

ALEKS® Practice Test Module B #1

College Algebra / Math 121 B – GARAGE (Dr. Vasan)

Student Name/ID:

1. Answer the questions below about the quadratic function.

$$f(x) = -2x^2 + 16x - 34$$

Does the function have a minimum or maximum value?
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What is the function's minimum or maximum value?
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Where does the minimum or maximum value occur?
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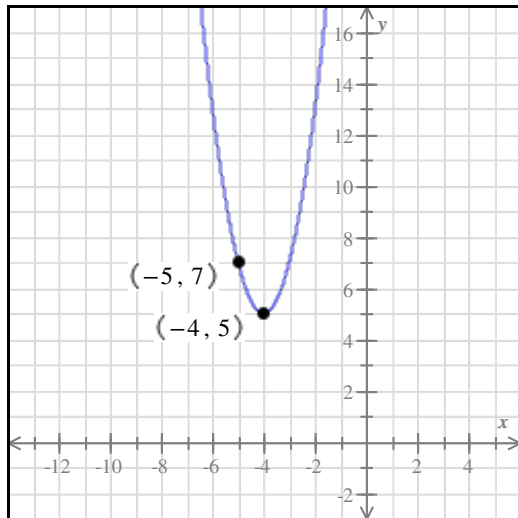
$x =$

2. Write the quadratic function in the form $f(x) = a(x - h)^2 + k$.

Then, give the vertex of its graph.

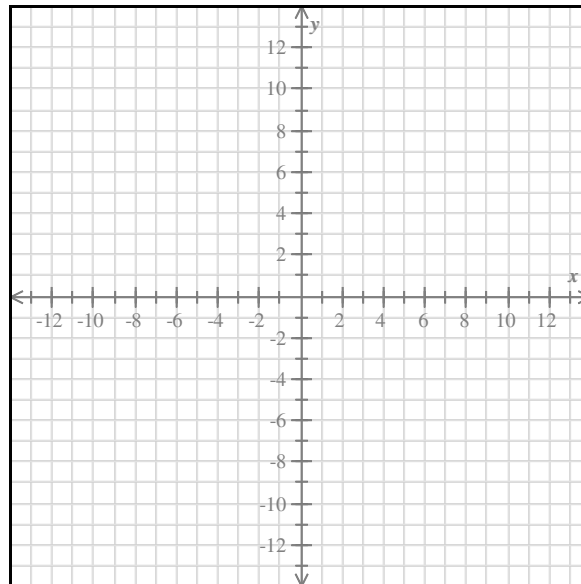
$$f(x) = 3x^2 - 18x + 31$$

3. Find the equation of the quadratic function f whose graph is shown below.



4. Graph the parabola.

$$y = 3x^2 + 12x + 5$$



5. Find all real zeros of the function.

$$f(x) = 2x(x - 3)^2(x - 4)^2$$

If there is more than one answer, separate them with commas.

6. Find a polynomial $f(x)$ of degree 4 that has the following zeros.

$$-2, 1, -6, 0$$

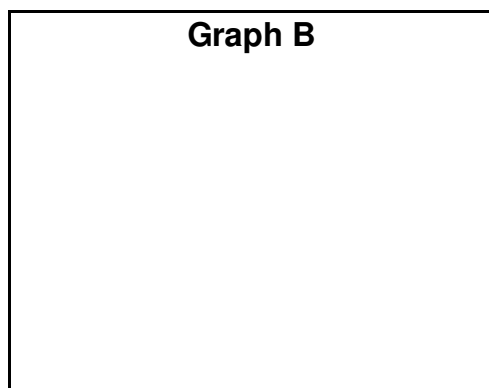
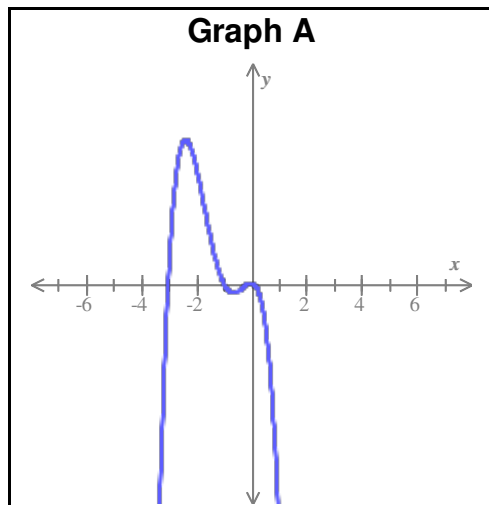
Leave your answer in factored form.

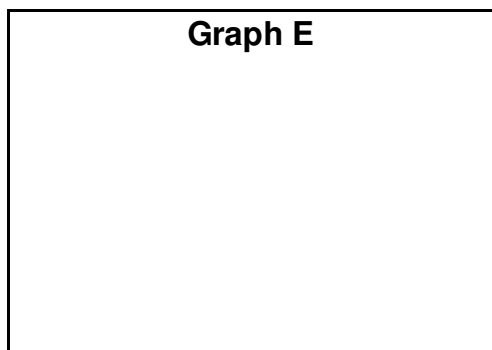
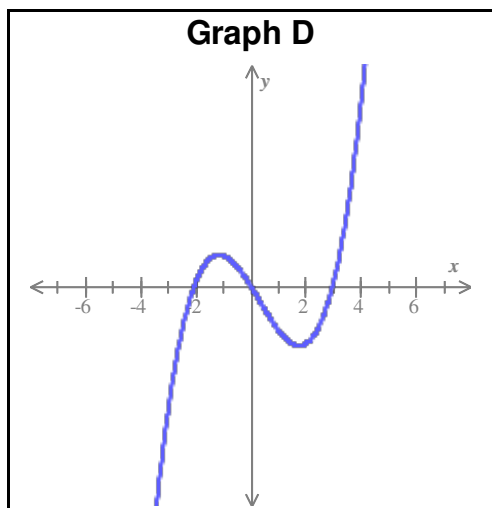
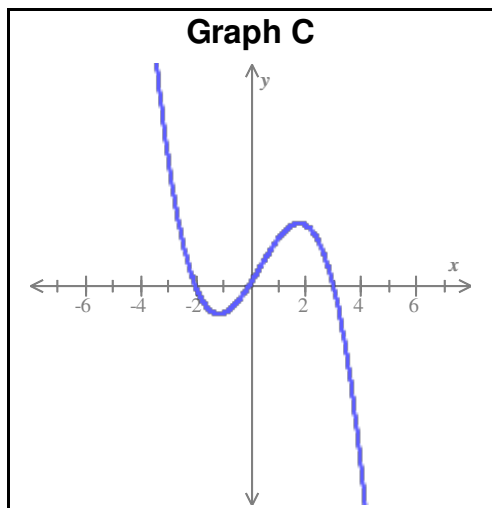
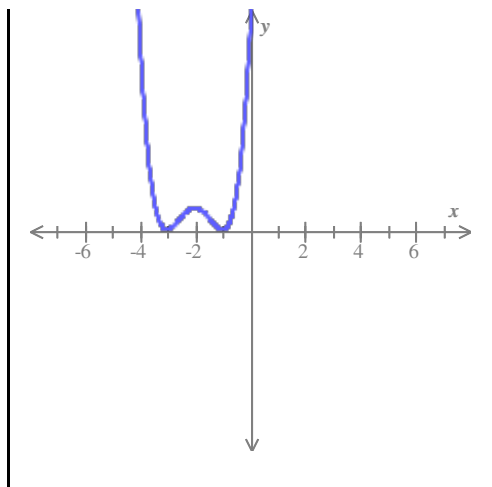
7. Consider the following polynomial functions.

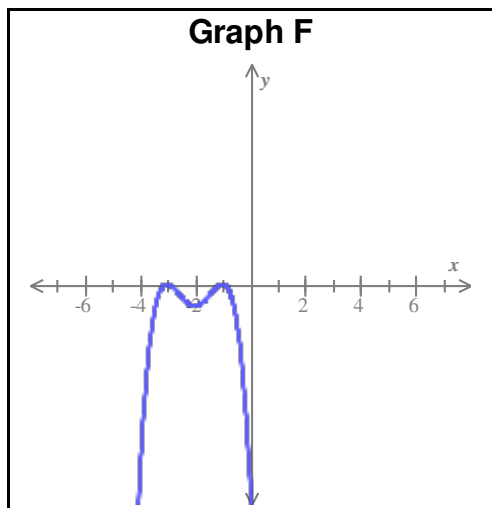
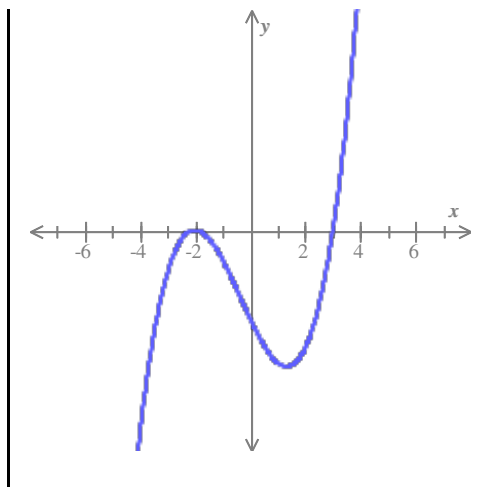
$$f(x) = -3(x + 1)^2(x + 3)^2$$

$$g(x) = x^3 - x^2 - 6x$$

Choose the graph of each function from the choices below.







Which is the graph of $f(x) = -3(x+1)^2(x+3)^2$?

Which is the graph of $g(x) = x^3 - x^2 - 6x$?

8. Find all x -intercepts and y -intercepts of the graph of the function.

$$f(x) = 2x^3 + 2x^2 - 18x - 18$$

If there is more than one answer, separate them with commas.

x -intercept(s):

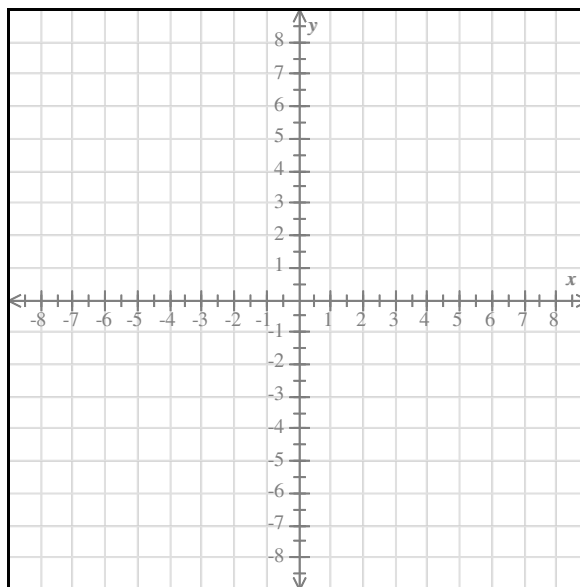
y -intercept(s):

9. Graph all vertical and horizontal asymptotes of the function.

$$f(x) = \frac{-9x - 1}{2x^2 - 2x - 12}$$

10. Graph the rational function $f(x) = \frac{2x + 3}{x + 3}$.

To graph the function, draw the horizontal and vertical asymptotes (if any) and plot at least two points on each piece of the graph.



11. Solve the inequality.

$$x^3 + 12x > -8x^2$$

Write your answer as an interval or union of intervals.

12. Solve the following inequality.

$$\frac{x-1}{-x+6} > 0$$

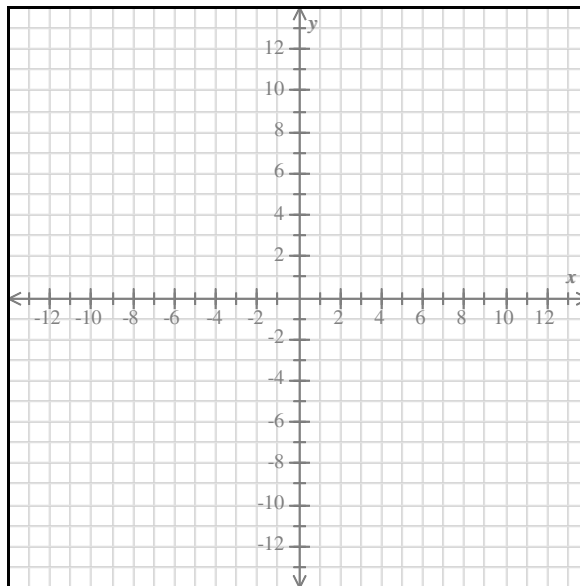
Write your answer using interval notation.

13. A supply company manufactures copy machines. The unit cost C (the cost in dollars to make each copy machine) depends on the number of machines made. If x machines are made, then the unit cost is given by the function $C(x) = 0.5x^2 - 170x + 25,850$. What is the minimum unit cost?

Do not round your answer.

14. Graph the parabola.

$$y = -3x^2 + 6x + 4$$



15. Find the range of the quadratic function.

$$f(x) = -x^2 + 8x - 18$$

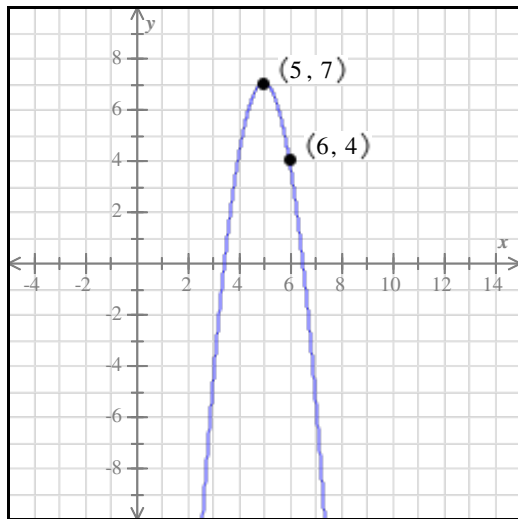
Write your answer using interval notation.

16. Write the quadratic function in the form $f(x) = a(x - h)^2 + k$.

Then, give the vertex of its graph.

$$f(x) = -3x^2 + 12x - 13$$

17. Find the equation of the quadratic function f whose graph is shown below.



18. Choose the end behavior of the graph of each polynomial function.

$$(a) f(x) = x^5 - 3x^3 - 2x^2 + 2$$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

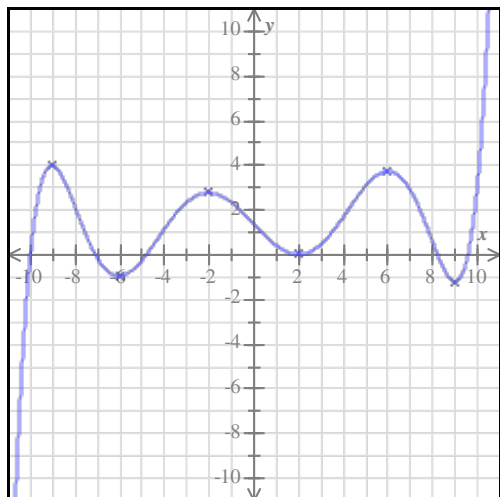
$$(b) f(x) = 3x^3 + 6x^2 + 9x + 4$$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

$$(c) f(x) = -x(x - 3)(5x + 2)$$

{(a) Rises, (b) Falls} to the left and
{(a) rises, (b) falls} to the right.

19. Below is the graph of a polynomial function f with real coefficients. Use the graph to answer the following questions about f . All local extrema of f are shown in the graph.



(a) The function f is increasing over which intervals? Choose all that apply.

$(-\infty, -9)$ $(-6, -2)$ $(2, 6)$

$(6, 9)$ $(2, 9)$ $(9, \infty)$

(b) The function f has local maxima at which x -values? If there is more than one value, separate them with commas.

(c) What is the sign of the leading coefficient of f ?

Positive Negative Not enough information

(d) Which of the following is a possibility for the degree of f ? Choose all that apply.

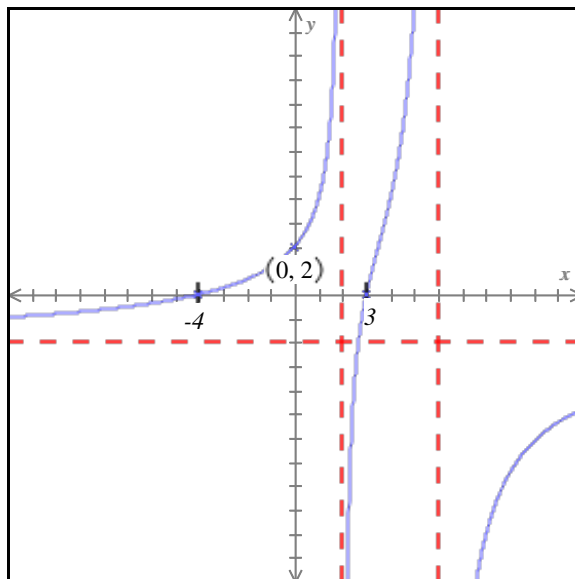
4 5 6 7 8 9

20. Graph all vertical and horizontal asymptotes of the function.

$$f(x) = \frac{-10x + 13}{4x + 6}$$

21. The figure below shows the graph of a rational function f . It has vertical asymptotes $x = 2$ and $x = 6$, and horizontal asymptote $y = -2$. The graph has x -intercepts 3 and -4 , and it passes through the point $(0, 2)$.

The equation for $f(x)$ has one of the five forms shown below. Choose the appropriate form for $f(x)$, and then write the equation. You can assume that $f(x)$ is in simplest form.



- $f(x) = \frac{a}{x - b}$
- $f(x) = \frac{a(x - b)}{x - c}$
- $f(x) = \frac{a}{(x - b)(x - c)}$
- $f(x) = \frac{a(x - b)}{(x - c)(x - d)}$
- $f(x) = \frac{a(x - b)(x - c)}{(x - d)(x - e)}$

22. Solve.

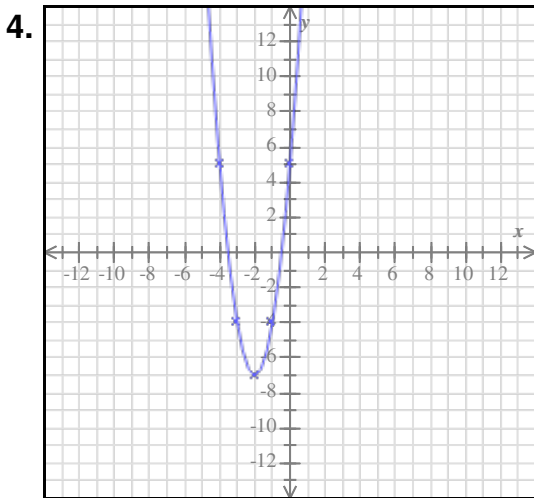
$$4|x - 9| - 5 \leq 11$$

Practice Test Module B #1 Answers for class College Algebra / Math 121 B – GARAGE

1. Does the function have a minimum or maximum value? maximum
What is the function's minimum or maximum value? -2
Where does the minimum or maximum value occur? $x = 4$

2. Writing in the form specified: $f(x) = 3(x - 3)^2 + 4$
Vertex: (3, 4)

3. $f(x) = 2(x + 4)^2 + 5$



5. zero(s): 0, 3, 4

6. $f(x) = x(x + 2)(x - 1)(x + 6)$

7. Which is the graph of $f(x) = -3(x+1)^2(x+3)^2$?

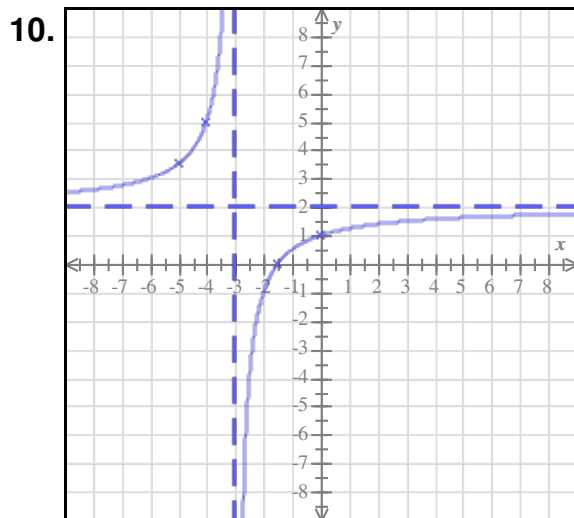
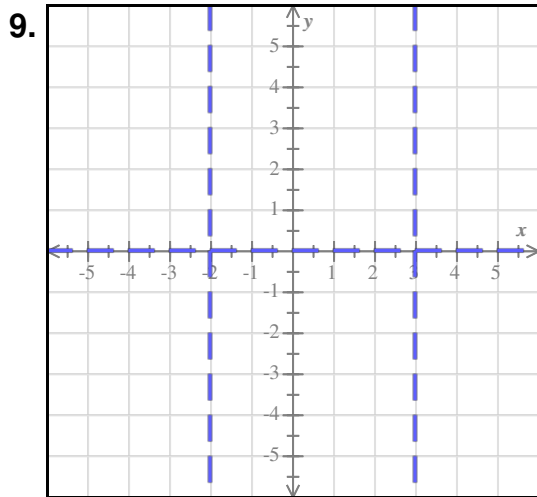
Graph F

Which is the graph of $g(x) = x^3 - x^2 - 6x$?

Graph D

8. x -intercept(s): $-1, 3, -3$

y -intercept(s): -18

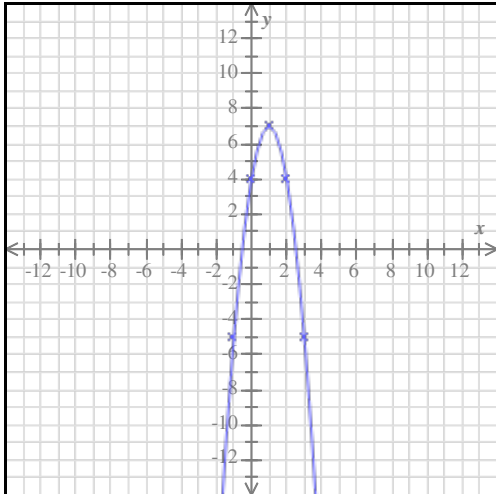


11. $(-6, -2) \cup (0, \infty)$

12. $(1, 6)$

13. Unit cost: \$11,400

14.



15. $(-\infty, -2]$

16. Writing in the form specified: $f(x) = -3(x - 2)^2 - 1$

Vertex: $(2, -1)$

17. $f(x) = -3(x - 5)^2 + 7$

18. (a) Falls to the left and rises to the right

(b) Falls to the left and rises to the right

(c) Rises to the left and falls to the right

19. (a) The function f is increasing over which intervals? Choose all that apply.

$(-\infty, -9)$ $(-6, -2)$ $(2, 6)$ $(9, \infty)$

(b) The function f has local maxima at which x -values? If there is more than one value, separate them with commas.

$-9, -2, 6$

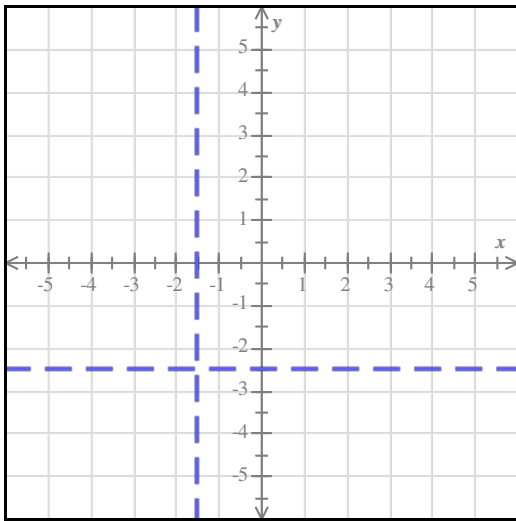
(c) What is the sign of the leading coefficient of f ?

Positive

(d) Which of the following is a possibility for the degree of f ? Choose all that apply.

7 9

20.



21.

$$f(x) = \frac{-2(x+4)(x-3)}{(x-2)(x-6)}$$

22. $5 \leq x \leq 13$