Midterm 2 (Practice)

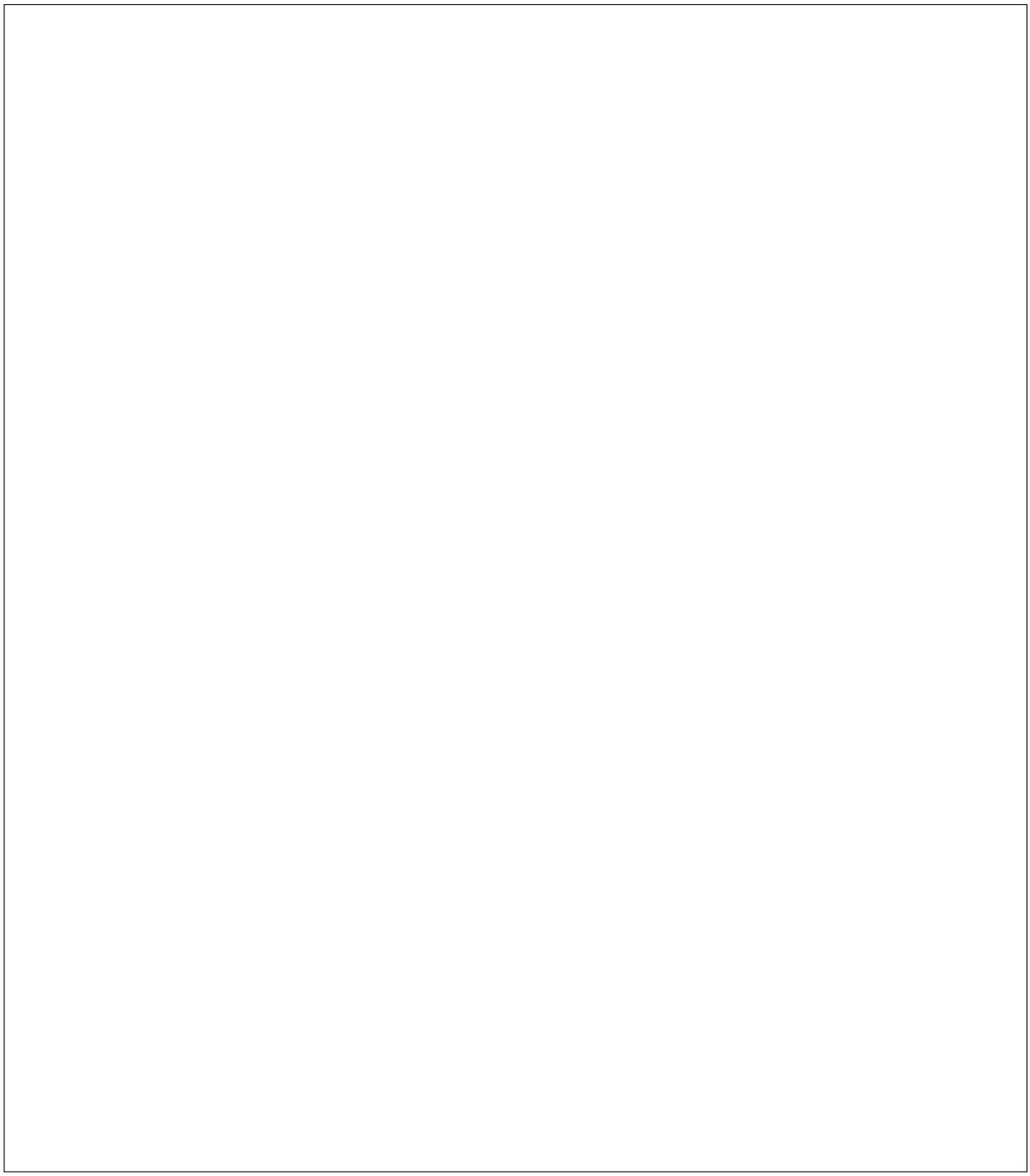
There are 11 problems worth 10 points each. A score of above 100 is possible on this midterm. Show all of your work for full credit.

1. Solve the following logarithmic equation.

$$\log_{\frac{1}{2}}(3x+2) = -1$$

2. Solve the following exponential equation.

$$e^{2-3x} = 11$$



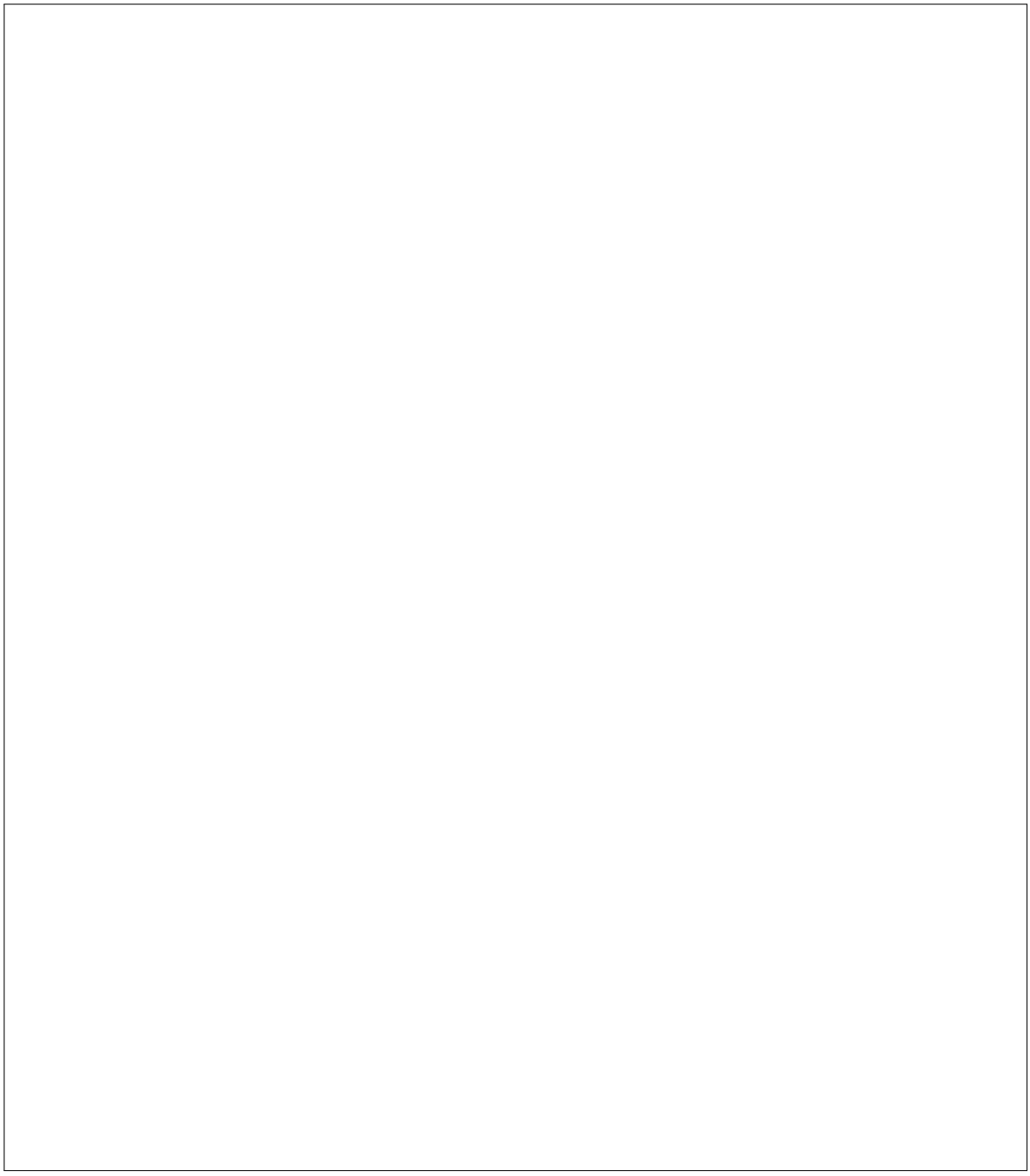
3. Use the laws of logarithms to expand the expression as much as possible.

$$\log \sqrt{x\sqrt{y\sqrt{z}}}$$

4. Sketch the graph

$$f(x) = 3 - e^x$$

Label the x and y-intercepts. Find the domain, range, and horizontal asymptote.

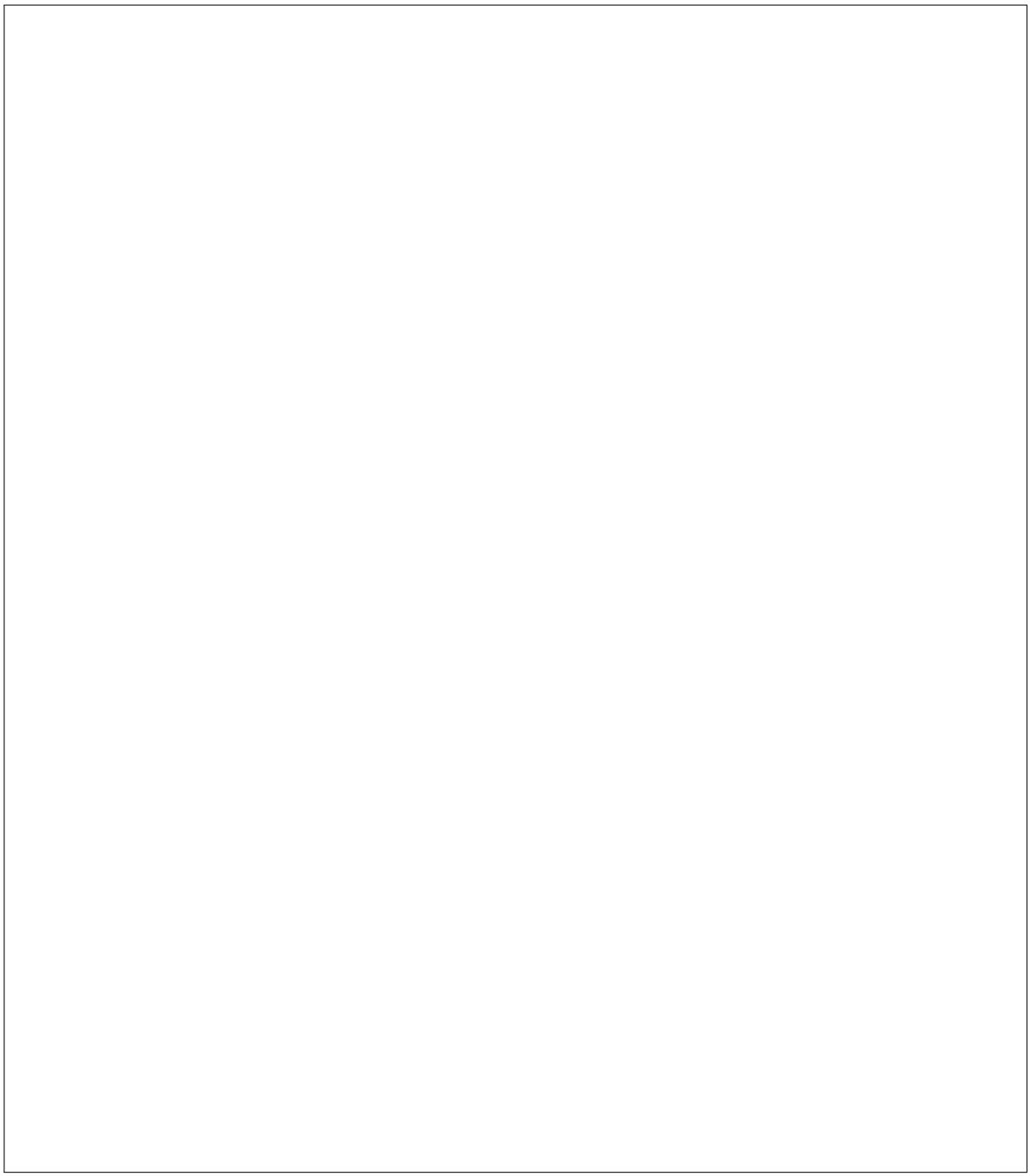


5. Write the parabola $f(x)$ in standard form $f(x) = a(x-h)^2 + k$

$$f(x) = x^2 - 8x + 8.$$

6. Factor the polynomial, find its zeros, and sketch it.

$$P(x) = x^4 - 3x^3 + 2x^2$$



7. All the real zeros of the given polynomial are integers. Find the zeros, and write the polynomial in factored form.

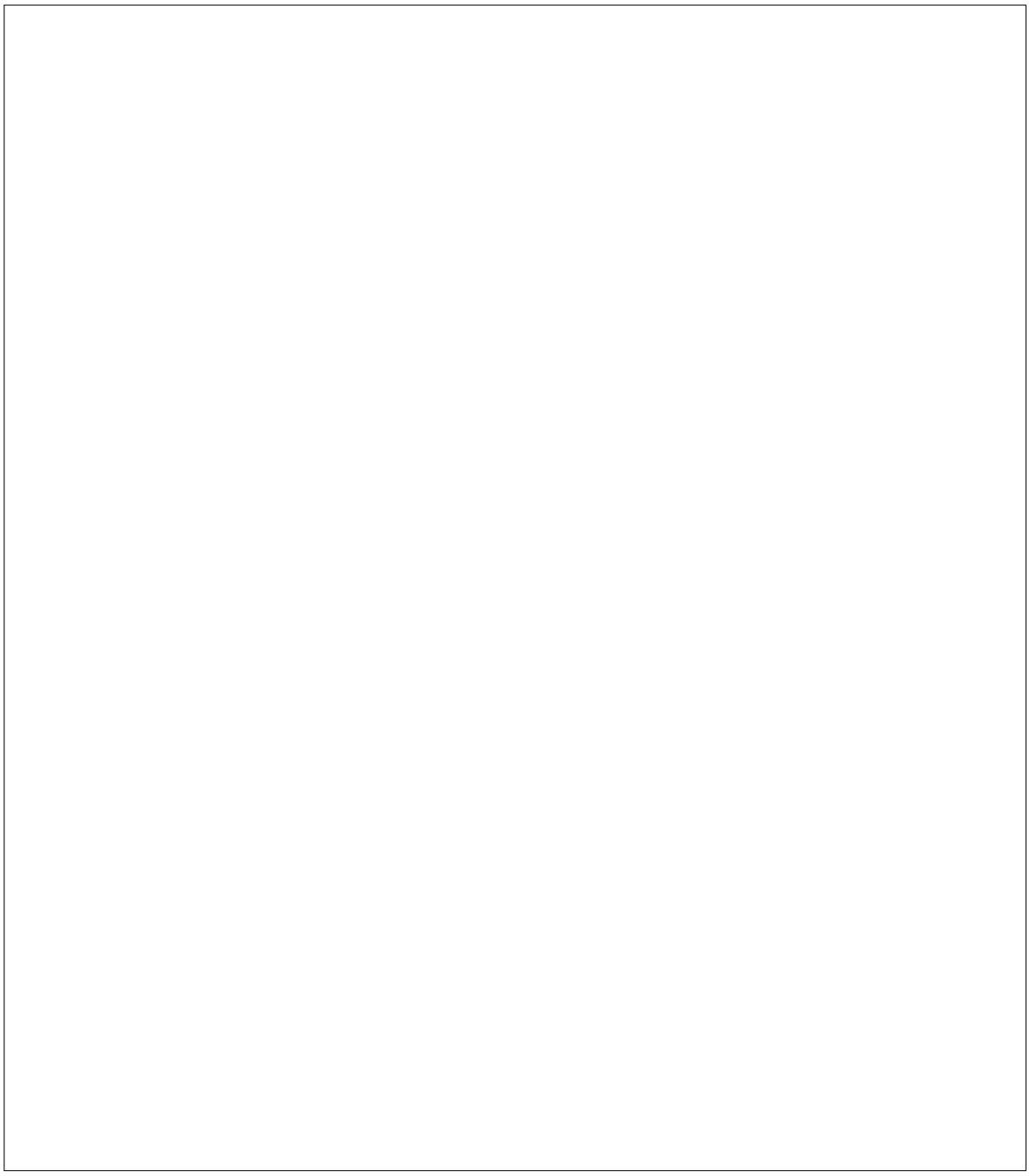
$$P(x) = x^3 - 5x^2 - 8x + 12$$

8. Solve the inequality.

$$\frac{6}{x-1} - \frac{6}{x} \geq 1$$

9. Is the following point on the unit circle?

$$\left(-\frac{6}{7}, \frac{\sqrt{13}}{7}\right)$$

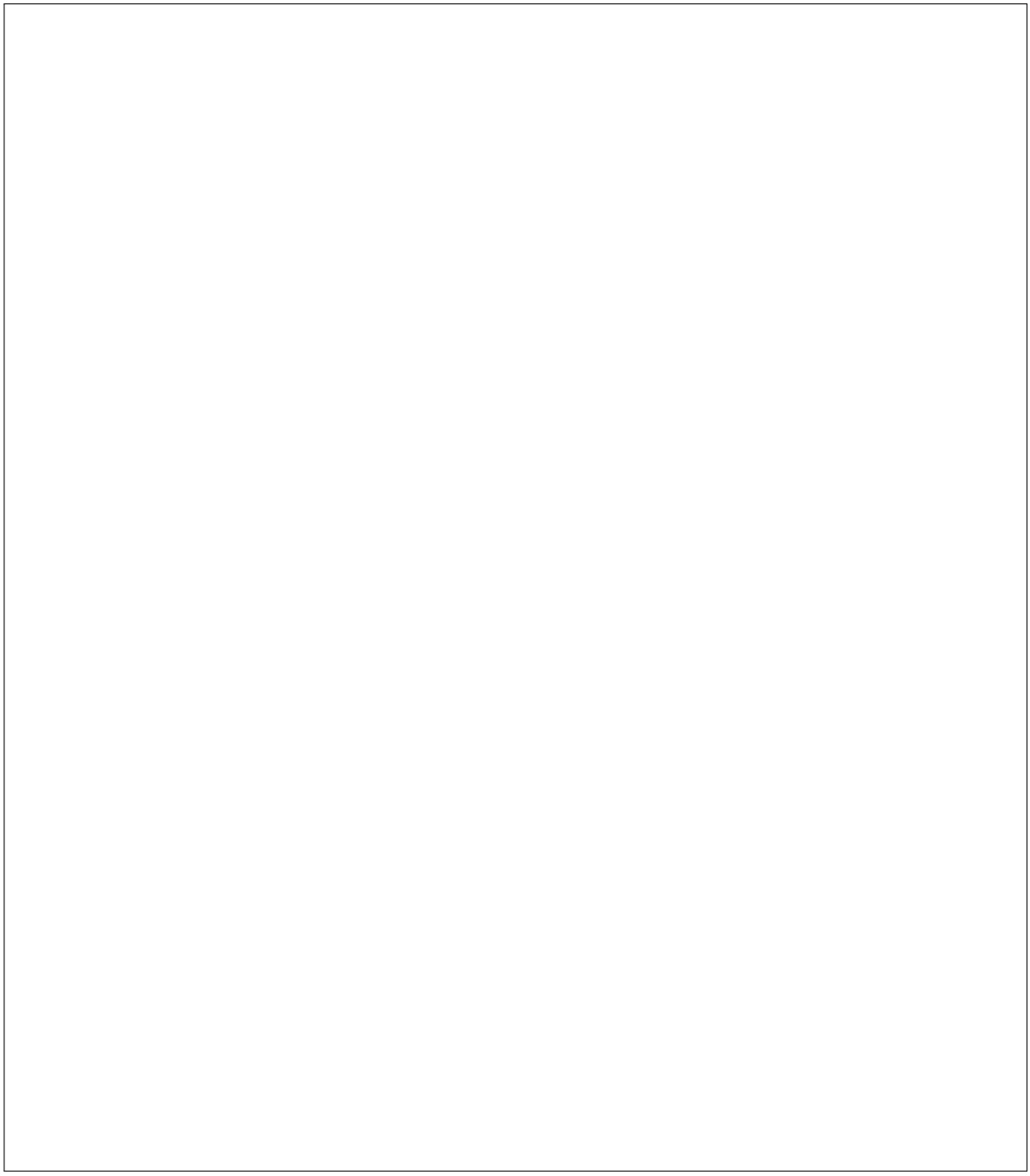


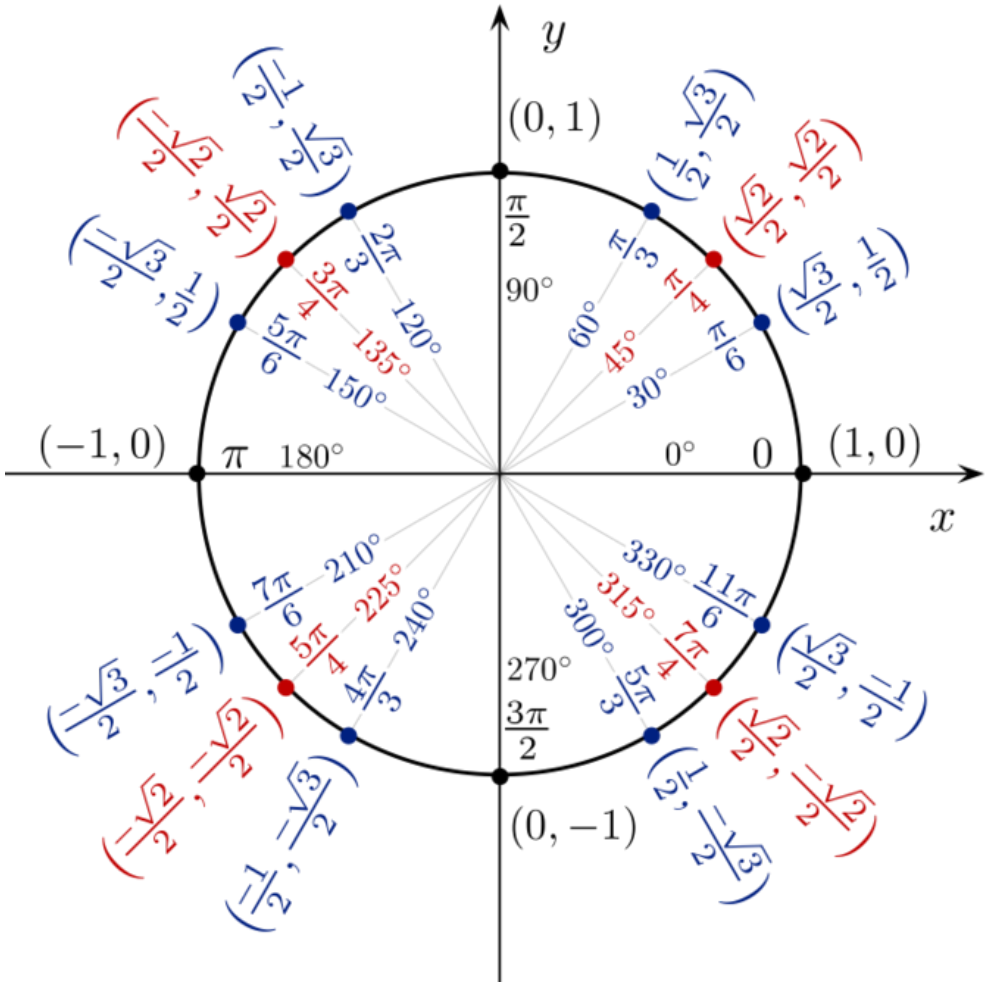
10. Evaluate the following quantities:

$$\sec\left(\frac{11\pi}{6}\right) \qquad \cot\left(\frac{-\pi}{3}\right)$$

11. Sketch (at least) one period of the following function. Label the axes and some points clearly.

$$10 \sin\left(\frac{1}{2}x\right)$$




y
x
(0, 1)
(1, 0)
(−1, 0)
(0, −1)
π/2
90°
π/3
60°
π/4
45°
π/6
30°
0°
0
π
180°
2π/3
120°
3π/4
135°
5π/6
150°
7π/6
210°
5π/4
225°
4π/3
240°
270°
3π/2
5π/3
300°
7π/4
315°
11π/6
330°
(1/2, √3/2)
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