

Integrated 3 Second Semester Skills Test

****All graphs must be properly labeled with axes and scaling. ****

Topic #1 Completing the Square
Write the equation in graphing form and identify the vertex of the parabola.

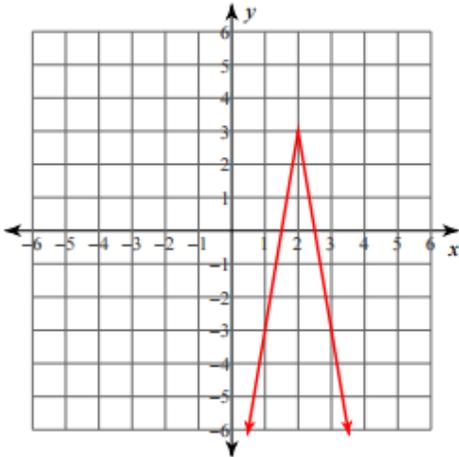
$$y = 5x^2 - 10x - 7$$

Topic #2: 1-Variable Inequalities
Solve. Show your solution(s) on a number line and algebraically.

$$x^2 - 2x < 3$$

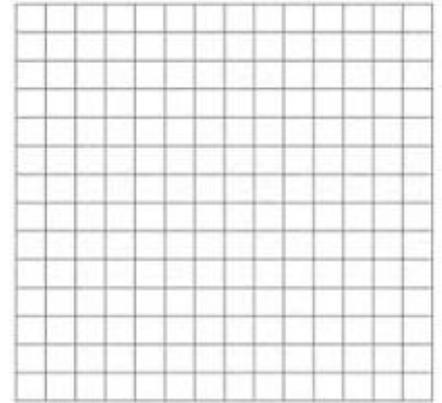
Topic #3 Transformations of parent graphs.

a. Write the equation of the given graph in graphing form.



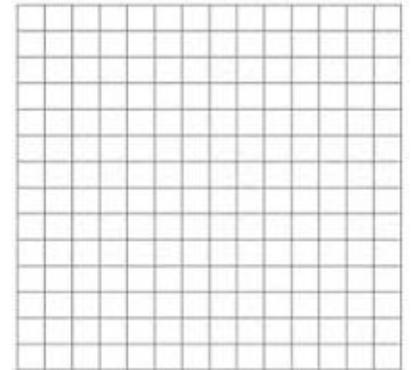
b. Use the parent graph of $f(x)$ to graph the given function. Clearly label the graph and any important points and/or lines of $f(x)$.

$$y = -\frac{1}{3}(x - 4)^2 - 3$$



Topic #4 Systems of Inequalities
Graphs the following system of inequalities. Make sure the solution is clearly shaded.

$$\begin{cases} y > x^2 - 2x - 3 \\ y \leq \frac{3}{4}x + 2 \end{cases}$$



Topic #5: Inverses

Consider the function. $f(x) = 3(x^3 + 6)$.

Using one of the two methods we have learned, find the inverse of $f(x)$ and label it $g(x)$. Show your thinking for credit.

Complete the tables for both the function and it's inverse.

$f(x)$	

$g(x)$	

Using a straight edge, graph the function and the inverse on the same set of axes below. Label each graph. Label the axes completely.



Topic #6: Logarithms

a. Rewrite each logarithm equation as an exponential equation and vice versa.

i. $y = \log_7 x$	ii. $y^4 = 9$
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b. Rewrite each product of logs as products as a sum of logs, each difference of logs as a log of a quotient, and vice versa. Simplify if possible.

i. $3\log_4 v - 7\log_4 w$	ii. $4\log_2 x + 7\log_2 y$	iii. $\log_2 \frac{p^3}{q^5}$	iv. $\log(e^5 f)^4$
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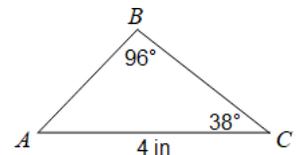
Topic #7: Solving with logarithms

Solve. Show work. Answers must be in logarithmic form AND to the thousandths place, when appropriate.

a. $16 = 2(4)^{x+3} - 12$	b. $\log_x 24 = 9$
a. Solve using the change of base formula. $\log_4 x + \log_4(x - 12) = 3$	b. $3\log_5 2 + \log_5 2x = \log_5(x + 30)$

Topic #8 Triangles

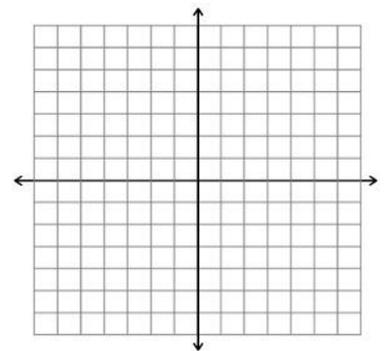
Find the missing sides and/or angles of the triangle. Then find the area of the triangle. Round your answer to the nearest tenth. Show all thinking clearly and neatly.



Topic #9 Polynomials

For the following polynomial, write it in standard form, state the degree of the polynomial. Then graph the polynomial. Label the x- and y-intercepts.

$$f(x) = -x(x + 4)(x - 1)(x - 4)^2$$



Topic #10 Exponents

Simplify the following exponents. Your answer should only contain positive exponents.

a. Write in radical form. You don't have to simplify. $10^{-\frac{3}{2}}$	b. $(81r^4)^{\frac{3}{4}}$	c. $\frac{2k^{\frac{1}{2}} \cdot 3k}{4k^{\frac{2}{3}}}$	d. $(x^{\frac{1}{2}} y^{-\frac{4}{3}})^{\frac{1}{3}} (x^{\frac{3}{2}} y^{\frac{2}{3}})^2$
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