

MATH 120  
SPRING 2013  
EXAM 2

NAME:

1. 10 pts. each Solve each equation by the indicated method.

  - (a)  $9x^2 = 12x - 4$  (by using the zero-factor property)
  - (b)  $(x + 5)^2 = -3$  (by using the square root property)
  - (c)  $-3x^2 + 9x = 7$  (by completing the square)
2. 10 pts. Solve  $h = -16t^2 + v_0t + s_0$  for  $t$  using the quadratic formula.
3. 15 pts. A box with no top and a square base is to be made from a piece of cardboard by cutting 3-cm squares from each corner and folding up the sides. The volume of the box is to be  $48 \text{ cm}^3$ . What size should the piece of cardboard be?
4. 15 pts. A factory is to be built on a lot measuring 180 m by 240 m. A local building code specifies that a lawn of uniform width and equal in area to the factory must surround the factory. What must the width of this lawn be, and what are the dimensions of the factory?
5. 10 pts. each Solve each equation.

  - (a)  $\frac{1}{x-1} = \frac{2}{x^2}$
  - (b)  $\frac{x+5}{x-2} = \frac{5}{x+2} + \frac{28}{x^2-4}$
  - (c)  $\sqrt{5-x} + 1 = x - 2$
  - (d)  $3 - \sqrt{x} = \sqrt{2\sqrt{x} - 3}$
  - (e)  $x^{4/3} - 5x^{2/3} + 6 = 0$
  - (f)  $|x - 1| = |3x + 2|$
6. 10 pts. each Solve each inequality. Write each solution set in interval notation.

  - (a)  $6x - (3 - 2x) \leq 3x - 7$
  - (b)  $-\frac{1}{2} < \frac{4 - 3x}{5} \leq \frac{1}{4}$
  - (c)  $x^2 + 5x + 6 > 0$
  - (d)  $\frac{2x + 1}{x - 5} \leq 3$
  - (e)  $|4 - 3x| > 2$
  - (f)  $|x - 3| < -2$
  - (g)  $|5 - x| \leq 12$

7. 10 pts. Show algebraically that the points  $P(-1, 3)$ ,  $Q(3, 11)$ , and  $R(5, 15)$  are collinear.
8. 10 pts. For the equation  $y = \sqrt{x - 3}$ , give a table with three ordered pairs that are solutions.
9. 10 pts. Write  $x^2 - 12x + y^2 + 10y = -25$  in Center-Radius form, then give the center and radius of the circle.
10. 10 pts. Suppose that receiving stations  $X$ ,  $Y$ , and  $Z$  are located on a coordinate plane at the points  $(7, 4)$ ,  $(-9, -4)$ , and  $(-3, 9)$ , respectively. The epicenter of an earthquake is determined to be 5 units from  $X$ , 13 units from  $Y$ , and 10 units from  $Z$ . At what coordinates is the epicenter located?

EXTRA CREDIT. 15 pts.

Find the area of the shaded region between the concentric circles.

