

College Algebra /

Module 8 - Linear and Quadratics Exam Review

Linear and Quadratics Exam Review



Watch on YouTube

Topic 1: Factoring a quadratic with leading coefficient 1

$$x^2 - 9x + 20$$

$$(x - 4)(x - 5)$$

$$\begin{array}{r} +20 \\ -4 \quad -5 \\ \hline -9 \end{array}$$

$$\begin{array}{r} 20 \\ 1 \quad 20 \\ 2 \quad 10 \\ 3 \quad 10 \\ \hline 4, 5 \end{array}$$

* (or FOIL to check your answer)

Topic 2: Finding the roots of a quadratic equation with leading coefficient greater than 1

$$3y^2 - 6 = -7y$$

$$3y^2 + 7y - 6 = 0$$

$$(3y + 9)(3y - 2) = 0$$

$$(y + 3)(3y - 2) = 0$$

$$y + 3 = 0 \quad 3y - 2 = 0$$

$$y = -3 \quad y = \frac{2}{3}$$

$$\boxed{y = -3 \quad y = \frac{2}{3}}$$

$$\begin{array}{r} 3x - 6 \\ -18 \\ +9 \quad -2 \\ \hline +7 \end{array}$$

Topic 3: Solving a quadratic equation using the square root property: Exact answers, advanced

On Test Work Page (below).

Topic 4: Applying the quadratic formula: Exact answers

On Test Work Page (below).

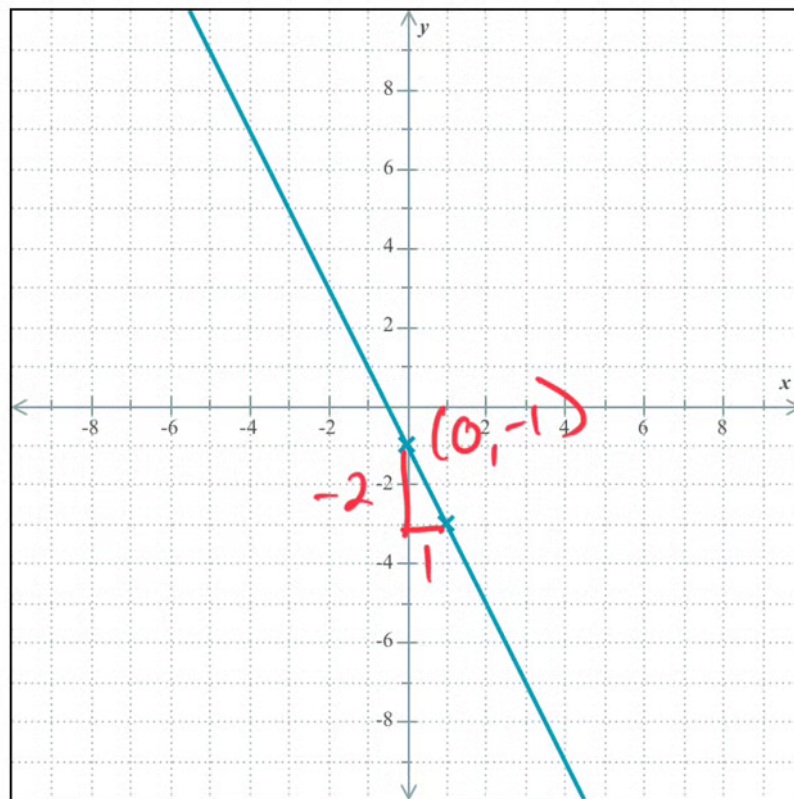
Topic 5: Solving a compound linear inequality: Interval notation

$$\begin{array}{l} 2x - 3 \leq -9 \quad \text{and} \quad 3x + 3 < 6 \\ \quad \quad \quad +3 \quad \quad +3 \quad \quad \quad -3 \quad \quad -3 \\ \hline \frac{2x}{2} \leq \frac{-6}{2} \quad \quad \quad \frac{3x}{3} < \frac{3}{3} \\ \hline x \leq -3 \quad \text{and} \quad x < 1 \end{array}$$

Answer on Test Work Page (below).

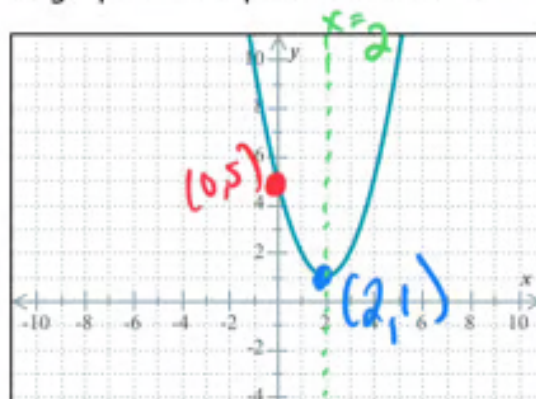
Topic 6: Graphing a function of the form $f(x) = ax + b$: Integer slope

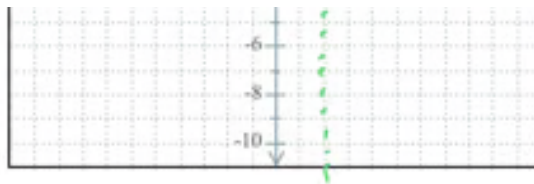
Graph the function $h(x) = -2x - 1$.



Topic 7: Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola

Use the graph of the parabola to fill in the table.





(a) Does the parabola open upward or downward?

☒ upward ☐ downward

(b) Find the coordinates of the vertex.

vertex: $(2, 1)$

(c) Find the equation of the axis of symmetry.

x value of the vertex

equation of axis of symmetry: $x = 2$

(d) Find the intercept(s).

For both the x - and y -intercept(s), make sure to do the following.

- If there is more than one, separate them with commas.
- If there are none, select "None".

x -intercept(s): None

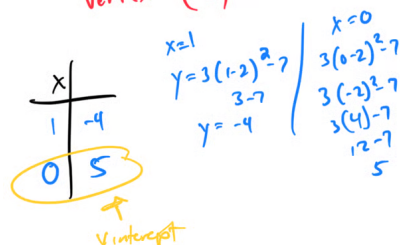
y -intercept(s): 5

Topic 8: Graphing a parabola of the form $y = a(x-h)^2 + k$

$$y = 3(x-2)^2 - 7$$

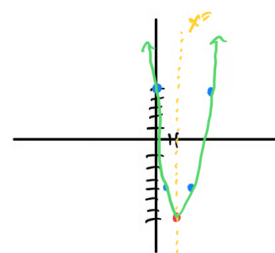
$a = 3$ opens up (a is positive)

Vertex $(2, -7)$



$$y = a(x-h)^2 + k$$

(h, k) Vertex



Answer on Test Work Page (below).

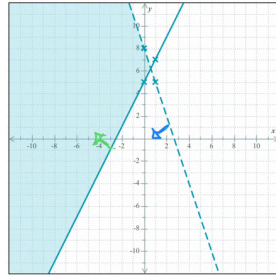
Topic 9: Solving a system of linear equations using elimination with multiplication and addition

On Test Work Page (below).

Topic 10: Graphing a system of two linear inequalities: Basic

Graph the solution to the following system of inequalities.

$$\begin{aligned} y &\geq 3x + 5 \\ y &< -3x + 8 \end{aligned}$$



$$\begin{aligned} y &\geq 3x + 5 \\ m &= 3 \\ b &= 5 \\ \text{Solid } &\geq \\ (0, 0) \\ 0 &\geq 3(0) + 5 \\ 0 &\geq 5 \\ \text{No} \\ \text{Shade away from } (0, 0) \end{aligned}$$

$$\begin{aligned} y &< -3x + 8 \\ m &= -3 \\ b &= 8 \\ \text{dashed } &< \\ (0, 0) \\ 0 &< -3(0) + 8 \\ 0 &< 8 \\ y &< 8 \\ \text{Shade towards } (0, 0) \end{aligned}$$

$$\begin{aligned} (v-2)^2 + 28 &= 0 \\ -28 \quad -28 \\ \sqrt{(v-2)^2} &= \sqrt{28} \\ v-2 &= \pm 2\sqrt{7} \\ +2 \quad +2 \\ v &= 2 \pm 2\sqrt{7} \end{aligned}$$

3 - Show your work

$$\begin{aligned} x &\leq -3 \quad \text{and} \quad x < 1 \\ \text{Blue AND red} \\ (-\infty, -3] \end{aligned}$$

5 - Put your answer on a number line and write the correct answer.

8 - Answer the following questions:

Does your parabola open up or down?

$$a = 3 \quad \text{opens up}$$

What is your vertex?

$$(2, -7)$$

What is the y-intercept?

$$\begin{aligned} \text{Plug in } x &= 0 \\ (0, 5) \end{aligned}$$

$$\begin{aligned} 3x^2 - 3x - 5 &= 0 \\ a=3 \quad b=-3 \quad c=-5 \\ x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ 3 \pm \sqrt{(-3)^2 - 4(3)(-5)} \\ 2(3) \\ x &= \frac{3 \pm \sqrt{69}}{6} \end{aligned}$$

4 - Show your work.

6 - Answer the following questions:

$$h(x) = -2x - 1$$

What is your slope? Also write how much it goes up/down and how much it goes to the right/left

$$m = -2 = \frac{-2}{1} \quad \text{down 2 right 1}$$

What is your y-intercept? What does x equal at the y-intercept and what do we call that?

$$\begin{aligned} b &= -1 \quad x = 0 \\ \text{starting point} \end{aligned}$$

$$\begin{aligned} 9x - 4y &= -23 \\ -2(-3x - 2y) &= -19 \\ +6x + 4y &= 38 \\ \hline 15x &= 15 \\ x &= 1 \end{aligned}$$

9 - Show your work

$$\begin{aligned} \text{plug in} \\ 9(1) - 4y &= -23 \\ 9 - 4y &= -23 \\ -4y &= -32 \\ y &= 8 \end{aligned}$$