

Chapter 9 Review

In problems 1-7, solve the given equation. Give exact answers.

1. $36x^2 - 5 = 0$

2. $2(x-6)^2 - 6 = 0$

3. $4x(x-2) - 3x(x+1) = -18$

4. $x^2 + 2x + 3 = 0$

5. $2x + 5 = x^2$

6. $x^2 - 4x + 8 = 0$

7. $6(x^2 + x) - 2x(9x + 3) = 10$

Complete the square by filling in the blanks.

8. $x^2 + 12x + \underline{\hspace{2cm}} = (x + \underline{\hspace{2cm}})^2$

9. $x^2 - 5x + \underline{\hspace{2cm}} = (x - \underline{\hspace{2cm}})^2$

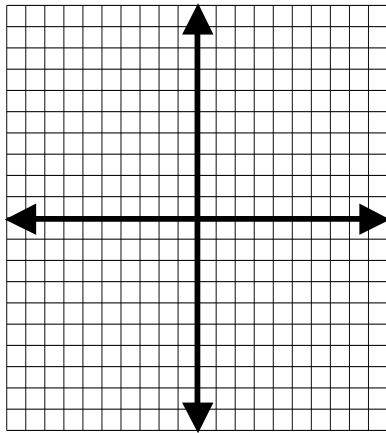
Solve by Completing the Square

10. $x^2 + 6x + 3 = 4$

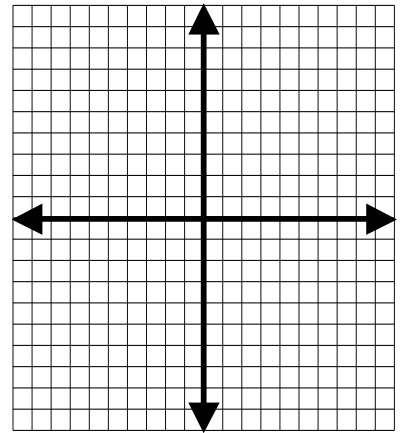
11. $2x^2 + 10x = 6$

In problems 12-14, sketch the function and give its axis of symmetry, vertex, domain, and range.

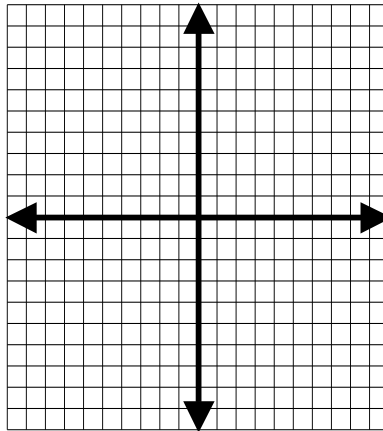
12. $f(x) = -3(x+2)^2 + 4$



13. $g(x) = 2x^2 + 4x - 6$



14. $y = -2x^2 + 8x + 1$



In problems 15-16, find the x-intercepts and y-intercept of the functions. Write your answers as ordered pairs, and give exact answers.

15. $g(x) = 2x^2 + 4x - 6$

16. $y = -2x^2 + 9x - 13$

The height (in feet) of a certain projectile at t seconds can be found using the equation $h(t) = 12 + 8t - 16t^2$.

17. Find the approximate time when the projectile hits the ground.

18. Find the time when the projectile reaches its maximum height (when it reaches its vertex).

19. The number of pounds of milk per day recommended for a calf that is x weeks old can be approximated by the function $p(x) = -0.2x^2 + 1.3x + 6.2$. When is a calf's milk consumption greatest and how much milk does it consume at that time?
20. A publisher is trying to minimize its average cost per book printed. This average cost in dollars is given by $f(x) = 0.015x^2 - 0.07x + 26$, where x represents the total number of books (in thousands) printed. What is the minimum cost per book, and how many books should they print to minimize the average cost?
21. Ginger is fencing in a rectangular garden, using the side of her house as one side of the rectangle. What is the maximum area that she can enclose with 40 yards of fencing? What should the dimensions of the garden be in order to yield this area?

Answers

1. $x = \pm \frac{\sqrt{5}}{6}$

2. $x = 6 \pm \sqrt{3}$

3. $x = 2, 9$

4. $x = -1 \pm \sqrt{2}i$

5. $1 \pm \sqrt{6}$

6. $2 \pm 2i$

7. $\pm \frac{\sqrt{30}}{6}i$

8. $x^2 + 12x + 36 = (x + 6)^2$

9. $x^2 - 5x + \frac{25}{4} = \left(x - \frac{5}{2}\right)^2$

10.

$$\begin{aligned}x^2 + 6x + 9 &= 4 + 9 \\(x + 3)^2 &= 10 \\x + 3 &= \pm \sqrt{10} \\x &= -3 \pm \sqrt{10}\end{aligned}$$

11.

$$\begin{aligned}x^2 + 5x + \frac{25}{4} &= 3 + \frac{25}{4} \\ \left(x + \frac{5}{2}\right)^2 &= \frac{37}{4} \\ x + \frac{5}{2} &= \pm \frac{\sqrt{37}}{2} \\ x &= \frac{-5 \pm \sqrt{37}}{2}\end{aligned}$$

12. vertex (-2,4), axis of symmetry $x = -2$, domain $(-\infty, \infty)$, range $(-\infty, 4]$ 13. vertex (-1,-8), axis of symmetry $x = -1$, domain $(-\infty, \infty)$, range $[-8, \infty)$ 14. axis of symmetry: $x = 2$. vertex: (2,9), domain: $(-\infty, \infty)$, range: $(-\infty, 9]$

15. x-intercepts (-3,0), (1,0), y-intercept (0,-6)

16. no x-intercepts, y-intercept (0,-13)

17. Time = $\frac{1 + \sqrt{13}}{4} \approx 1.15$ seconds to reach the ground18. $t = -\frac{b}{2a} = -\frac{8}{2(-16)} = \frac{-8}{-32} = \frac{1}{4}$ second to reach it's max height

19. 0.957 seconds

20. At 3.25 weeks old, the calf needs 8.3125 pounds of milk.

21. When they print 2.333 thousand books (or 2,333 books), the average cost per book is \$25.92.

22. The width should be 10 yards, the length should be 20 yards, and the maximum area is 200 square yards.