$\dfrac{\pi}{4}$

1. Find $f \circ g$ and $g \circ f$ for the pair of functions
$$f(x) = \sqrt{x + 2}, g(x) = 2x^2 - 1$$
2. Solve. Leave answers in exact form
$$8 = 4^{x^2} * 2^{5x}$$
3. Find $f \circ g$ and $g \circ f$ for the pair of functions
$$f(x) = 1 - 3x^2, g(x) = \sqrt{4 - x}$$
4. Find the maximum value of
$$f(x) = -2x^2 + 4x - 21.$$

$\dfrac{\pi}{2}$

1. Graph using transformations. Show all stages
$$f(x) = (1 - x)^3 + 5$$
2. Write the expression as a single logarithm
$$2 \log 2 + 3 \log x - \frac{1}{2}(\log(x + 3) + \log(x + 2))$$
3. Determine the domain and find all the asymptotes
$$R(x) = \frac{(x^2 + 3x + 2)}{(x + 2)^2}$$
4. Solve the inequality
$$x(x + 1) > 20$$

$\dfrac{3\pi}{4}$

1. Determine the domain and find all asymptotes
$$R(x) = \frac{x^2 + 4}{x - 2}$$
2. Jered has 3500 feet of ice available to enclose a rectangular igloo. Express the area A of the rectangle as a function of x, where x is the length of the rectangle.
3. Graph using transformations. Show all stages
$$g(x) = \frac{1}{2}\sqrt{x + 1} - 3$$
4. Solve the inequality
$$x^2 + 7x < -12$$

$\dfrac{\pi}{}$

1. Solve each inequality. Graph the solution set.
$$\frac{x^2 - 8x + 12}{x^2 - 16} > 0$$
2. Solve. Leave answers in exact form
$$\log_6(x + 3) + \log_6(x + 4) = 1$$
3. Write the expression as a sum or difference of logarithms
$$\ln\left(\frac{2x + 3}{x^2 - 3x + 2}\right)^2$$
4. Determine the domain and range of the function,
$$f(x) = -2x^2 - x + 4$$

$\dfrac{5\pi}{4}$

1. Find the minimum value of
$$f(x) = -9x^2 - 6x + 3.$$
2. Find the inverse of the function and verify your answer
$$f(x) = \frac{x^2 + 3}{3x^2}$$
3. Determine the domain and range of the function,
$$f(x) = \frac{x^2 - x - 12}{2x^2 + 8x + 6}$$
4. Solve each inequality. Graph the solution set.
$$\frac{3 - 2x}{2x + 5} \geq 2$$

$\dfrac{3\pi}{2}$

1. Solve:
$$2(2x^2 - 3x) > -9$$
2. Solve each inequality. Graph the solution set.
$$x^3 + x^2 < 4x + 4$$
3. Find all intercepts, asymptotes, end behavior, and behavior between zeros/asymptotes to obtain the graph of the rational function. (Seven step process)
$$R(x) = \frac{x + 2}{x(x - 2)}$$
4. Determine the end behavior of
$$(a)\ f(x) = \frac{1}{x}, \qquad (b)\ f(x) = x^{n^n}, \qquad (c)\ f(x) = \sqrt{x}$$

$\dfrac{7\pi}{4}$

1. Solve. Leave answers in exact form
$$3^{2x} + 3^{x+1} - 4 = 0$$

2. Find all intercepts, asymptotes, end behavior, and behavior between zeros/asymptotes to obtain the graph of the rational function. (Seven step process)
$$H(x) = \frac{(x^2 - 4)}{x^2 - x - 2}$$

3. Find the inverse of the function and verify your answer
$$f(x) = \frac{2 - x}{3 + x}$$

4. On Thursday, Vishal decides to slingshot your final exams to each one of you upon your entrance to the final exam room. His old-school slingshot fires the exams at an inclination of $45°$ to the horizontal with a velocity of 25 ft. sec. The height is given by
$$h(x) = \frac{-32x^2}{(25)^2} + x$$
where x is the horizontal distance of the exam from Vishal. Find the maximum height the exam will reach.

2π

1. Find all intercepts, asymptotes, end behavior, and behavior between zeros/asymptotes to obtain the graph of the rational function. (Seven step process)
$$G(x) = \frac{x^4}{x^2 - 9}$$

2. A child's grandparents purchase a $10,000 bond fund that matures in 18 years to be used for her college education. The bond fund pays 4% interest compounded semiannually. How much will the bond be worth at maturity? How long will it take the bond to double in value under these terms?

3. A friend and you decide to start up a used textbook business. You must pay in $400 dollars to start the business. You then buy used PreCalculus books from math students for $40 each. You turn around and sell them to incoming freshman the following semester for $60 each. How many books must you sell to "break even"? (In other words, how many books must you sell before your business is out of the debt from paying the 400 dollar buy in and $40 per book?)

4. Determine whether the graph opens up or down, and find its vertex, axis of symmetry, y-intercept, and x-intercepts, if any
$$f(x) = 3x^2 + 12 + 1$$