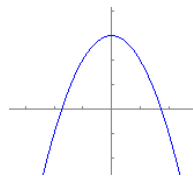# Sample Questions to the Final Exam in Math 1111—Chapter 3
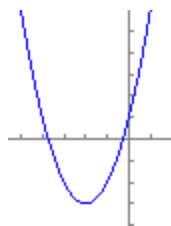
Section 3.1: Quadratic Functions

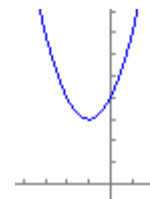1. Find the quadratic function shown on the graph.

a. $f(x) = (x-2)^2 + 3$ b. $f(x) = -x^2 + 3$ c. $f(x) = -(x-2)^2 + 3$ d. $f(x) = -(x+2)^2 + 3$ e. None of these

2. Match the function to its graph.

a. $f(x) = (x-2)^2 - 3$ b. $f(x) = -(x+2)^2 - 3$ c. $f(x) = (x+2)^2 - 3$ d. $f(x) = -(x+2)^2 + 3$ e. None of these

3. The vertex of the given graph is (-1,3). Find the correct function of the graph.

a. $f(x) = x^2 - 2x + 4$ b. $f(x) = x^2 + 2x + 4$ c. $f(x) = x^2 + 2x - 4$ d. $f(x) = x^2 + 4$ e. None of these

4. Find the x-intercepts of the function $f(x) = 2x^2 + 2x - 12$.

a. $\{-3,0\}$ b. $\{0,2\}$ c. $\{-3,2\}$ d. $\{3,-2\}$ e. None of these

5. The profit $f(x)$ that a company makes depends on the amount **x** the company spends on advertising according to the model $P(x) = -\frac{1}{3}x^2 + 2x + 52$. What is the value **x** for advertising that will yield maximum profit?

a) \$3   b) \$6   c) \$12   d) \$24   e) \$48

6. The maximum value of the function $f(x) = -3x^2 + 6x + 2$ is:

a) 1   b) -3 c) 3   d) -5 e) 5

7. The minimum value of the function $f(x) = 3x^2 + 6x + 6$ is:
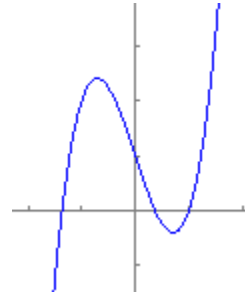
a) 1   b) -3 c) 3   d) -5 e) 5

Section 3.2: Polynomials of Higher Degree Than 2.

1. Find all the real zeros of the polynomial function: $f(x) = x^3 - 4x^2 - 25x + 100$.

a. $\{4,5,-5\}$ b. $\{-4,5,-5\}$ c. $\{-4,4,5,-5\}$ d. $\{-4,4,5\}$ e. None of these

2.   Find all the real zeros of the polynomial function: $f(x) = x(x^2+1)(x-3)$.
a. $\{0,3\}$ b. $\{0,-1,-3\}$ c. $\{0,3,-3\}$ d. $\{0,-1,1,3\}$ e. None of these

3. Which is the correct equation for the following graph?

a. $f(x) = -2x+3$ b. $f(x) = x^2-4x$ c. $f(x) = 2x^3-3x+1$ d. $f(x) = x^4+2x^3$ e. None of these

Section 3.5 Rational Functions and Their Graphs

1.   Find the vertical asymptote(s) for the rational function: $f(x) = \dfrac{x+3}{x^2+9}$.
a. $x=-3$ b. $x=\pm3$ c. $y=-3$ d. $y=\pm3$ e. No vertical asymptotes

2.   Find the vertical asymptote(s) for the rational function: $f(x) = \dfrac{x+5}{x^2-16}$.
a. y=4   b. $x=4$ and $y=4$ c. $x=4$ d. $x=\pm4$ e. No vertical asymptotes

3.   Find the vertical asymptote(s) for the rational function: $f(x) = \dfrac{2x-5}{3x^2+7x-6}$.
a. $x=\dfrac{2}{3}$ b. $y=-3$ c. $x=\dfrac{2}{3}$ and $y=-3$ d. $x=\dfrac{2}{3}$ and $x=-3$ e. $y=\dfrac{2}{3}$ and $y=-3$

4. Find the horizontal asymptote(s) for the rational function: $f(x) = \dfrac{3x-2}{5x^2-7x+3}$.
a. x=$\dfrac{3}{5}$ b. $y=0$ c. $y=\dfrac{3}{5}$ d. $x=0$ e. No horizontal asymptotes

5.   Find the horizontal asymptote(s) for the rational function: $f(x) = \dfrac{3x^3+1}{(x-2)(x+1)}$.
a. $x=-1$ and $x=2$ b. $y=-1$ and $y=2$ c. $x=-3$ d. $y=-3$ e. No horizontal asymptotes

6. Find the horizontal asymptote(s) for the rational function: $f(x) = \dfrac{2-5x^3+x^2}{3x^3-2x^2+1}$.
a. $x=-\dfrac{5}{3}$ b. $y=-\dfrac{5}{3}$ c. $x=1$ d. $y=0$ e. No horizontal asymptotes
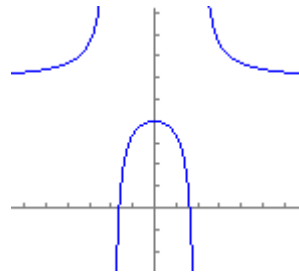
7.   Which of the following is the graph of a rational function?
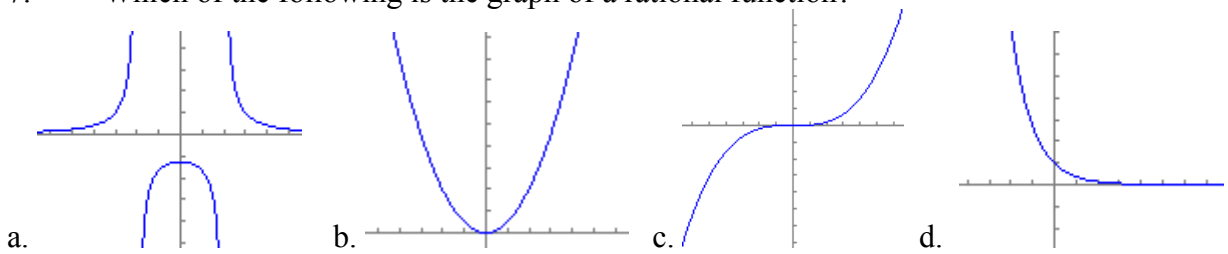
a.   b.   c.   d.   e. None of th
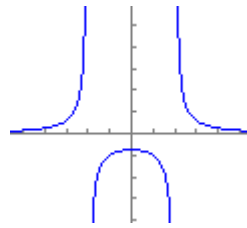
8.   This is the graph of a rational function. Find the y-intercept.

a. {-2,2}   b. {−2}   c.{2}   d.{4}   e. None of these

9.   Given the graph, find the vertical asymptote(s).
        Note: The x-axis and y-axis are labeled with a dot
        every 1 unit.

a. {-2}   b. {−2,2}   c.{2}   d.{0}   e. None of these

Section 3.6: Polynomial and Rational Inequalities
1.   Solve the inequality: $2x^2 - 5x > 3$

a. $\left(-\dfrac{1}{2},3\right)$ b. $\left(-\infty,-\dfrac{1}{2}\right)\cup(3,\infty)$ c. $(-\infty,-3)\cup\left(\dfrac{1}{2},\infty\right)$ d. $\left(-\dfrac{1}{2},\infty\right)$ e. None of these

2.   Solve the inequality: $\dfrac{x+16}{3x+2}\le 5$

a. $\left(-\infty,-\dfrac{2}{3}\right]\cup\left[\dfrac{3}{7},\infty\right)$ b. $\left[-\dfrac{2}{3},\dfrac{3}{7}\right]$ c. $\left(-\infty,-\dfrac{2}{3}\right)\cup\left[\dfrac{3}{7},\infty\right)$ d. $\left(-\dfrac{2}{3},\dfrac{3}{7}\right]$ e. None of these

Section 3.7: Modeling Using Variation
1.   The volume of a cylinder varies jointly as the square of the radius of the base and
        the height of the cylinder. If the volume of a cylinder is 225π cubic inches when
        the radius is 5 inches and the height is 9 inches, find the volume of a cylinder with
        radius 7 feet and height 3 feet.
a. 147π b. 21π c.63π d.441π e. None of these

2.   The distance that an object falls is directly proportional to the square of the
        amount of time since it was dropped. An object falls 128 feet in 2 seconds. Find
        the distance the object falls in 5 seconds.
a. 800 *ft*   *b.* 160 *ft*   *c.* 320 *ft*   *d.* 10 *ft*   *e.* None of these

3.   The distance that a spring will stretch varies directly as the force applied to the
        spring. If a force of 9 pounds is needed to stretch the spring 6 inches, how much
        force is required to stretch the spring 14 inches?
a. 7 *pounds*   *b.* 11 *poundst*   *c.* 18 *pounds*   *d.* 21 *poundst*   *e.* None of these

4.   The loudness of a stereo speaker, measured in decibels, varies inversely as the
        square of your distance from the speaker. When you are 8 feet from the speaker,
        the loudness is 28 decibels. What is the loudness when you are 4 feet from the
        speaker?
a. 56 *decibels*   *b.* 448 *decibels*   *c.* 112 *decibels*   *d.* 14 *decibels*   *e.* None of these

5.   The time required to assemble computers varies directly as the number of
        computers assembled and inversely as the number of workers. If 30 computers
        can be assembled by 6 workers in 10 hours, how long would it take 5 workers to
        assemble 40 computers?
a. $13\frac{1}{3}$ *hours*   *b.* 9 *hours*   *c.* $6\frac{1}{4}$ *hours*   *d.* 16 *hours*   *e.* None of these