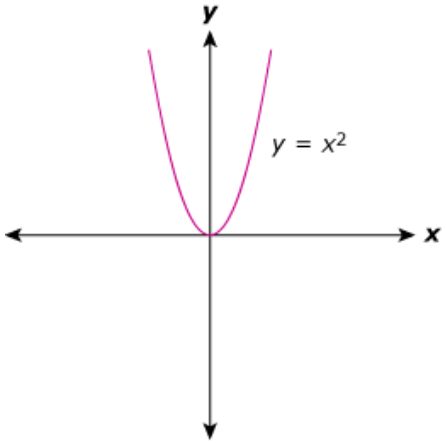
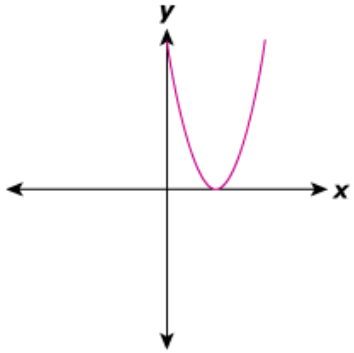
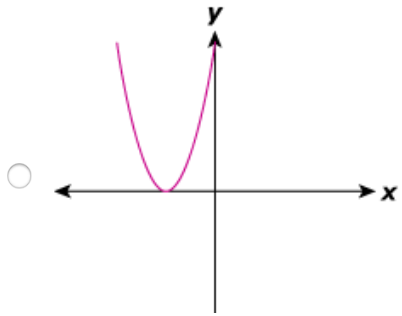
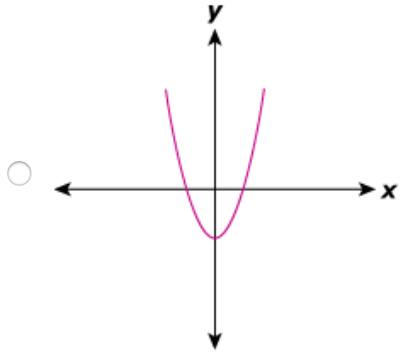
1. The graph of $y = x^2$ is shown below.

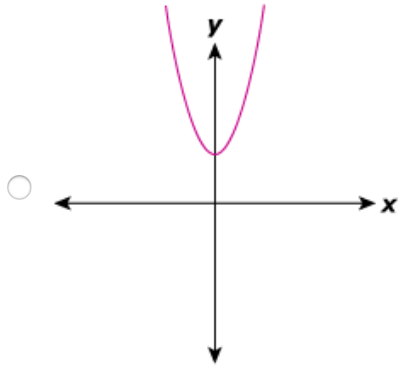


Which of the following could be the graph of $y = x^2 - 3$?

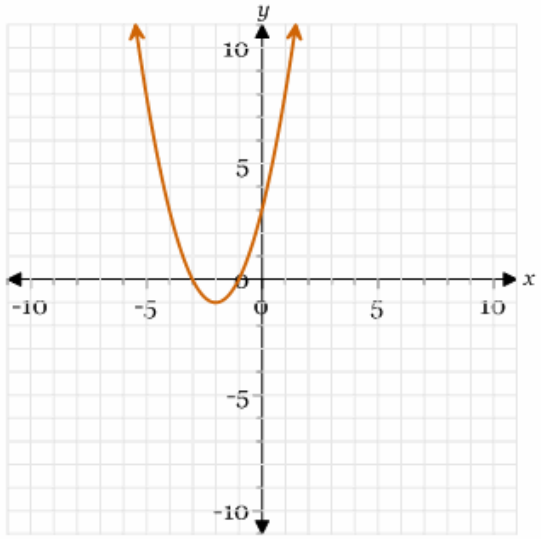



y
x


y
x


y
x

2.



Which equation could be solved using the graph above?

- $x^2+4x+3=0$
- $x^2-4x+3=0$
- $x^2-6x+9=0$
- $x^2-1=0$

3. What is the solution to $3x^2+3x+5=0$?

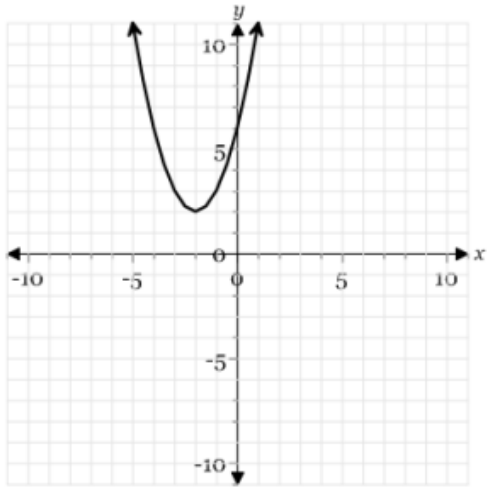
- $\frac{-3\pm i\sqrt{17}}{3}$
- $\frac{3\pm i\sqrt{51}}{6}$
- $\frac{-1\pm i\sqrt{17}}{2}$

- $\frac{-3 \pm i\sqrt{51}}{6}$

4. What are the zeroes of $y = x^2 + 2x - 8$?

- –4, 2
- 4, –2
- –4, –2
- 4, 2

5.



How many real solutions does the function shown on the graph have?

- no real solutions
- one real solution
- two real solutions
- cannot be determined

6. A football is kicked into the air from an initial height of 4 feet. The height, in feet, of the football above the ground is given by $s(t) = -16t^2 + 50t + 4$, where t is time, in seconds, and $t \geq 0$. At what time will the football be 25 feet above the ground?

- 3.625 seconds
- 3.20 seconds
- 0.5 seconds or 3.625 seconds
- 0.5 seconds or 2.625 seconds

7. The lengths of the sides of a rectangular window have the ratio 1.7 to 1. The area of the window is 2,720 square inches. What are the dimensions of the window?

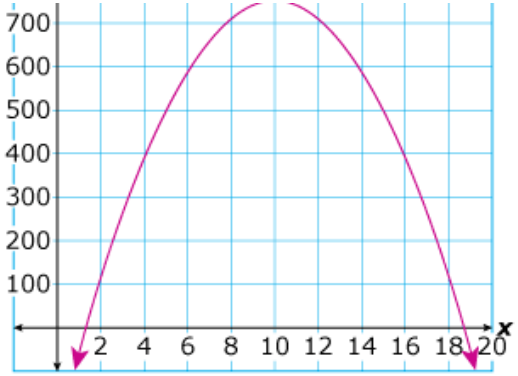
- 40 inches by 136 inches
- 40 inches by 65 inches
- 40 inches by 34 inches
- 40 inches by 68 inches

8. What is the solution to the following equation?

$x^2 + 14x + 48 = 0$

- $x = 6$ or $x = 8$
- $x = -6$ or $x = -8$
- $x = 4$ or $x = 12$
- $x = -4$ or $x = -12$

9. Max makes and sells posters. The function $p(x) = -10x^2 + 200x - 250$, graphed below, indicates how much profit he makes in a month if he sells the posters for $20 - x$ dollars each.

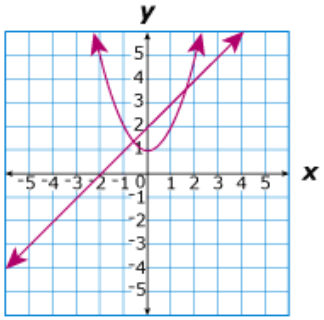


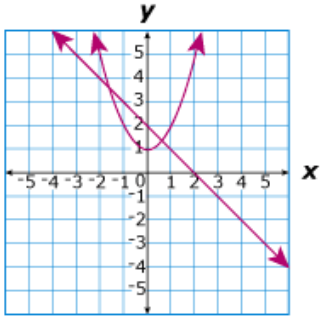
What should Max charge per poster to make the maximum profit, and what is the maximum profit he can make in a month?

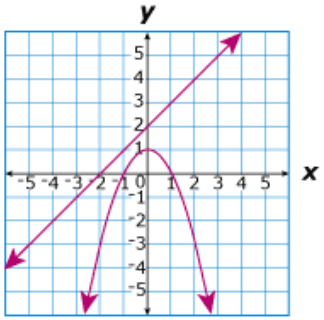
- ○ $800 at $10 per poster
- ○ $800 at $5 per poster
- ○ $750 at $10 per poster
- ○ $750 at $5 per poster

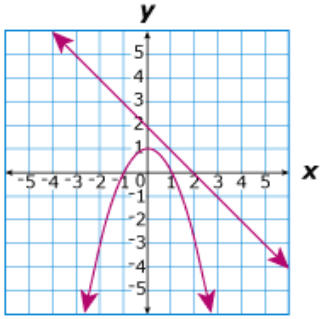
10. Use graphing to find the solutions to the system of equations.

$$\begin{cases} -x^2 + y = 1 \\ -x + y = 2 \end{cases}$$

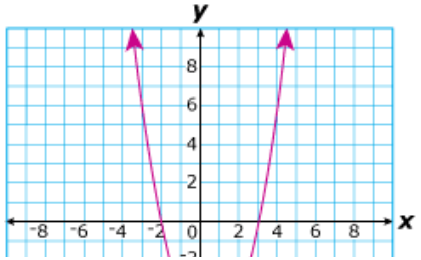

y
x
5
4
3
2
1
-5 -4 -3 -2 -1 0 1 2 3 4 5
-1
-2
-3
-4
-5

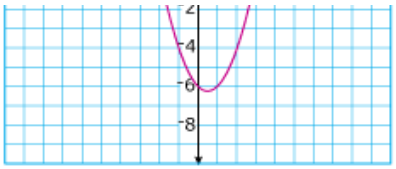

y
x
5
4
3
2
1
-5 -4 -3 -2 -1 0 1 2 3 4 5
-1
-2
-3
-4
-5


y
x
5
4
3
2
1
-5 -4 -3 -2 -1 0 1 2 3 4 5
-1
-2
-3
-4
-5


y
x
5
4
3
2
1
-5 -4 -3 -2 -1 0 1 2 3 4 5
-1
-2
-3
-4
-5

11.


y
x
8
6
4
2
-8 -6 -4 -2 0 2 4 6 8



Which of the following are the **most likely** factors of the function graphed above?

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

12. Suppose a parabola has an axis of symmetry at $x = -1$, a maximum height of 6, and passes through the point $(-2, 1)$. Write the equation of the parabola in vertex form.

- $y = -0.56(x-1)^2 + 6$
- $y = -5(x+1)^2 + 6$
- $y = -2.5(x-1)^2 + 6$
- $y = -2(x+6)^2 - 1$

True or False

13. Any number in the form of $a \pm bi$, where a and b are real numbers and $b \neq 0$ is considered a pure imaginary number.

- True
- False

14. The minimum value of a function is the smallest y-value of the function.

- True

○ False

15. $i^2 = \sqrt{-1}$

○ True
○ False

16. Complex numbers can be graphed on the real *xy* coordinate plane.

○ True
○ False

17. What is the vertex form of the equation? show work from 17-21
$y = -x^2 + 12x - 4$

18. What is the expression in factored form?
$2x^2 + 16x + 24$

19. Use the quadratic formula to solve the equation.
$x^2 - 7x - 6 = 0$

20. Simplify the expression.

$(-2i)(8i)$

21. A quadratic equation can be written in vertex form or in standard form. Sometimes one form is more beneficial than the other. Identify which form would be more helpful if you needed to do each task listed below and explain why.

a. Factor the equation.

b. Graph the parabola.

c. Identify the vertex, minimum, or maximum of the parabola.

d. Solve the equation using the quadratic formula.