

Show clear supporting work on problems with several steps. Algebraic problems that display little or no supporting work will get little or no credit. You do not need to show work on calculator problems. To solve numerical problems guess-and-check is legal unless you are requested to solve them "algebraically."

1. Short answer [No work need be shown]:

a) Box A is 100% larger than Box B.
 Box B is how much smaller than Box A?

b) Let n be a positive integer and $f(x) = x^n$.
 f is not one-to-one if _____

c) If y is proportional to x and $y = 12$ when $x = 3$,
 what is y when $x = 4$?

d) Simplify $\frac{x^6}{\sqrt{x}}$ to x to some power.

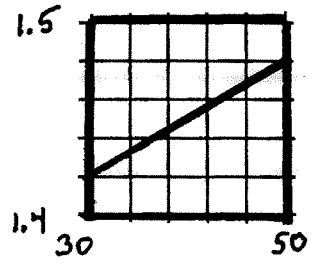
Problem	points	score
1	12	
2	8	
3	4	
4	8	
5	8, 8	
6	8	
7	12	
8	10	
9	12	
10	10	
total		

2. To show a graph on a TI calculator, you must enter an equation.

What equation would you enter to graph

$$3x^2 + 5y^2 + 4x + 2xy = 97 ?$$

3. Find the slope of the line in the pictured graph:



4. This is the equation of a circle. $x^2 + 7x + y^2 = 30$
Put it in "standard form" and identify its center and radius.

center _____

radius _____

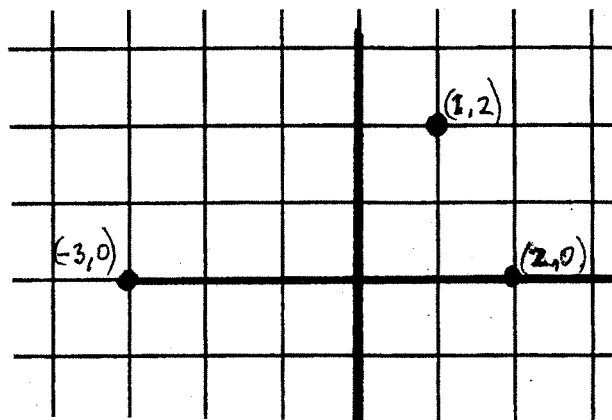
standard form:

5. Solve algebraically for x . [Show work, of course. The answer alone is worth little without supporting work]

a) $\frac{3}{2}\sqrt{x}(1-x)^3 - 3x^{3/2}(1-x)^2 = 0$

c) $\sqrt{x+17} = x-3$

6. A quadratic goes through the three pictured points. $(-3, 0)$, $(1, 2)$ and $(2, 0)$. Give the quadratic in factored form. [Factored form is required. Show your algebra.]



7. Suppose all we know about a function f is that $f(14) = 75$, $f(29) = 47$, and $f(48) = 11$. We want to approximate the solution for x to $f(x) = 23$ using linear interpolation.
- Find the most relevant line in point-slope form.
 - Use the line to find the approximate solution to $f(x) = 23$.

8. A Precalculus exam has 4 easy problems, 5 medium problems, and 3 hard problems. The professor thinks the easy problems are worth least, each medium problem is worth twice as much as each easy problem, and each hard problem three times as much as each easy problem. To make a 100-point exam, how many points should be assigned to each easy problem? Show this won't work in integers. But it would if one more problem were added in. Which type? How much should the easy problems then be worth?

9. The revenue of BozemanWidget.com, went up 29% in 2011, changed an unknown amount in 2012, and went up 40% in 2013. Over those three years revenue went up 50%.

a) How much did it change in 2012? [Express the answer as a percent change up or down.]

b) What was the average change over those three years?

10. PizzaDeal makes **square** pizzas and uses the same amount of dough in their 10" square they do in their 12" square, so the 12" pizza is thinner. Suppose each pizza is a square of uniform thickness. How much thinner is the dough on a 12" pizza than a 10" pizza? [Answer in percents.]