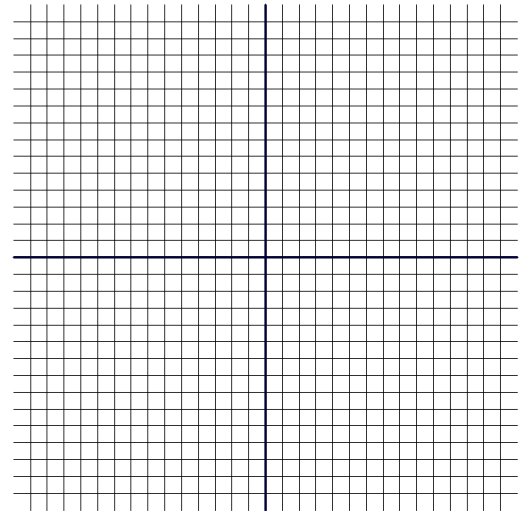


## Sample Math 111 Final Exam Questions

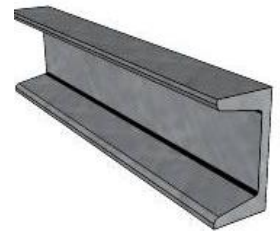
1. Consider the linear equation:  $4x + 3y - 15 = 0$ 
  - a. Put the equation in slope intercept form
  - b. State the slope
  - c. State the coordinate of the y-intercept
  - d. Give the exact coordinate for the x-intercept
  - e. Graph the line



2. Find the equation of a line passing through points:  $(-5,4)$  &  $(5,8)$

3. Consider the data in the chart concerning the weight of channel iron

| Channel iron lengths and weights chart |         |         |         |         |
|----------------------------------------|---------|---------|---------|---------|
| Length (x)                             | 19 feet | 23 feet | 37 feet | 44 feet |
| Weight (y)                             | 152 lbs | 196 lbs | 336 lbs | 408 lbs |

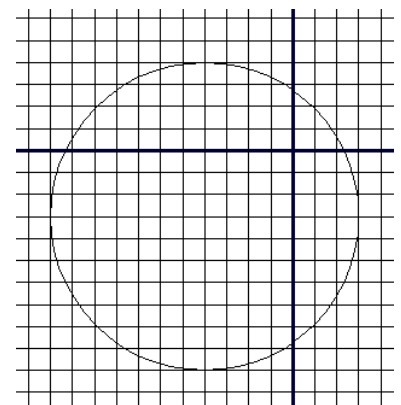


- a. Find a linear model for the relationship **by hand** using the longest and shortest lengths.
- b. Use the **regression function** in your calculator to find a linear model (equation) for the relationship between length (x) and weight (y).
- c. Use the regression equation to predict the weight of a 62 foot length of channel iron.
- d. Use the regression equation to predict the length of channel iron weighing 784 lbs.

4. Solve the equation:  $6.2(2x - 7) + 10.24 = 9 - 4(3x - 4.1)$

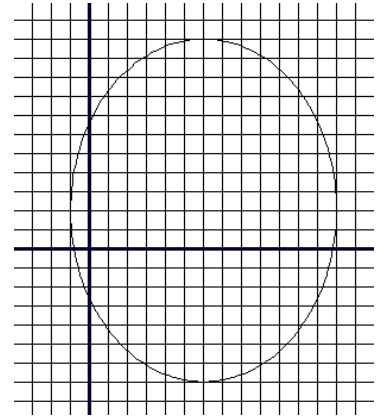
5. Solve the equation:  $3x - 2 = \frac{2}{5} - \frac{5x-2}{4}$

6. Find the equation for the circle in standard form.



7. Change the equation of the circle to standard form:  $x^2 + y^2 - 8x + 14y + 29 = 0$

8. Find the equation for the ellipse in standard form.



9. Find exact zeros for the function  $f(x) = x^3 - x^2 - 22x - 8$

10. Solve (rounded to 2 decimal places):  $12 - 4\ln(x-3) = 5$

11. Calculate the interest rate necessary for \$760 to grow to \$980 in 4 years compounded continuously. Use the compound interest formula:  $A = Pe^{rt}$ , where A = final amount, P = starting amount, r = interest rate, and t = time in years.

12. Solve the system by substitution:  $y = 2x^2 - 3x + 4$

$$7x - y = 8$$

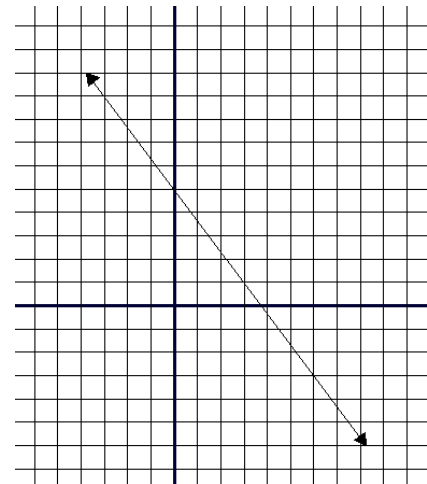
13. A river flows at 384 cfs at 6:00 am, then at 786 cfs at 11:00 am. Use the exponential function:  $A = A_0e^{kt}$ , where A = final amount,  $A_0$  = initial amount, k = rate of change and t = time in hours. Find a function for A(t) and use it to find the time the river will reach 1200 cfs.

14. Solve the system by elimination:

$$\begin{aligned} -2x - 3y + 5z &= 13 \\ 4x - 2y - 6z &= 2 \\ 3x + 4y - z &= 1 \end{aligned}$$

**Solutions:**

1. a.  $y = -\frac{4}{3}x + 5$     b.  $-\frac{4}{3}$     c. (0,5)    d.  $(3\frac{3}{4}, 0)$     e.



2.  $y = \frac{2}{5}x + 6$     3. a.  $y = 10.24x - 42.56$     b.  $y = 10.18x - 39.98$     c. 591 lbs.    d. 81 feet    4.  $x = 2.4$     5.  $\frac{58}{85}$

6.  $(x+4)^2 + (y+3)^2 = 49$     7.  $(x-4)^2 + (y+7)^2 = 36$     8.  $\frac{(x-6)^2}{49} + \frac{(y-2)^2}{81} = 1$     9.  $x = -4$  &  $\frac{5 \pm \sqrt{33}}{2}$

10.  $x \approx 8.75$     11.  $r \approx 6.4\%$     12. (2,6) & (3,13)    13.  $A(t) = 384e^{.143t}$      $t \approx 7.97$  or 1:58 pm    14. (4,-2,3)