3} - 17$.

(f) Solve for p : $(1 - x)^p(1 - x)^8 = (1 - x)^3$.

(g) Suppose a polynomial has two local maxima and one local minimum. What degree is it?

2. True or false (circle one).

(a) (T) (F) The area of a circle is proportional to its radius.

(b) (T) (F) A rectangle has the maximum area when all the sides are the same length.

(c) (T) (F) $(a + b)^2 = a^2 + b^2$.

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

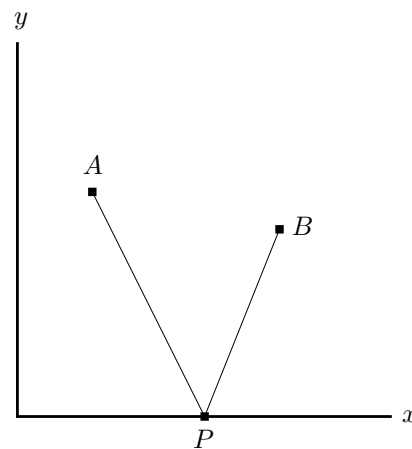
3. Suppose the graph of $y = ax^2 + bx + c$ passes through the points $(1, 9)$ and $(6, 9)$. Find $\frac{-b}{2a}$ by using what you know about the axis of symmetry.

4. Solve algebraically: $5x^4(1-x)^4 - 4x^5(1-x)^3 = 0$.

5. Find the center and radius of the circle given by the equation $x^2 + y^2 + 5y = 12$.
center =
radius =

6. Let $f(x) = x^2$. Find the equation of the line through the points on the graph of f where $x = a$ and $x = a + h$.

7. Light coming from a light source at $A = (2, 6)$ reflects off the x -axis at an unknown point P and goes through $B = (7, 5)$. P is located so the total distance from A to P to B is minimized. Find P .



8. The cost of gas in Bozeman is $\$1.59^9$ per gallon. Gas in Livingston is $\$1.49^9$ per gallon. Your car gets 22 miles per gallon, and it is 26.41 miles from Bozeman to Livingston. How much gas must your car hold for it to be cheaper to get gas in Livingston than in Bozeman? (Hint: Assume that your tank is empty when you fill it. Also note that you have to pay for the gas both to and from Livingston.)

9. Give the equation of the circle centered at $(3, 4)$ and passes through the closest point of the graph of $f(x) = x^2$.

10. Let $\gamma(.2) = .31$, $\gamma(.4) = .41$, $\gamma(.6) = .60$, and $\gamma(.8) = .93$.

(a) Estimate $\gamma(.57)$.

(b) Solve for x in $\gamma(x) = .34$.

11. (Bonus 4 points) Solve for y : $y = 3xy - 7x^3 + 3y^2 - 2$.