

Quadratic Functions

(Approximately 15 questions on STAAR)

Domain and Range of Quadratic Functions (A6A)

Determine the **domain and range** of quadratic functions and represent the domain and range using inequalities

I can...

- Determine domain and range given a graph, table, or equation

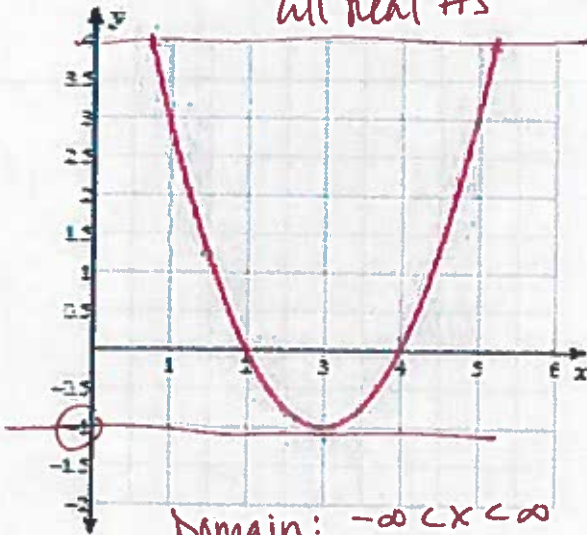
Notes:

X Domain: left to right

Y Range: bottom to top

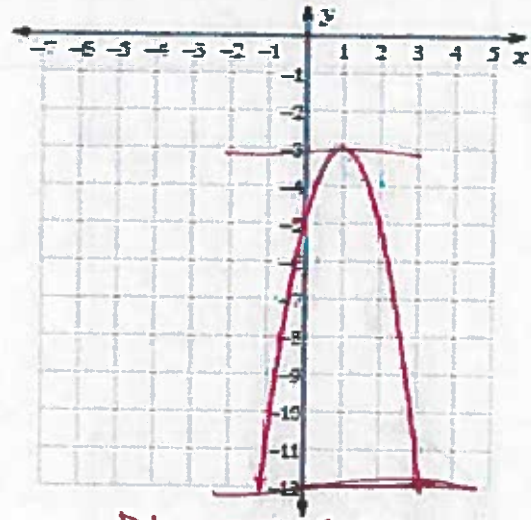
almost always

$-\infty < x < \infty$
all real #s



Domain: $-\infty < x < \infty$

Range: $-1 \leq y < \infty$



D: $-\infty < x < \infty$

R: $\infty < y \leq -3$

30 What is the domain of $f(x) = 9 - x^2$?

F $f(x) \geq 9$

↑ always
all real #s

G All real numbers

H $-3 \leq x \leq 3$

J $x \leq 9$

5 What is the range of $y = -x^2 - 2x + 3$?

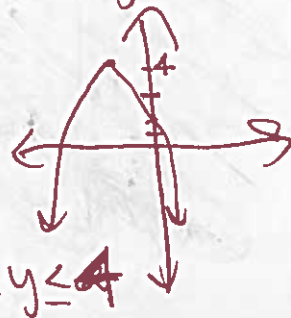
A ~~$x \leq 4$~~

B ~~$x \geq -4$~~

C $y \leq 4$

D $y \geq -4$

↑
put into graph



$-\infty < y \leq 4$

Graph Systems of Linear Inequalities (A3H)

graph the solution set of systems of two linear inequalities in two variables on the coordinate plane

I can...

- Determine region of the graph that represents solution
- Determine if a point satisfied the system of inequalities

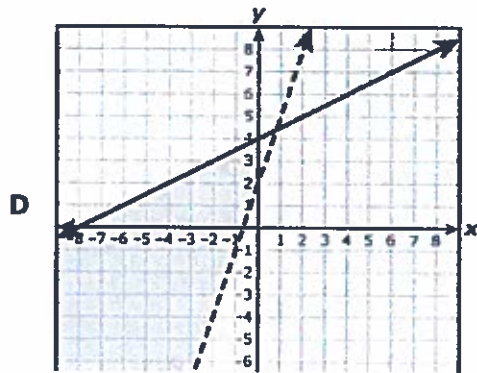
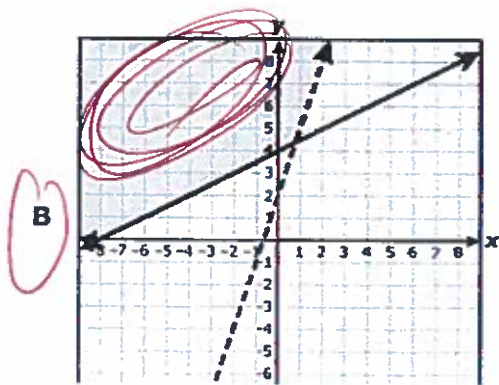
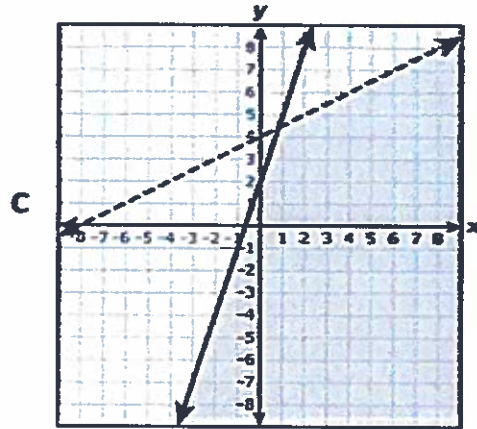
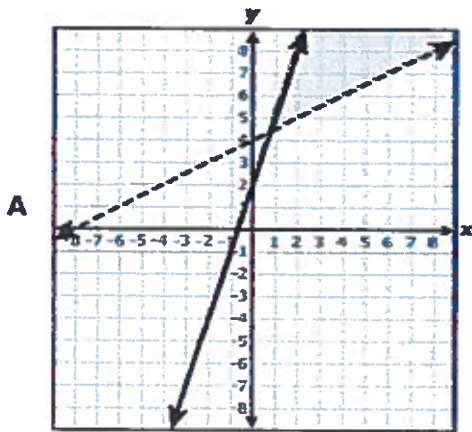
Notes:

Solution set: *where the shading overlaps*

How to graph in calculator: *put in Graph (Relations)*

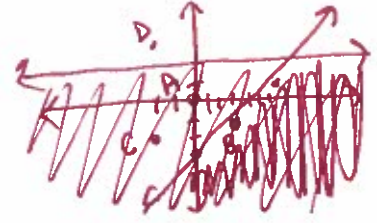
Which graph best represents the solution set for this system of inequalities?

$$\begin{aligned} y &> 3x + 2 \\ 2y - 8 &\geq x \end{aligned}$$



3. Which of the following points is in the solution set of this systems of inequalities?

$$\begin{aligned} y &\leq 1 \\ y &\leq \frac{2}{3}x - 3 \end{aligned}$$



- A. (0, 0) **B. (3, -2)** C. (-2, -2) D. (-2, 3)

Sample Questions

43 What is the range of $f(x) = x^2 + 1$?

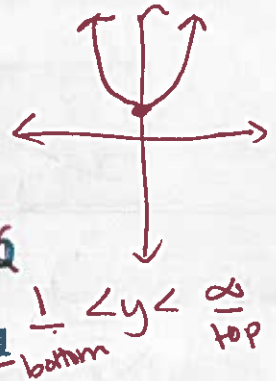
A All real numbers

B All real numbers greater than or equal to 0

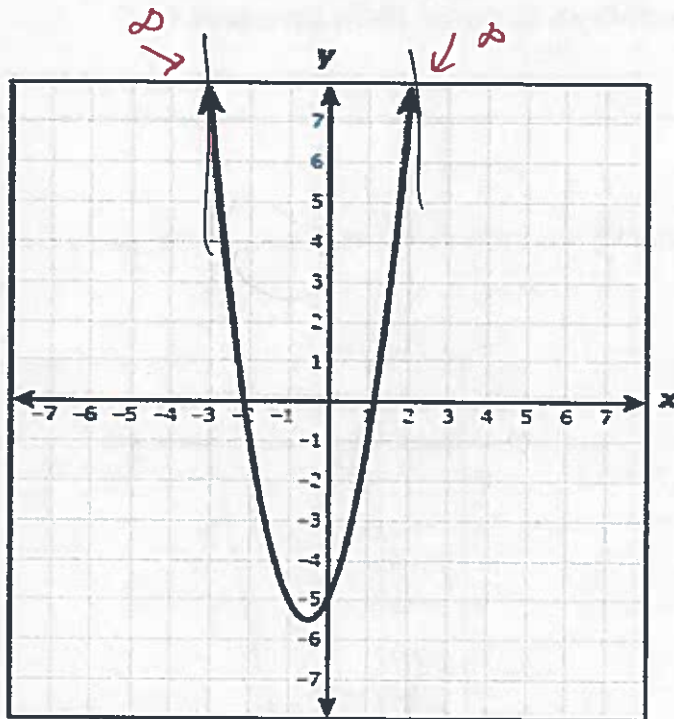
C All real numbers greater than or equal to 1

D All real numbers less than or equal to 1

put into Graph



38 The graph of quadratic function f is shown on the grid.



Which of these best represents the domain of f ?

F $-3 \leq x \leq 2$

G All real numbers

H $x \geq 5.5$

J All real numbers less than -3 or greater than 2

$-\infty < x < \infty$

The table shows some ordered pairs that belong to quadratic function h .

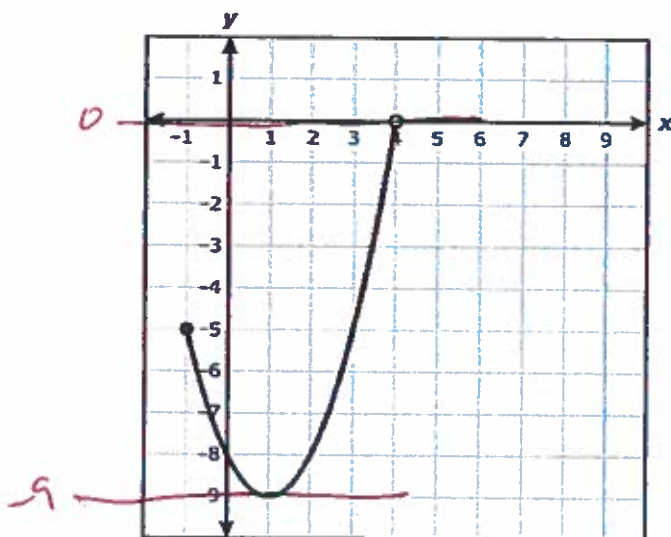
x	-4	-2	0	2	3	4	6
$h(x)$	41	17	1	-7	-8	-7	1

What is the range of h ?

biggest # \rightarrow 41
 smallest # \rightarrow -8

- A All real numbers
- B All real numbers greater than or equal to -7
- C All real numbers greater than or equal to -8
- D All real numbers greater than or equal to 0

Which inequality best represents the range of the part of the quadratic function graphed on the grid?



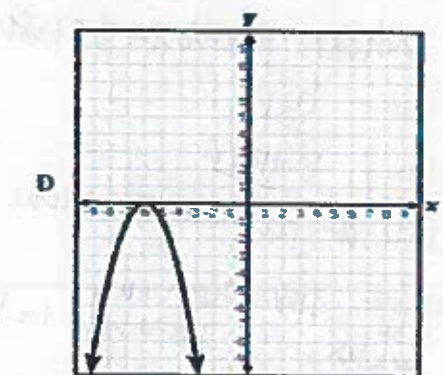
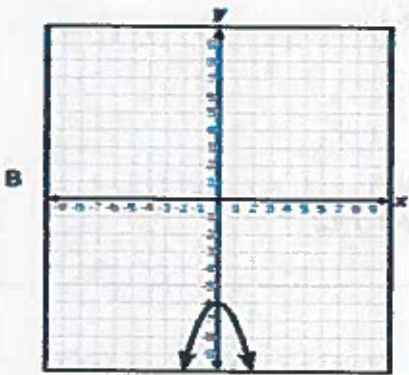
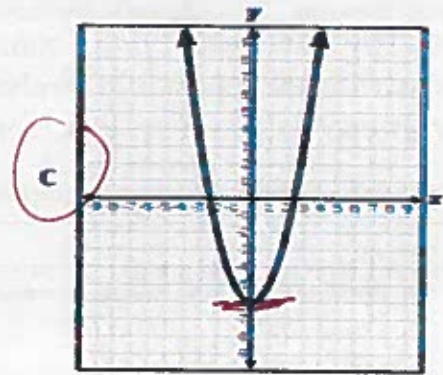
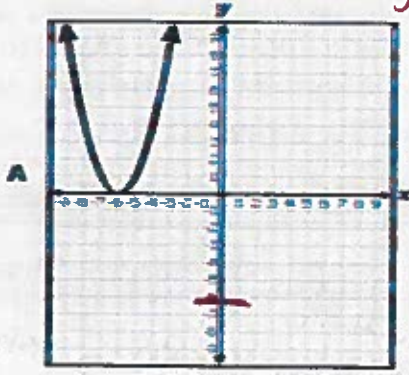
- A $-1 \leq y < 4$
- B $-1 \leq y < 4$
- C $-9 \leq y < 0$
- D $-9 \leq y < 0$

$-9 \leq y < 0$
 bottom \rightarrow \uparrow p

53 Which graph best represents a function with a range of all real numbers greater than or equal to -5 ?

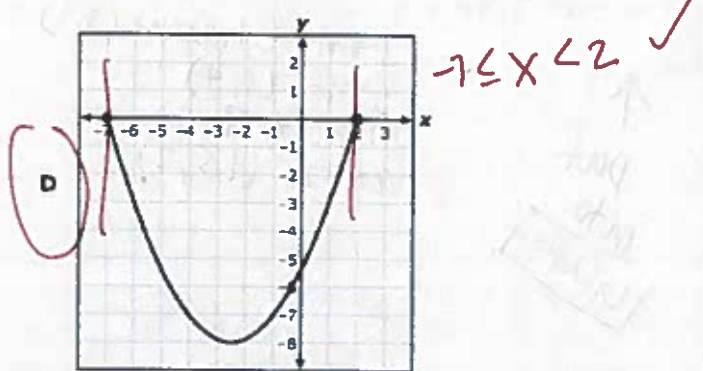
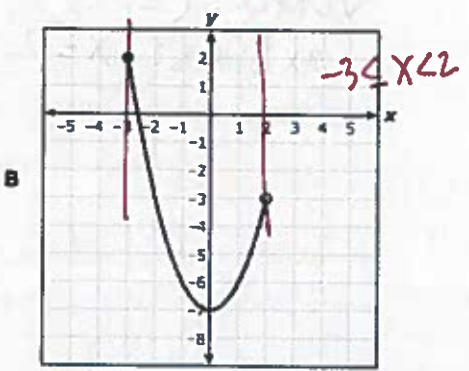
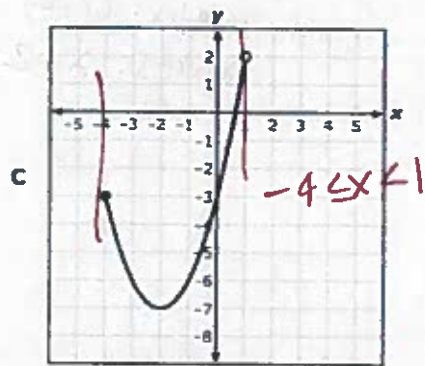
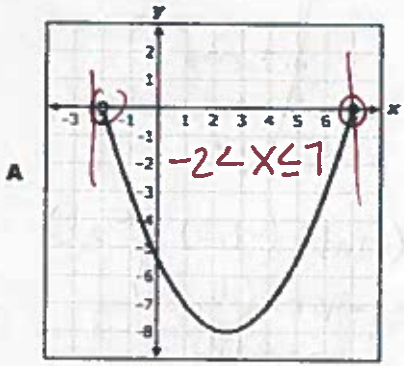
-5

$-6 < y < \infty$



53 Which graph represents a function with a domain of all real numbers greater than or equal to -7 and less than 2 ?

left \rightarrow right



Graphs of Quadratic Functions (A7A)

Graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercepts, y-intercept, zeros, maximum value, minimum values, vertex, and the equation for the axis of symmetry

I can...

- Identify all the key attributes given either a graph, equation, or table.

Notes:

x-intercepts/zeros/solutions/roots - where ^{parabola} crosses x-axis → can have none, one, or 2

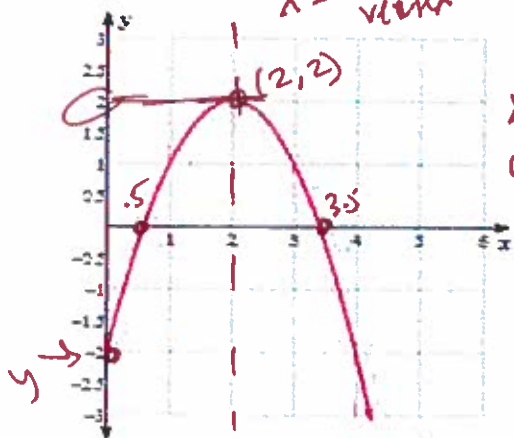
y-intercept - where parabola crosses y-axis

maximum value - top

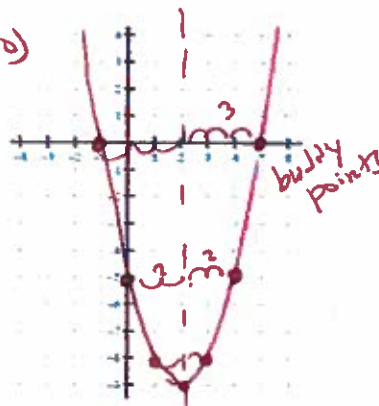
minimum value - bottom

vertex - middle of parabola, where direction changes

axis of symmetry - line that cuts parabola in 1/2
 $X = X_{\text{of vertex}}$



x-int: (0.5, 0) and (3.5, 0)
 y-int: (0, -2)
 max value: 2
 vertex: (2, 2)
 axis of s: $X=2$



x-int: (-1, 0) (5, 0)
 y-int: (0, -5)
 min value: -9
 vertex: (2, -9)
 axis of s: $X=2$

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

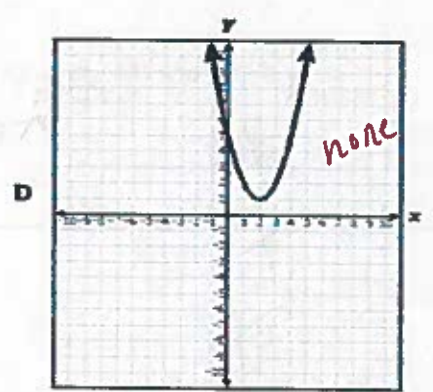
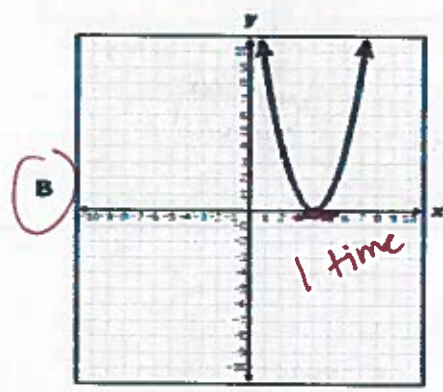
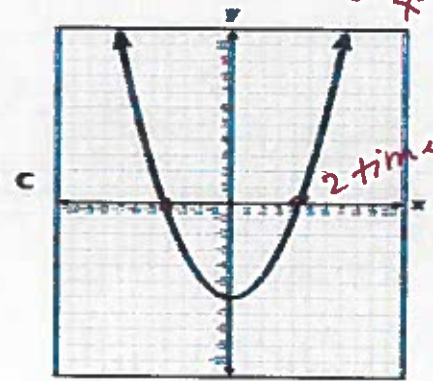
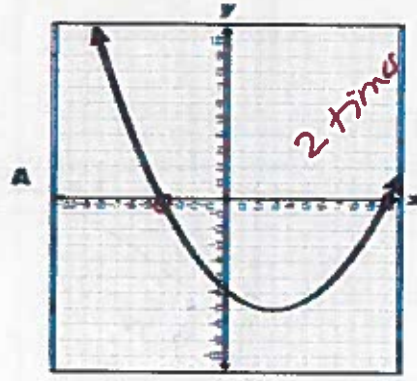
x-int: (-1, 0) and (4, 0)
 y-int: (0, 4)
 max: 7
 vertex: (1.5, 7)

↑
 put
 into
 Graph

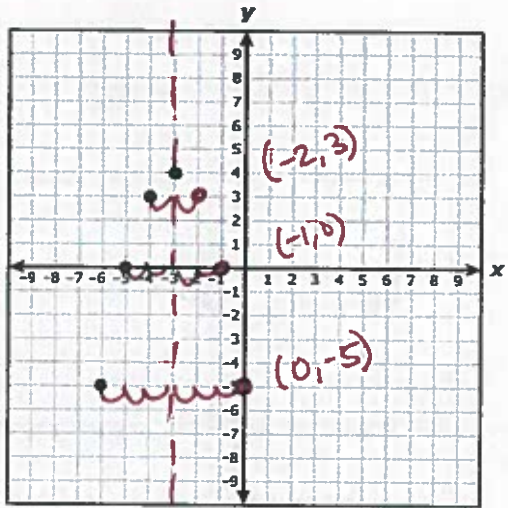
Sample Questions

29 Which graph best represents a quadratic function that has only one zero?

only crosses x-axis once



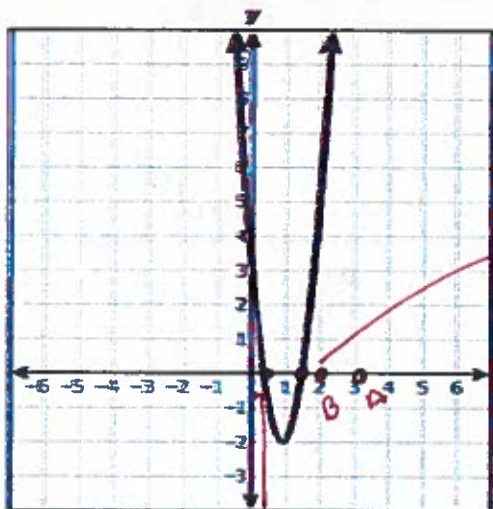
Four points on the graph of quadratic function h are shown on the grid.



The axis of symmetry of the graph of h is $x = -3$. Which ordered pair represents an additional point on the graph of h ?

- A (-1, 0) ✓
- B (1, -5)
- C (-2, 5)
- D (0, 6)

A graph of $f(x) = 6x^2 - 11x + 3$ is shown on the grid.



What are the zeros of f ?

~~A~~ 3

~~B~~ 2 and 9

~~C~~ $\frac{11}{12}$

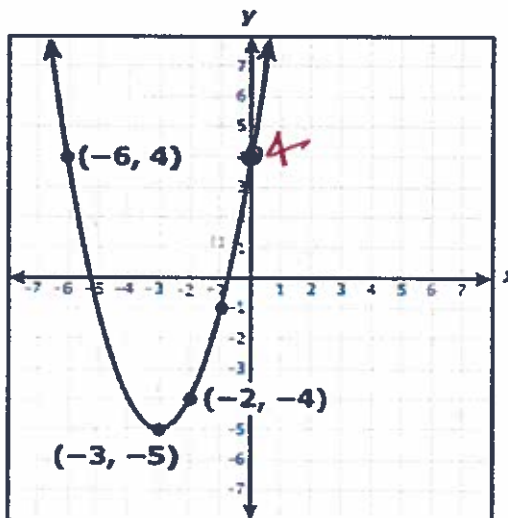
D $\frac{1}{3}$ and $\frac{3}{2}$

crosses x-axis

between 0 and 1

between 1 and 2

14 The graph of quadratic function f is shown on the grid.



4

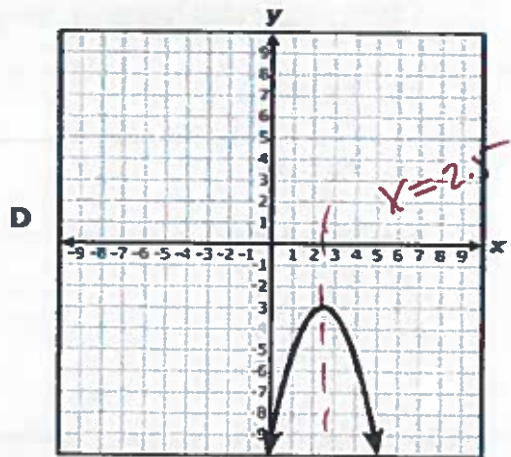
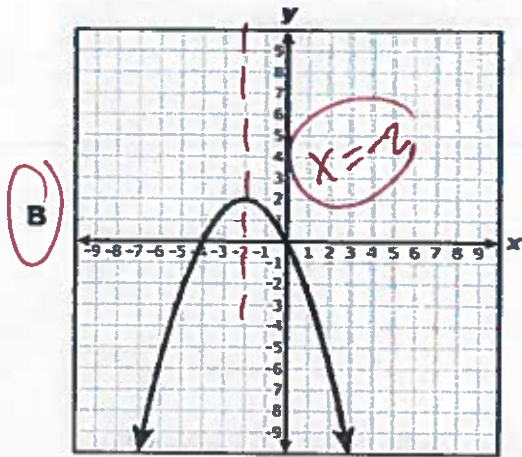
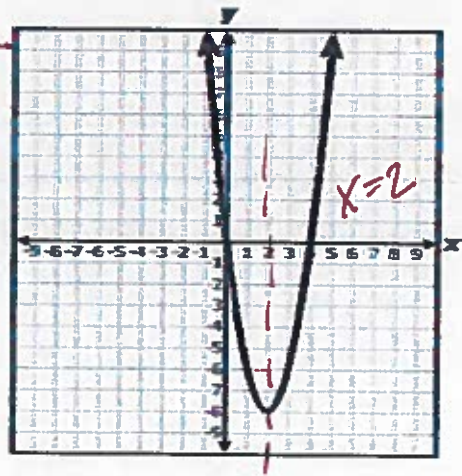
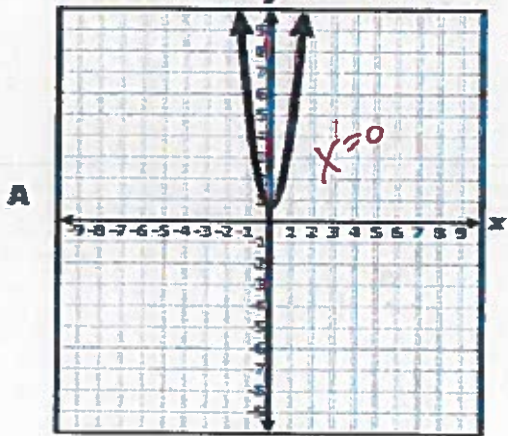
crosses y-axis

What is the y -intercept of the graph of f ?

Record your answer and fill in the bubbles on your answer document.

Which graph of a quadratic function has the same axis of symmetry as the graph of $f(x) = 2.5x^2 + 10x - 15$?

graph in calculator



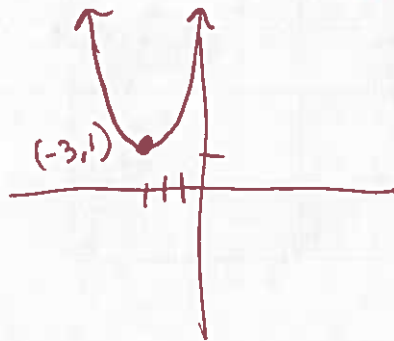
What is the vertex of the graph of the quadratic function $f(x) = x^2 + 6x + 10$?

F (3, -1)

G (-3, -1)

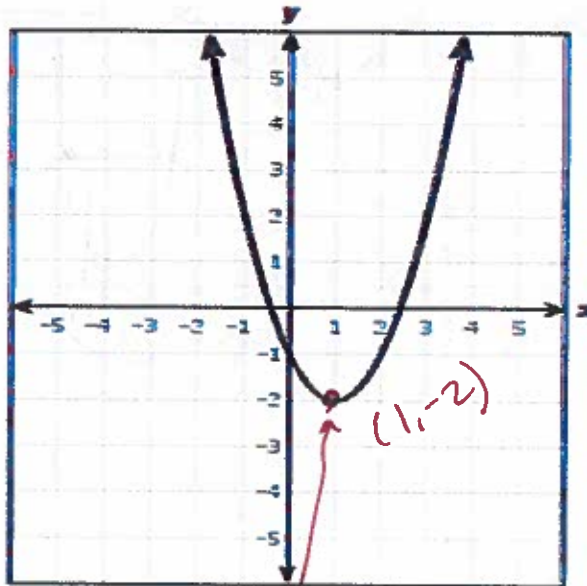
H (-3, 1)

J (3, 1)



put in Graph on calculator

50 A graph of a quadratic function is shown on the grid.



Which coordinates best represent the vertex of the graph?

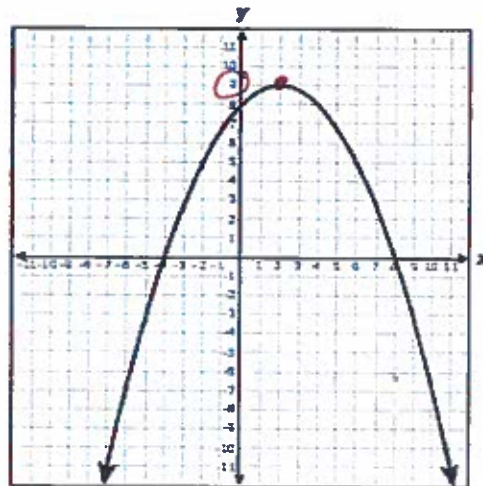
F $(2.4, 0)$

G $(0, -1)$

H $(-0.4, 0)$

J $(1, -2)$

34 The graph of quadratic function g is shown on the grid. The coordinates of the x -intercepts, the y -intercept, and the vertex are integers.

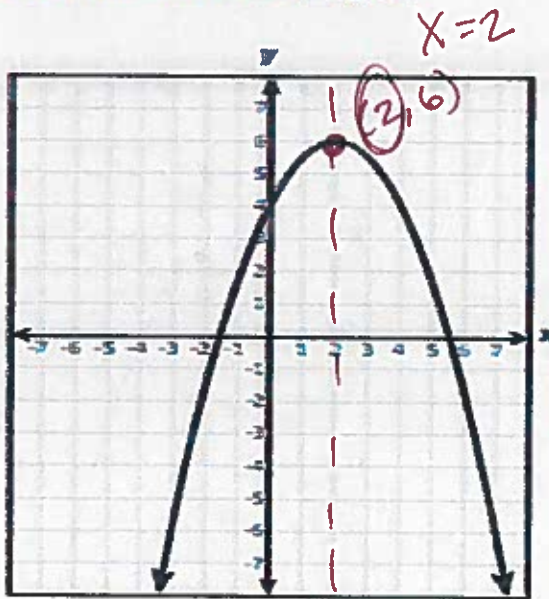


9
highest

What is the maximum value of g ?

Record your answer and fill in the bubbles on your answer document.

46 The graph of a quadratic function is shown on the grid.



Which equation best represents the axis of symmetry?

F $y = 6$

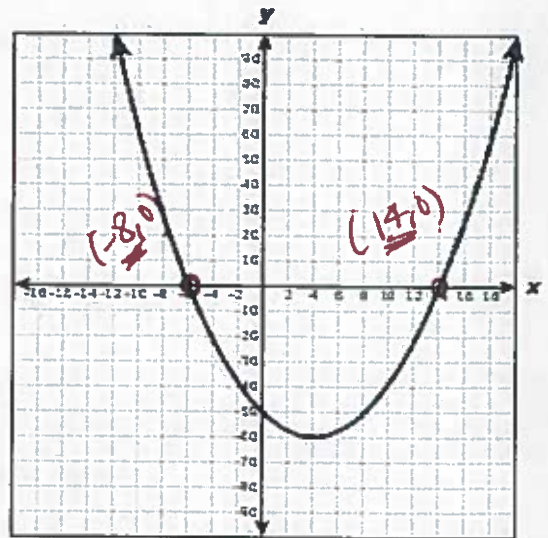
G $x = 2$

H $y = 4$

J $x = 0$

$X = X$ of vertex

3 The graph of quadratic function r is shown on the grid.



Where it crosses X-axis

What is a solution to $r(x) = 0$?

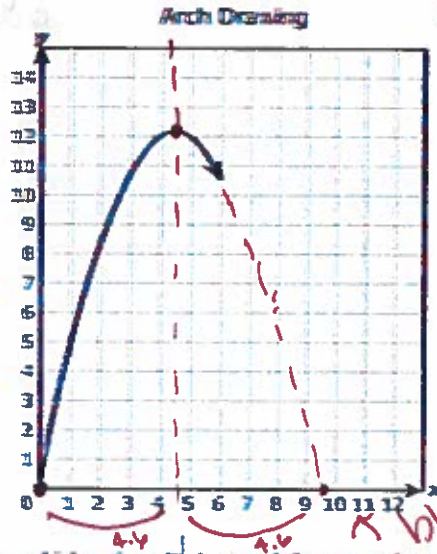
A -50

B 4

C 14

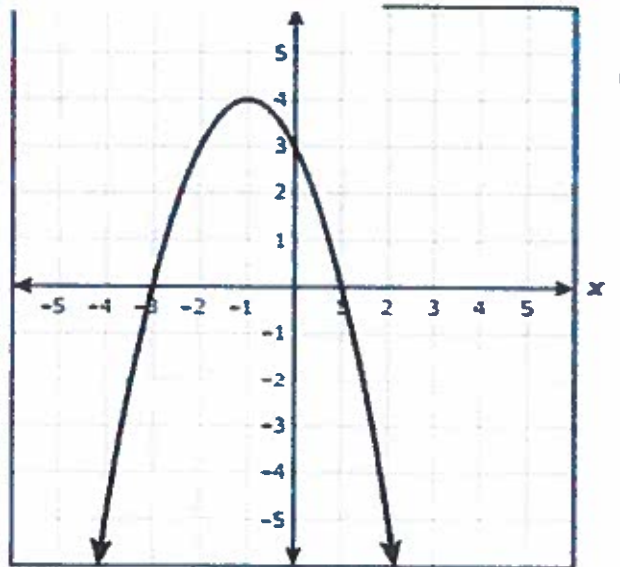
D -60

- 43 An architecture student is drawing a graph of an arch. As shown below, the arch has the shape of a parabola that begins at the origin and has a vertex at $(4.6, 12.2)$.



Other than the origin, at which point will the graph intersect the x-axis?

- A $(12.2, 0)$
- B $(9.2, 0)$**
- C $(4.6, 0)$
- D $(10.6, 0)$



Which function is best represented by this graph?

- F** $y = -(x + 1)^2 + 4$
- G $y = -(x - 1)^2 + 4$
- H $y = -x^2 + 4x + 3$
- J $y = -x^2 - 4x + 3$

Put all these into graph
Which matches picture?

13 The table of values for quadratic function g is shown below.

x	$g(x)$
-3	48
-2	30
-1	16
0	6
2	-2
3	0
4	6
6	30

where it crosses x-axis (#, 0)

$g(x) = 0$

If 1 is a solution to $g(x) = 0$, what is the other solution?

A -1

B 3

C 6

D -2

A table of values for the quadratic function f is shown below.

x	$f(x)$
-8	-2.75
-7	0
-6	2.25
-5	4
-4	5.25
-3	6
-2	6.25
-1	6
0	5.25
1	4

$f(x) = 0$

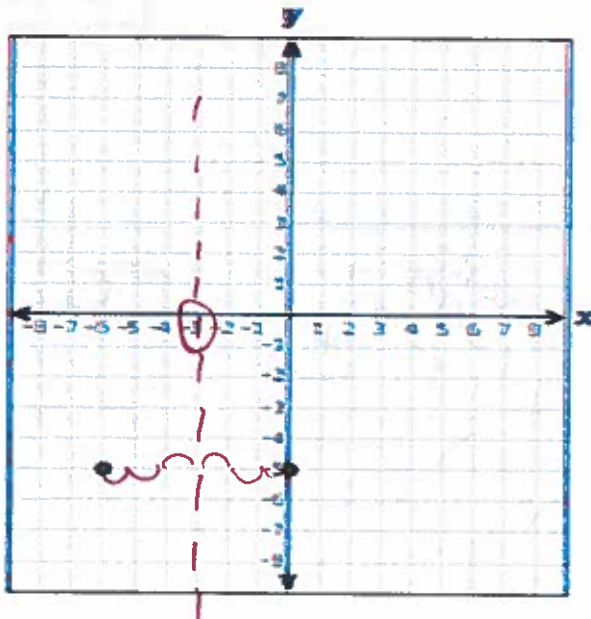
-7

where it crosses x-axis (#, 0)

If 3 is one solution to $f(x) = 0$, what is the value of the other solution?

Record your answer and fill in the bubbles on your answer document.

Two points on the graph of a quadratic function are shown on the grid below.



What is the equation for the axis of symmetry of the graph of this function?

A $x = -3$

B $x = -3$

C $x = -5$

D $x = -5$

$x = x$ of vertex

* middle of parabola

What are the x-intercepts of the graph of the quadratic function $f(x) = 5x^2 + 4x - 1$?

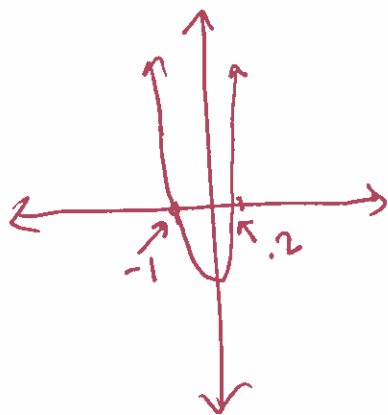
F $\frac{1}{5}$ and -1

G $-\frac{1}{5}$ and 1

H 0 and -1

J $-\frac{2}{5}$ and $1\frac{2}{5}$

crosses x-axis

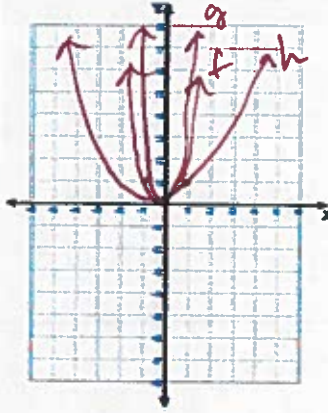
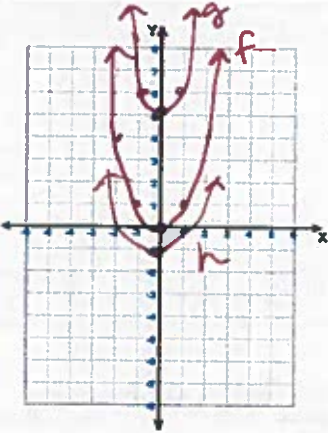
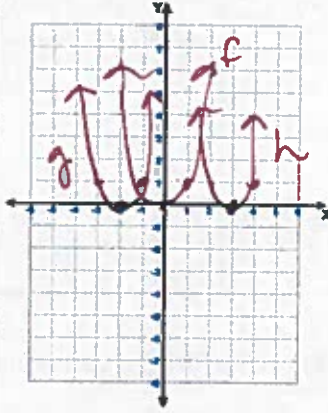


put in Graph on calculator go to Trace to see exact answer

Effects of Change of Quadratic Functions (A7C)

Determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x-c)$, $f(bx)$ for specific values of a , b , c , and d

Notes:

<p style="text-align: center;">$af(x)$</p> <p>Rule: <u>a is bigger \rightarrow narrower a is smaller \rightarrow wider</u></p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>$f(x) = x^2$</p> <p>$g(x) = 4x^2$ narrower</p> <p>$h(x) = \frac{1}{2}x^2$ wider</p> </div> </div>	<p>Calculator way:</p> <p><i>put equations into graph and compare</i></p>
<p style="text-align: center;">$f(x) \pm d$</p> <p>Rule: <u>shifts \uparrow and \downarrow</u></p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>$f(x) = x^2$</p> <p>$g(x) = x^2 + 5$ up 5</p> <p>$h(x) = x^2 - 1$ down 1</p> </div> </div>	<p style="text-align: center;">$f(x \pm c)$</p> <p>Rule: <u>Shift \uparrow left and \downarrow right (opposite of what you think)</u></p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>$f(x) = x^2$</p> <p>$g(x) = (x + 2)^2$ left 2</p> <p>$h(x) = (x - 3)^2$ right 3</p> </div> </div>

Sample Questions

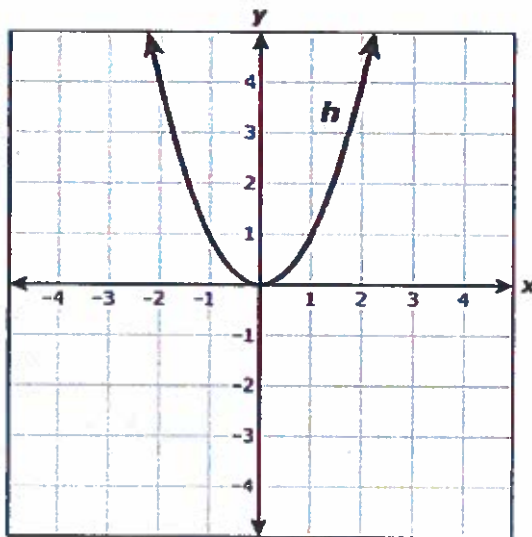
Quadratic functions q and w are graphed on the same coordinate grid.

The vertex of the graph of q is 18 units below the vertex of the graph of w .

Which pair of functions could have been used to create the graphs of q and w ?

- A $q(x) = 18x^2$ and $w(x) = x^2$
- B $q(x) = x^2 + 18$ and $w(x) = x^2$
- C $q(x) = -18x^2$ and $w(x) = x^2$
- D** $q(x) = x^2 - 18$ and $w(x) = x^2$

The graph of h is shown on the grid.

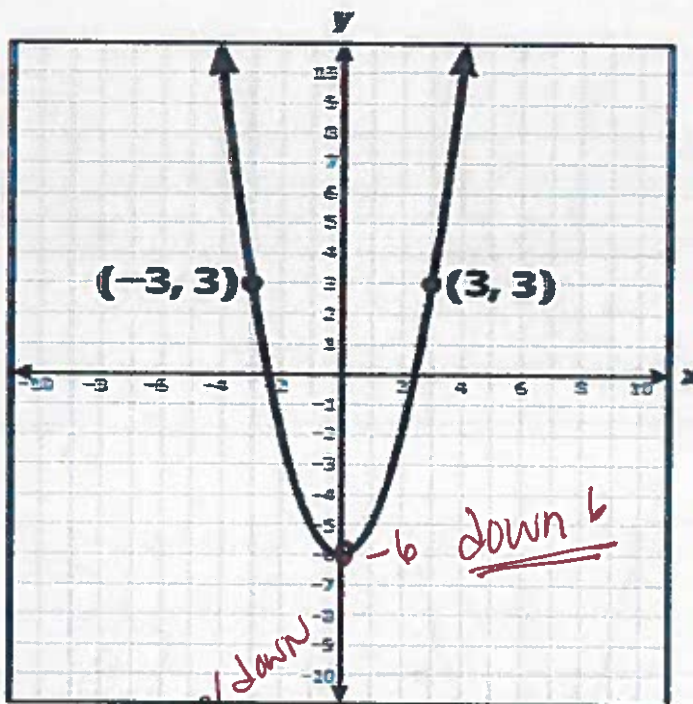


If the graph of h was transformed to create the graph of $g(x) = x^2 + 3$, which statement is true?

- A The graph of g is wider than the graph of h .
- B The graph of g is narrower than the graph of h .
- C** The graph of g is 3 units above the graph of h .
- D The graph of g is 3 units below the graph of h .

↑
up 3

14 The graph of quadratic function p is shown on the grid.



If $k(x) = x^2$ and $p(x) = k(x) + n$, what is the value of n ?

Record your answer and fill in the bubbles on your answer document.

-6

4 The graph of $f(x) = x^2$ was transformed to create the graph of $g(x) = (x - 7.5)^2$. Which of these describes this transformation?

F A horizontal shift to the right 7.5 units

G A horizontal shift to the left 7.5 units

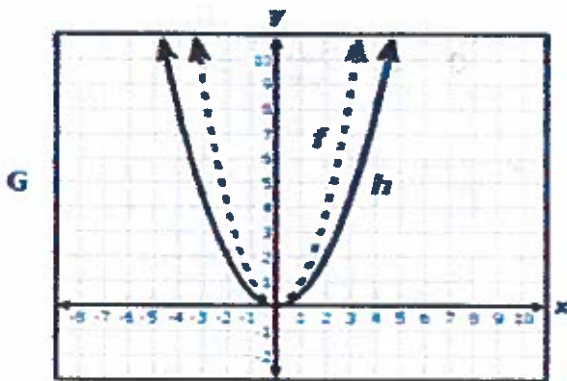
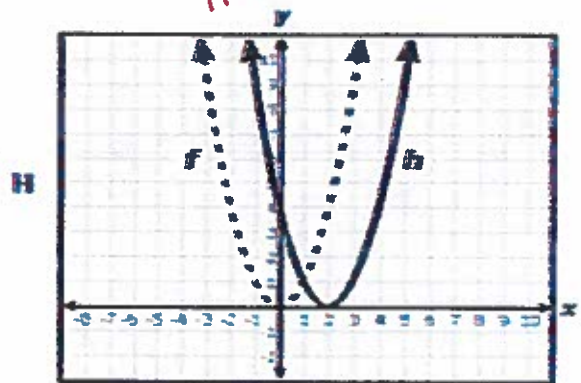
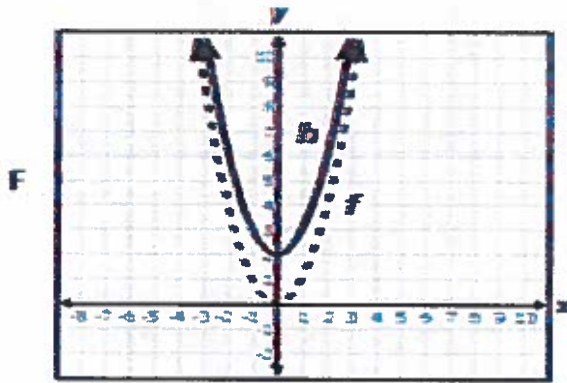
H A vertical shift down 56.25 units

J A vertical shift up 56.25 units

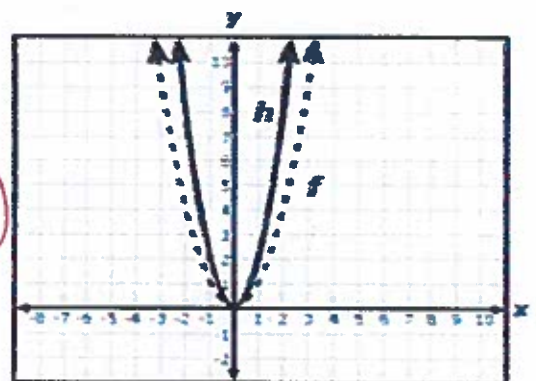
↑
Right 7.5

- 24 The graph of $f(x) = x^2$ is transformed to create the graph of $h(x) = 2f(x)$. Which graph best represents f and h ?

harder



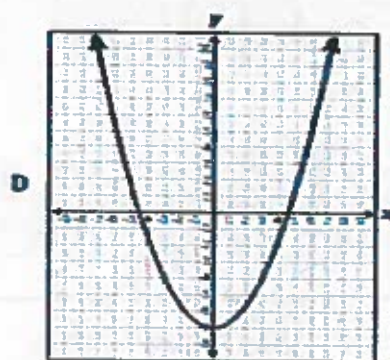
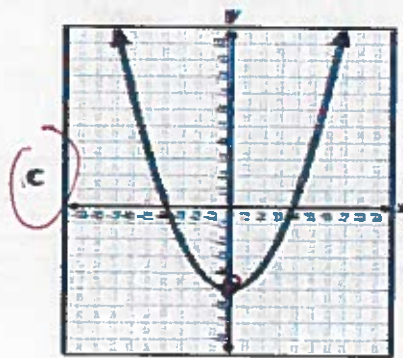
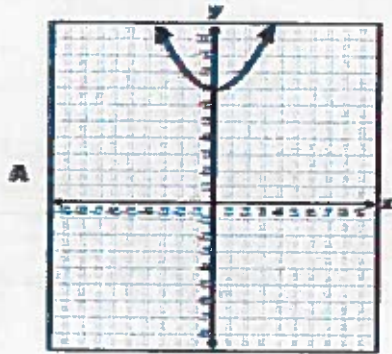
J



- 41 Quadratic functions q and w are graphed on the same coordinate grid. The vertex of the graph of q is 18 units below the vertex of the graph of w . Which pair of functions could have been used to create the graphs of q and w ?

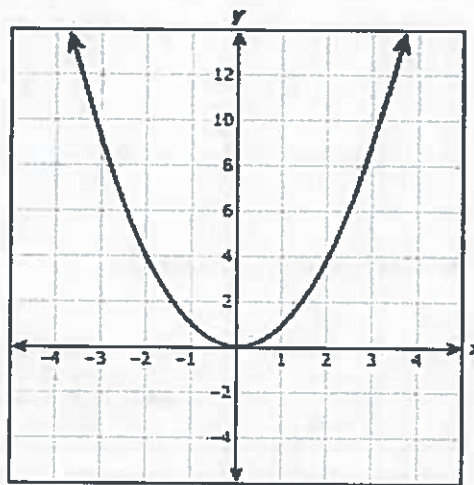
- A $q(x) = 18x^2$ and $w(x) = x^2$
- B $q(x) = x^2 + 18$ and $w(x) = x^2$
- C $q(x) = -18x^2$ and $w(x) = x^2$
- D $q(x) = x^2 - 18$ and $w(x) = x^2$

23 Which graph can be obtained by translating the graph of $h(x) = 0.33x^2 + 2$ down 7 units?



+2
-7
-5

24 The graph of $f(x) = x^2$ is shown on the grid.

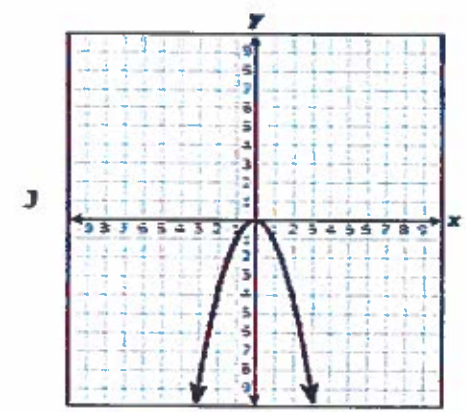
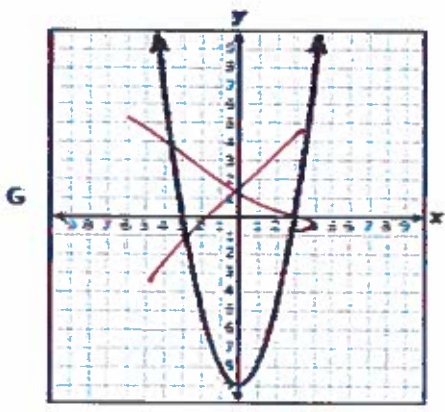
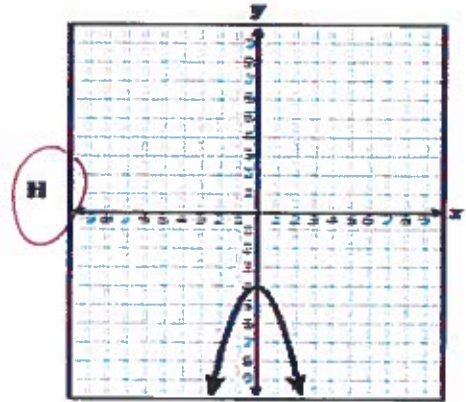
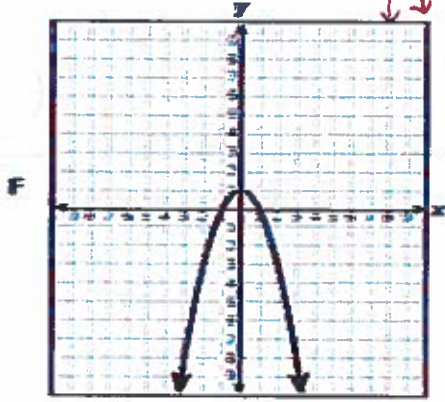


Which statement about the relationship between the graph of f and the graph of $g(x) = 7x^2$ is true?

- F The graph of g is narrower than the graph of f .
- G The graph of g is wider than the graph of f .
- H The graph of g is 7 units below the graph of f .
- J The graph of g is 7 units above the graph of f .

↑
narrower

4. Function p is in the form $y = ax^2 + c$. If the values of a and c are both less than 0, which graph could represent p ? negative shifts down



27. Quadratic functions g and k are shown below.

$$g(x) = 5x^2 - 12$$

$$k(x) = 5x^2 + c$$

$+9 = (-3)$

For what value of c will the graph of k be 9 units above the graph of g ?
 Record your answer and fill in the bubbles on your answer document.

Solve Quadratic Functions (A8A)

Solve quadratic equations having real solutions by factoring, taking square roots, and applying the quadratic formula

Notes:

Two ways to find answer: ~~GRAPH~~



Plug in answers for x



Sample Questions

22 What are the solutions to $(x + 7)^2 = 81$?

F ~~-74~~ and 88

G ~~-2~~ and 16

H ~~-88~~ and 74

J ~~-16~~ and 2

What is the solution set for $(2x - 7)^2 = 25$?

~~A~~ $\{-5, 5\}$

B $\{-6, -1\}$

C $\{1, 6\}$

D $\{2, 12\}$

What is the solution set for $9x^2 - 25 = 0$?

A $\{-\frac{5}{3}, \frac{5}{3}\}$

B $\{-\frac{25}{9}, \frac{25}{9}\}$

C $\{-\frac{3}{5}, \frac{3}{5}\}$

D $\{-\frac{9}{25}, \frac{9}{25}\}$

40 Which statement about the quadratic equation below is true?

$$-4.5x^2 + 72 = 0$$

- F The equation has $x = 4$ as its only solution. $-4.5(4)^2 + 72 \stackrel{?}{=} 0 \checkmark$
- G The equation has no real solutions.
- H The equation has $x = 4$ and $x = \cancel{4}$ as its only solutions.
- J The equation has an infinite number of solutions.

7. What is the solution set for the quadratic equation $x^2 - 16 = 0$?

- A. {4}
- B. {-4, 4}
- C. {256}
- D. {-256, 256}

37 What are the solutions to the equation $3x^2 + 15x = 18$?

- A $x = \cancel{3}$ and $x = -2$ $3(-3)^2 + 15(-3) \stackrel{?}{=} 18$
- B $x = -6$ and $x = 1$ ✓
- C $x = 6$ and $x = 13$
- D $x = 0$ and $x = 1$

34 What is the positive solution to the equation $0 = \frac{1}{3}x^2 - 3$?

Record your answer and fill in the bubbles on your answer document.

$$1 \rightarrow \frac{1}{3}(1)^2 - 3$$

$$2 \rightarrow \frac{1}{3}(2)^2 - 3$$

$$\textcircled{3} \rightarrow \frac{1}{3}(3)^2 - 3 = 0$$

Factor (A10E)

Factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two

I can...

- Factor when $a = 1$ and $a > 1$
- Determine if a trinomial is prime (cannot be factored)
- Factor a perfect square trinomial

Notes:

Factor -

Ex: $y = x^2 + 4x - 21$

Ex: $y = 6x^2 - 5x - 4$

Sample Questions

Which function is equivalent to $h(x) = 10x^2 + 9x - 1$?

A $h(x) = (x - 1)(10x + 1)$

B $h(x) = (x + 1)(10x - 1)$

C $h(x) = (10x + 1)(x + 1)$

D $h(x) = (10x - 1)(x - 1)$

Handwritten work for the first question:

$$\begin{array}{l} (x + \frac{10}{10})(x - \frac{1}{10}) \\ \hline (x + 1)(10x - 1) \end{array}$$
$$\begin{array}{r|l} -10 & \\ \hline 1 & -10 \\ -1 & 10 \end{array}$$

Which expression is a factor of $9x^2 - 18x + 8$?

A $3x - 4$

B $3x + 8$

C $3x + 4$

D $3x - 8$

Handwritten work for the second question:

$$\begin{array}{r|l} 72 & \\ \hline 1 & 72 \\ 2 & 36 \\ 3 & 24 \\ 4 & 18 \\ -6 & -12 \end{array}$$
$$\begin{array}{l} (x - \frac{6}{3})(x - \frac{12}{9}) \\ (x - \frac{2}{3})(x - \frac{4}{3}) \\ \hline (3x - 2)(3x - 4) \end{array}$$

31 Which expression is a factor of $21x^2 + 13x - 20$?

A $3x - 4$

B $7x - 5$

C $7x + 4$

D $3x + 5$

$$\begin{array}{r} -420 \\ -15 \overline{) 28} \end{array}$$

$$(x - \frac{15}{21})(x + \frac{28}{21})$$

$$(x - \frac{5}{7})(x + \frac{4}{3})$$

$$(7x - 5)(3x + 4)$$

44 Which expression is a factor of $9r^2 - 4r + 1$?

F $3r - 1$

G $r - 1$

H $9r - 1$

J) There are no real factors.

$$\begin{array}{r} 9 \\ 1 \overline{) 9} \\ 3 \overline{) 3} \end{array}$$

6 Which expression is equivalent to $2x^2 + 7x + 4$?

F $(2x - 1)(x + 4)$

G $(2x + 1)(x - 4)$

H $(2x + 1)(x + 4)$

J) None of these

$$\begin{array}{r} 8 \\ 1 \overline{) 8} \\ 2 \overline{) 4} \end{array}$$

~~$(2x + 1)(x + 4)$~~

25 Which function is equivalent to $f(x) = 6x^2 - 13x + 5$?

A $f(x) = (3x - 1)(2x + 5)$

B $f(x) = (3x - 5)(2x - 1)$

C $f(x) = (3x - 1)(2x - 5)$

D $f(x) = (3x - 5)(2x + 1)$

$$\begin{array}{r|l} 30 & \\ \hline 1 & 30 \\ 2 & 15 \\ \hline -3 & 10 \end{array}$$

$(X - \frac{3}{6})(X - \frac{10}{6})$ $(X - \frac{1}{2})(X - \frac{5}{3})$
 $(2X - 1)(3X - 5)$

17 Which expression is equivalent to $6x^2 + 13x + 5$?

A $(2x + 5)(3x - 1)$

B $(2x - 5)(3x + 1)$

C $(2x + 1)(3x + 5)$

D $(2x - 1)(3x - 5)$

$$\begin{array}{r|l} 30 & \\ \hline 3 & 10 \end{array}$$

$(X + \frac{3}{6})(X + \frac{10}{6})$
 $(X + \frac{1}{2})(X + \frac{5}{3})$
 $(2X + 1)(3X + 5)$

28 Which expression is equivalent to $m^2 - 13m - 30$?

F $(m - 15)(m + 2)$

~~G $(m - 10)(m + 3)$~~

H $(m + 15)(m - 2)$

J $(m + 10)(m + 3)$

$$\begin{array}{r|l} -30 & \\ \hline 1 & -30 \\ -1 & 30 \\ 5 & -6 \\ -5 & 6 \\ \hline 3 & -10 \\ -3 & 10 \\ \hline 2 & -15 \\ -2 & 15 \end{array}$$

$(X + 2)(X - 15)$

41 Which expression is a factor of $18x^2 - 15x + 2$?

A $3x - 2$

B $9x - 1$

C $x - 2$

D $2x - 1$

$$\begin{array}{r|l} 36 & \\ \hline 1 & 36 \\ 2 & 18 \\ -3 & 12 \end{array}$$

$$\left(\frac{x-3}{18}\right)\left(\frac{x-12}{18}\right)$$

$$\left(x - \frac{1}{6}\right)\left(x - \frac{2}{3}\right)$$

$$(6x-1)(3x-2)$$

49 Which expression is a factor of $x^2 - 5x - 6$?

A $x - 6$

B $x - 2$

C $x - 3$

D $x - 1$

$$\begin{array}{r|l} -6 & \\ \hline -1 & 6 \\ 2 & -3 \\ -2 & 3 \end{array}$$

$$(x+1)(x-6)$$

$$(x+1)(x-6)$$

2. Factor the following trinomial: $4x^2 + 52x + 144$

A. $4(x - 4)(x - 9)$

B $4(x + 4)(x + 9)$

C. $(4x + 4)(x + 9)$

D. $(2x - 5)(2x - 14)$

$$4(x^2 + 13x + 36)$$

$$4(x+4)(x+9)$$

$$\begin{array}{r|l} 36 & \\ \hline 1 & 36 \\ 2 & 18 \\ 3 & 12 \\ 4 & 9 \end{array}$$

Difference of Squares (A10F)

Decide if a binomial can be written as a **difference of two squares** and, if possible, use the structure of a difference of two squares to rewrite the binomial

Notes:

Definition of Difference of Squares

Steps: Take $\sqrt{\quad}$ of both #s

(+) (-)

* only works when #s are perfect squares AND there is a - in the middle

Sample Questions

25 Which expression is a factor of $36x^2 - 49$?

A $18x - 7$

B $6x - 49$

C $18x - 49$

D $6x - 7$

$\sqrt{36} = 6$

$\sqrt{49} = 7$

$(6x + 7)(6x - 7)$

1) $25n^2 - 4$

A) Not factorable

B) $(3n + 1)(3n - 1)$

C) $(5n + 2)(5n - 2)$

D) $(5n - 2)^2$

2) $9x^2 - 25$

A) $(5x + 3)(5x - 3)$

B) $(3x - 5)^2$

C) $(3x + 5)(3x - 5)$

D) $(4x + 5)(4x - 5)$

3) $25p^2 + 4$

A) $(5p + 3)(5p - 3)$

B) Not factorable

C) $(-5p + 2)(5p - 2)$

D) $(4p + 5)(4p - 5)$

4) $16k^2 - 1$

A) $(k + 5)(k - 5)$

B) $(4k - 1)^2$

C) $(4k + 1)(4k - 1)$

D) $(4k + 1)^2$

5) $16n^2 - 9$

A) $(4n + 3)(4n - 3)$

B) $(4n - 3)^2$

C) $(8n + 3)(8n - 3)$

D) $(3n + 4)(3n - 4)$

6) $x^2 - 1$

A) $(x + 1)(x - 1)$

B) $(x + 3)(x - 3)$

C) $(x - 1)^2$

D) $(3x + 5)(3x - 5)$

7) $9x^2 + 4$

A) $(3x - 2)^2$

B) Not factorable

C) $(9x + 4)^2$

D) $(3x + 2)(3x - 2)$

8) $4r^2 - 9$

A) $(2r + 3)(2r - 3)$

B) $(2r + 1)(2r - 1)$

C) $(-2r + 3)(2r - 3)$

D) $(r + 3)(r - 3)$

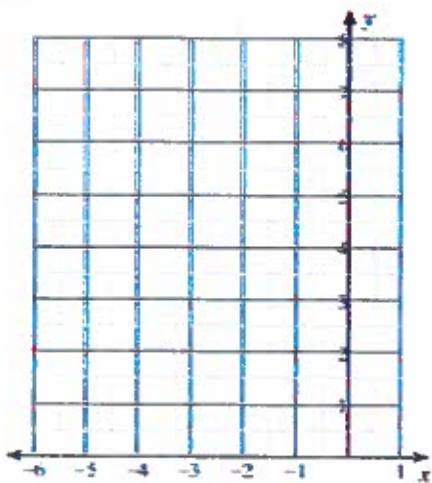
Vertex Form (A6B)

Write equations of quadratic functions given the vertex and another point on the graph, write the equation in **vertex form**, and rewrite the equation from vertex form to standard form

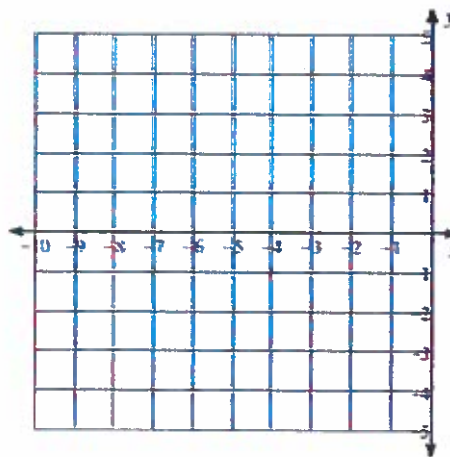
Notes:

Standard Form $f(x) = ax^2 + bx + c$ \rightarrow **Vertex Form** $f(x) = a(x - h)^2 + k$

1) $y = (x + 4)^2 + 3$



2) $y = -2(x + 2)^2 + 4$



Sample Questions

12 Which function's graph has a vertex at (3, 5) and contains the point (5, 13)?

~~K~~ $y = \frac{1}{10}(x + 3)^2 - 5$ \leftarrow put into Graph and go to Table

~~G~~ $y = \frac{1}{10}(x - 3)^2 - 5$

H $y = 2(x - 3)^2 + 5$

J $y = 2(x + 3)^2 + 5$

43 Which quadratic function in vertex form can be represented by the graph that has a vertex at $(3, -7)$ and passes through the point $(1, -10)$?

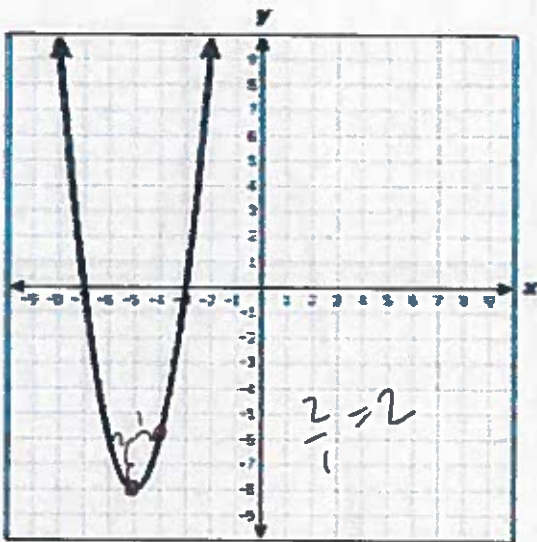
~~A~~ $y = \frac{3}{4}(x+3)^2 + 7$

~~B~~ $y = -\frac{3}{4}(x+3)^2 - 7$

~~C~~ $y = \frac{3}{4}(x-3)^2 + 7$

D $y = -\frac{3}{4}(x-3)^2 - 7$

16 A quadratic function is graphed on the grid below.



If this function is written in the form $y = a(x - h)^2 + k$, what is the value of a ?

F -3

G -8

H 5

J 2

*Rise
run
from
vertex*

Which function is equivalent to $f(x) = \frac{1}{4}(x - 2)^2 + 3$?

A $f(x) = \frac{1}{2}x + 2$

B $f(x) = \frac{1}{4}x^2 - 4x + 7$

C $f(x) = \frac{1}{4}x^2 + 4$

D $f(x) = \frac{1}{4}x^2 - x + 4$

*put this
into
2nd equation*

*put this into
graph*

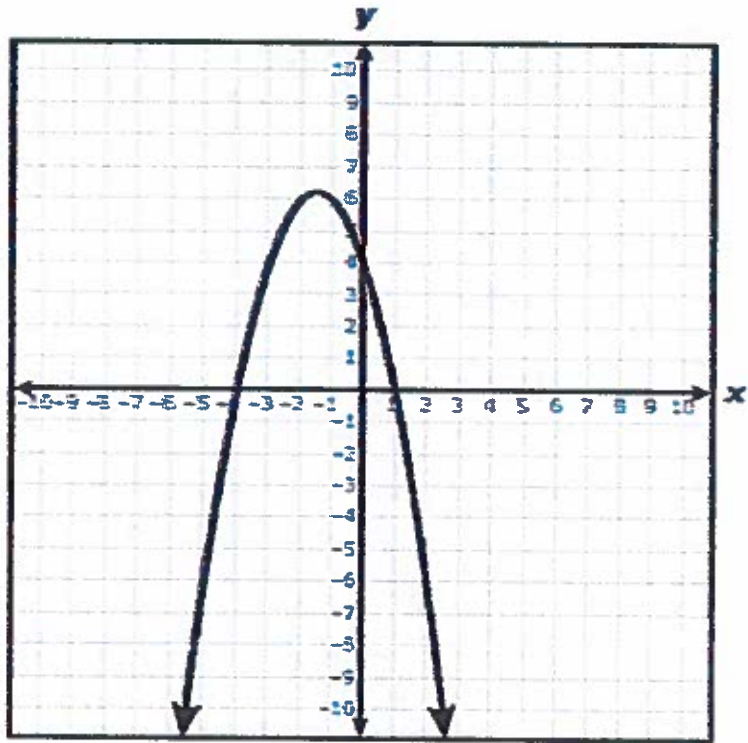
*go to Table
Do they match?*

Write Quadratic Functions with Solutions (A6C)

Write quadratic functions when given real solutions and graphs of their related equations

Sample Questions:

10 The graph of a quadratic function is shown on the grid.



Which function is best represented by this graph?

F $f(x) = x^2 + 3x - 4$ ← put into graph

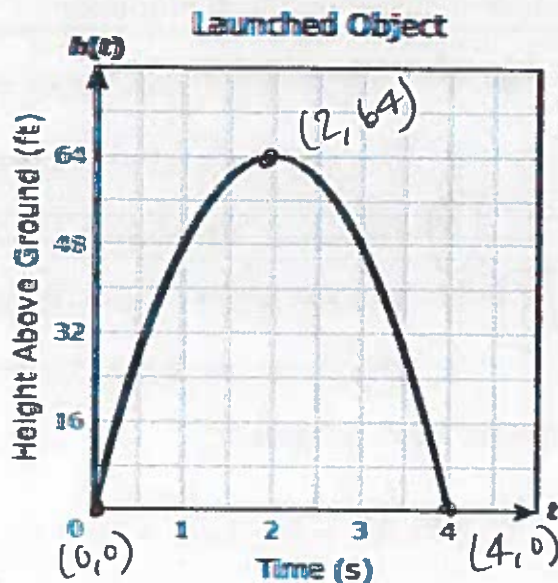
G $f(x) = -x^2 - 3x + 4$

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

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

match to ↗

- 7 The graph shows the height in feet of an object above the ground t seconds after it was launched from the ground.



Which function is best represented by the graph of this situation?

A $h(t) = -16t^2 - 64t$

~~B~~ $h(t) = -16t^2 + 128t - 256$

C $h(t) = -16t^2 + 64t$

D $h(t) = -16t^2 - 128t - 256$

← put into graph

Because #s are so big,
took at table to
see if points are
in table

If the solutions of $p(x) = 0$ are -14 and 11 , which function could be p ?

A $p(x) = x^2 - 3x - 154$

B $p(x) = x^2 - 14x + 11$

C $p(x) = x^2 + 14x + 11$

D $p(x) = x^2 + 3x - 154$

↑ where parabola crosses
x-axis } graph

or
go to Table
when $y=0$, what is x ?

x	y
-14	0 ✓
11	0 ✓

Quadratic Zeros and Linear Factors (A7B)

Describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions

Sample Questions

zeros = x-intercepts

Graph Put equation in

- look @ Graph

- or go to Table

$$y = 0$$

16 Which statement about $k(x) = -x^2 - 2x + 15$ is true?

F The zeros are -3 and 5, because $k(x) = -(x + 3)(x - 5)$.

G The zeros are -5 and 3, because $k(x) = -(x + 5)(x - 3)$.

H The zeros are -5 and -3, because $k(x) = -(x + 5)(x + 3)$.

J The zeros are 3 and 5, because $k(x) = -(x - 3)(x - 5)$.

37 Which statement about $f(x) = 2x^2 - 3x - 5$ is true?

A The zeros are $-\frac{5}{2}$ and -1, because $f(x) = (x + 1)(2x + 5)$.

B The zeros are $\frac{5}{2}$ and 1, because $f(x) = (x - 1)(2x + 5)$.

C The zeros are -1 and $\frac{5}{2}$, because $f(x) = (x + 1)(2x - 5)$.

D The zeros are 1 and $\frac{5}{2}$, because $f(x) = (x - 1)(2x - 5)$.

18 Which statement about $g(x) = x^2 - 576$ is true?

F The zeros, -288 and 288, can be found when $0 = (x + 288)(x - 288)$.

~~G The only zero, 288, can be found when $0 = (x - 288)^2$.~~

H The zeros, -24 and 24, can be found when $0 = (x + 24)(x - 24)$.

J The only zero, 24, can be found when $0 = (x - 24)^2$.

Which statement about $f(x) = 72x^2 - 352x - 40$ is true?

A The zeros, $-\frac{1}{9}$, 5, and ~~8~~, can be found when $0 = 8(9x + 1)(x - 5)$.

B The zeros, $-\frac{1}{9}$ and 5, can be found when $0 = 8(9x + 1)(x - 5)$.

C The zeros, ~~-5~~, 0, and $\frac{1}{9}$, can be found when $0 = 8(x + 5)(9x - 1)$.

D The zeros, ~~-5~~ and $\frac{1}{9}$, can be found when $0 = 8(x + 5)(9x - 1)$.