

NOTE: You will be allowed a calculator for application problems during the exam. All work must be shown in order to earn any points on the exam. Further, while this review is a largely comprehensive refresher of what we've gone over so far, and I largely base my exams off of the reviews I give, the exam could still have problems which are pulled from any part of the lessons/homework/worksheets we've done this term.

1. Solve the following quadratic equations using the zero-product-principle.

a. $3x^2 - 23x + 30 = 0$

b. $x^2 = -x + 30$

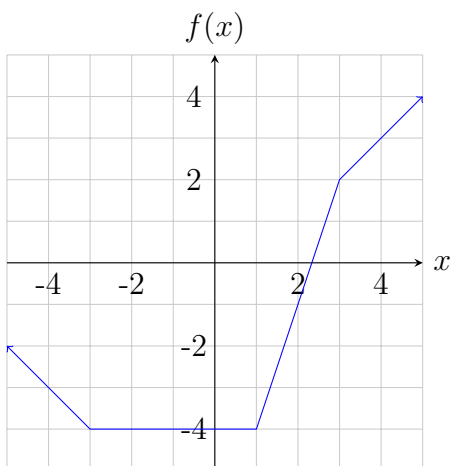
2. Let $g(x) = -2x^2 + 9x - 4$. Evaluate and solve the following as indicated. State your answer using formal notation as per the notation standards.

a. $g(0)$

b. $g\left(-\frac{1}{2}\right)$

c. Solve $g(x) = 0$.

3. Given the function f , shown in the graph below, evaluate or solve as indicated. Use formal notation as per the notation packet.



a. $f(0)$

b. $f(-1)$

c. $f(x) = -1$

d. $f(x) = 0$

4. Determine the domain of the following functions.

a. $K(x) = -\frac{x-5}{-3x^2-10x+25}$

c. $H(t) = \frac{\sqrt{x-4}}{-3x+15}$

b. $k(t) = \sqrt{-7-3x}$

d. $f(t) = -\frac{2x+4}{\sqrt{4x-28}}$

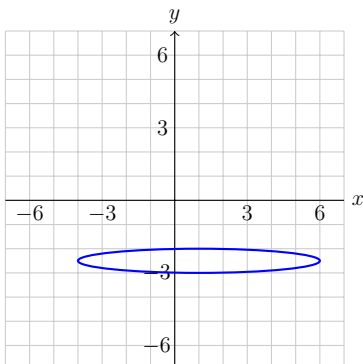
5. Given $g(x) = \frac{-3x}{6-x}$, simplify the following expressions.

a. $g(-2x+1)$

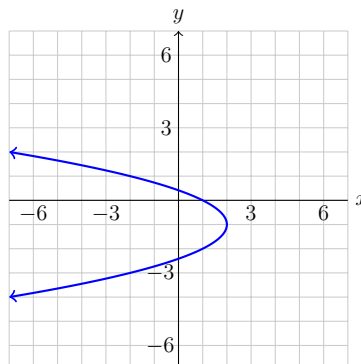
b. $-3g(x) - 3$

6. Which of these graphs constitute y as a function of x ? Determine the domain and range of each.

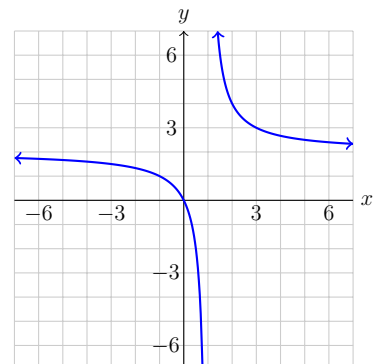
a.



b.



c.



7. Simplify the following rational expressions and, if applicable, write the restricted domain on the simplified expression.

a. $f(x) = \frac{x^2 + 16x + 55}{x^2 + 8x - 33}$

c. $\frac{12t + 30}{5t^2 + 15t - 20} \div \frac{-2t^2 + 10t}{t^2 + 7t + 12}$

b. $\frac{x^2 - 9}{x^2 - 2x - 15} \cdot \frac{x^2 - 4x - 5}{x^2 + 6x}$

d. $\frac{\frac{24x^5y^4}{49z^2}}{\frac{8x^4y^5}{35z^5}}$

8. Add or subtract the following rational expressions into a single rational expression and, if possible, simplify the resultant expression. If the domain changes during the simplification, make a note of it.

a. $\frac{3}{x - 5} + \frac{5}{x + 4}$

b. $\frac{-21}{x^2 - 9x + 18} - \frac{-2x + 5}{x - 6}$

9. Simplify the following complex rational expressions. If the domain changes during simplification, make note of it.

a.
$$\frac{5 + \frac{1}{x-1}}{\frac{1}{x-1} - \frac{1}{4}}$$

b.
$$\frac{\frac{2}{x-1} - 4}{\frac{1}{x-1} + \frac{1}{x-2}}$$

10. Solve the following quadratic equations.

a.
$$\frac{y}{y+2} = \frac{4}{y-3}$$

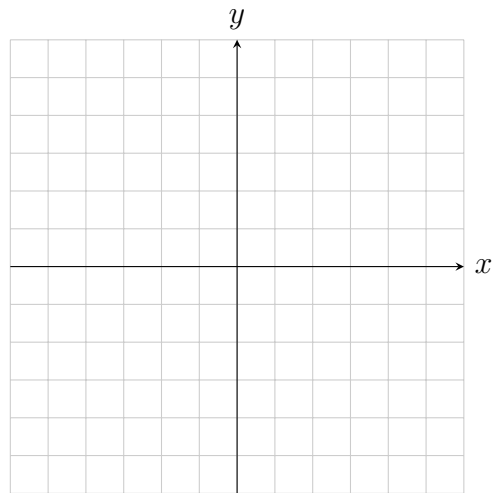
b.
$$\frac{1}{x^2-4} + \frac{1}{(x-2)^2} = \frac{2}{(x+2)^2}$$

11. It takes a less experienced painter 20 hours longer to paint a house than it does a more experienced painter. Together they can paint the house in 24 hours. How long does it take for each painter to paint the house working alone?

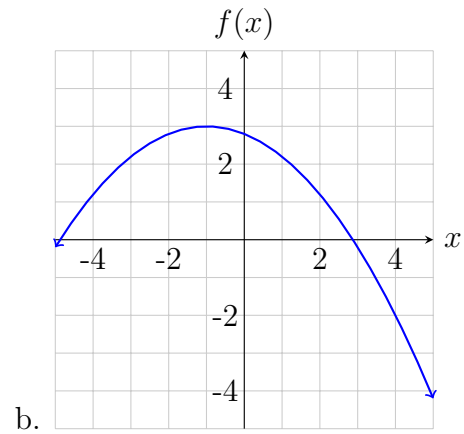
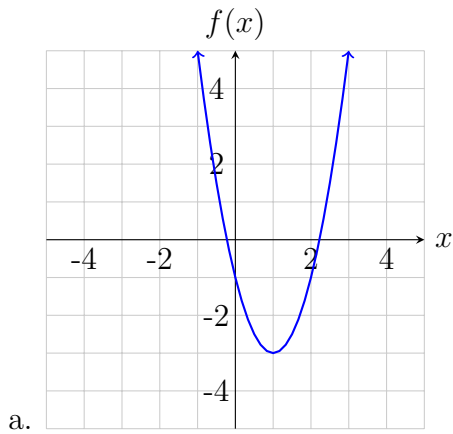
12. When there is a 50-mile-per-hour wind, an airplane can fly 675 miles with the wind in the same time that it can fly 450 miles against the wind. Find the speed of the plane when there is no wind.

13. Given the following function, determine the i) vertex, ii) y -stretch, iii) whether it opens up or down, iv) the y -intercept, v) the x -intercepts, vi) any other points needed to make a nice graph. Then graph the function.

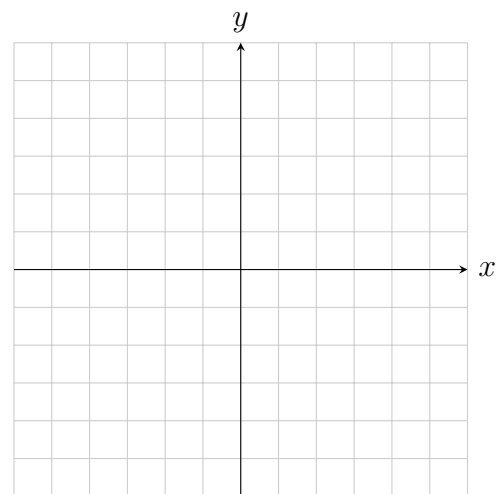
$$f(x) = -\frac{1}{3}(x + 2)^2 + 5$$



14. Given the following parabolas, determine the vertex and another point on the graph and use these to determine the symbolic form of the function in vertex form.



15. Given the function $f(x) = \frac{5}{2}(x + 3) - 2$ determine the slope and a point on the line and use this information to graph the function.



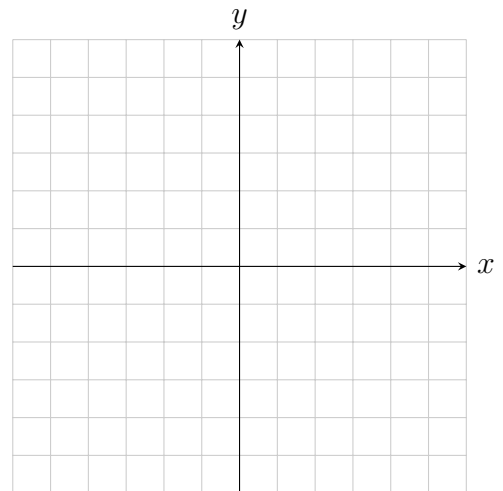
16. Solve the following equations by completing the square.

a. $y^2 + 18y = -17$

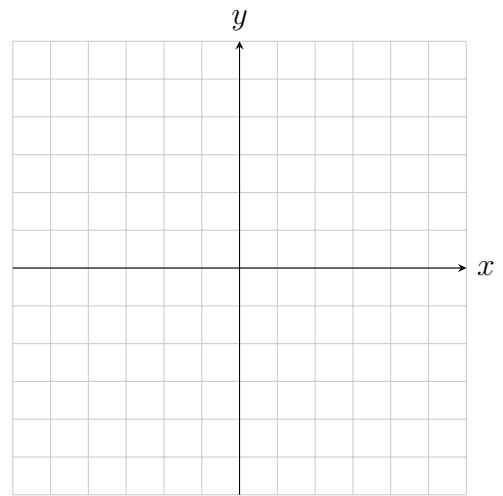
b. $-3r^2 + 15r + 10 = 0$

17. Complete the square of the following functions to put them into vertex form, find the vertex, whether it opens up or down, the y -intercept, the y -intercept's mirror point, and then graph the function.

a. $f(x) = x^2 - 12x + 8$



a. $g(x) = -2x^2 - 16x - 18$



18. Solve the following absolute value equations.

a. $\left| \frac{3x - 4}{5} \right| = 12$

c. $|x + 5| = |x + 6| + 5$

b. $|5x - 3| + 7 = 4$

d. $|-6x + 1| = |2x - 3|$

19. Solve the following compound inequalities.

a. $24 \leq -6 - 3x < 30$

c. $5x + 6 < 21$ or $-2x - 8 < 6$

b. $-3x + 5 \leq -13$ and $-5x - 4 > -9$

d. $3x - 8 \geq 7$ or $-3x - 8 \geq 7$

20. Solve the following inequalities graphically.

a. $\left| -\frac{2}{3}x + 5 \right| \leq 4$

c. $|5x - 18| \geq 17$

b. $\sqrt{-12 - 8x} + 6 > -4 + \frac{3}{4}x$

d. $-3x^2 + 12x + 200 \geq 12x^2 - 25x - 50$