

## Final Exam

Math 135: Intermediate Algebra

January 10 2008

**Instructions:** Please write your name on every page. All 8 problems are worth an equal number of points. As always, show your work. Partial credit will be given for incorrect answers with relevant work shown. Credit will not be given for correct answers with no work shown. You may leave your answers in terms of square roots that do not evaluate to integers. Good luck!

<b>Name:</b>	
<b>Signature:</b>	

**Do not mark. For grading purposes only.**

Question	Score	Possible
1		10
2		10
3		10
4		10
5		10
6		10
7		10
8		10
9		10
10		10
Total		100

## Useful Formulas

$$\text{midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

$$m_{\text{perp}} = -\frac{1}{m}$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{Distance} = \text{Rate} \times \text{Time}$$

$$\text{Area of rectangle} = \text{Length} \times \text{Width}$$

$$\text{Area of triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$\text{Circumference of a circle} = 2\pi \times \text{Radius}$$

$$\text{Area of circle} = \pi \times \text{Radius}^2$$

$$\text{Surface area of sphere} = 4\pi \times \text{Radius}^2$$

$$\text{Vertex of a parabola} : x = -\frac{b}{2a}$$

1. Solve:

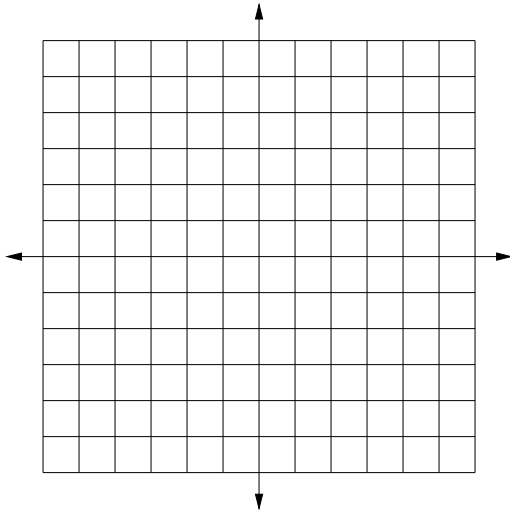
$$\frac{2x}{x-3} - \frac{7}{2x+5} = \frac{10x+18}{2x^2-x-15}$$

2. Divide:  $(1 + 3i) \div (3 - 2i)$

3. Solve:  $2x^2 - 4x - 1 = 0$

4. Consider the function  $y = \frac{1}{2}x^2 - 2x + 1$ .

- (a) Graph this function.
- (b) Find the coordinates of the vertex and mark it on your graph.
- (c) Find the axis of symmetry and draw it on your graph.



5. Evaluate:  $81^{-3/4}$

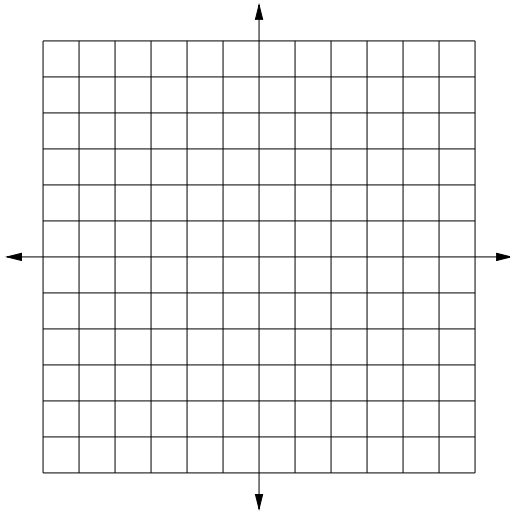
6. Simplify:

$$\frac{x^{-1/2}y^{1/2}\left(y^{1/3}z^{-2}\right)^2}{x^{2/3}yz^2}$$



7. Solve:  $2x - y = 7$  and  $3x + 4y = -6$ .

8. A farmer is planning to fence a pasture for cows. The pasture will be a square  $x$  meters by  $x$  meters. Each month the farmer expects to make \$0.10 per square meter of pasture from his cows, to spend \$10 per meter of fencing for upkeep, and to pay fixed costs of \$5000 regardless of how big the pasture is.
- (a) Write down a function giving the farmer's net monthly income in terms of  $x$ .
  - (b) Graph the function.
  - (c) Find the minimum pasture size required for the farmer to make a profit. Indicate this point on your graph.



9. A coast-to-coast airplane trip takes 5 hours heading East, with the wind, and 6 hours heading West, against the wind. If the trip is 3000 miles each way, find the speed of the wind and the speed of the plane in still air.

10. A coffee store owner has two types of coffee beans: a Kona bean and a Brazillian bean. He mixes them to make a breakfast blend, which is 40% Kona and 60% Brazillian, and a house blend, which is 10% Kona and 90% Brazillian. If a 10 ounce bag of the breakfast blend is \$10.50 and a 10 ounce bag of the house blend is \$8.25, find the price per ounce for pure Kona beans and for pure Brazillian beans.