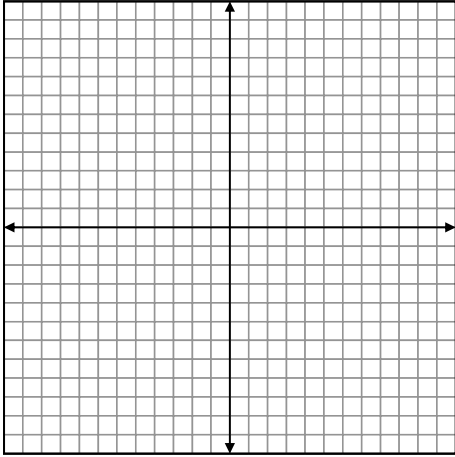


PRECALCULUS REVIEW

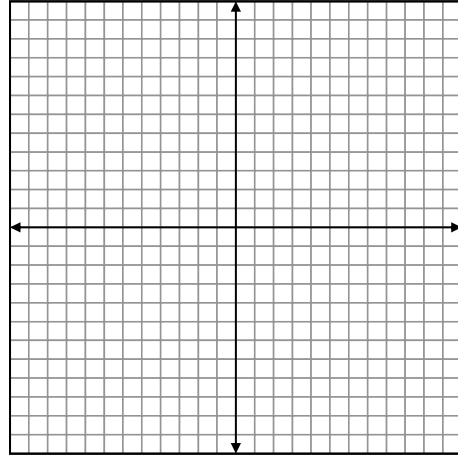
PART 1: LINEAR & QUADRATIC FUNCTIONS

Graph the following. If the function is quadratic, make sure to state the coordinates of the vertex.

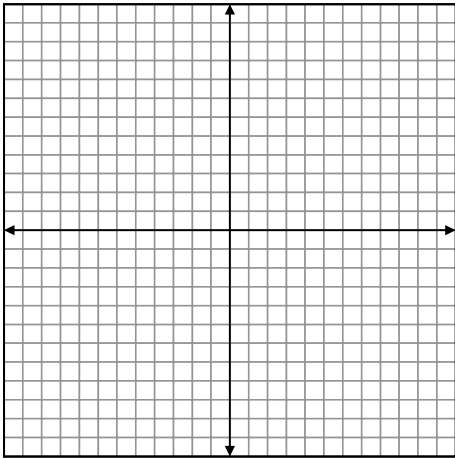
1. $y = \frac{2}{3}x + 5$



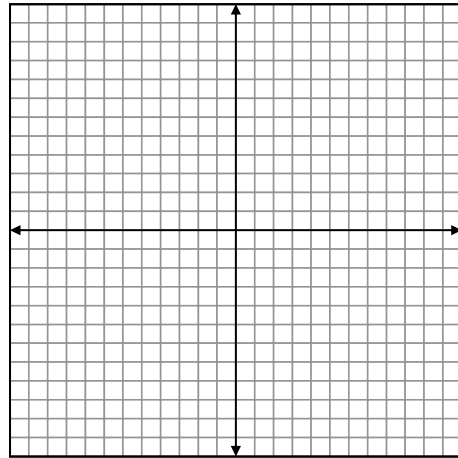
2. $y = -4x - 7$



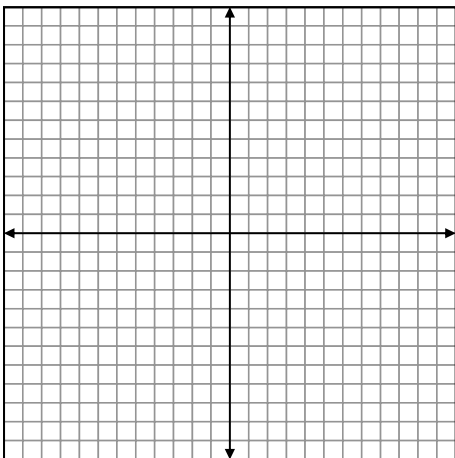
3. $y + 3 = 2(x + 1)$



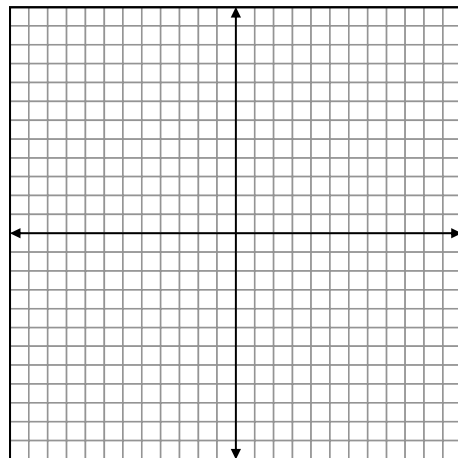
4. $y - 7 = -\frac{3}{4}(x + 5)$



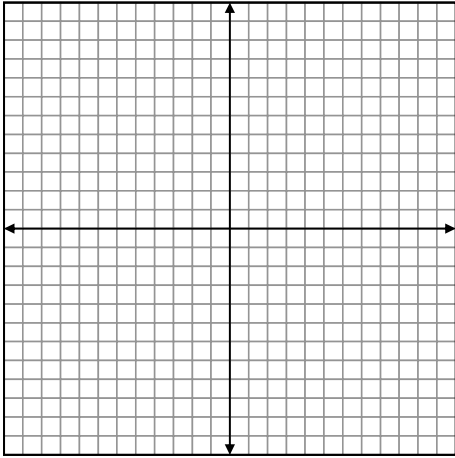
5. $5x + 4y = 12$



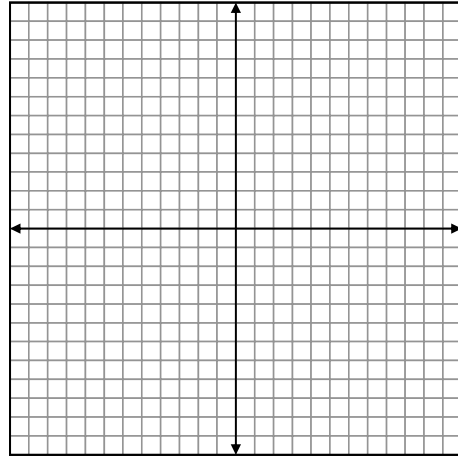
6. $6x - 5y = -20$



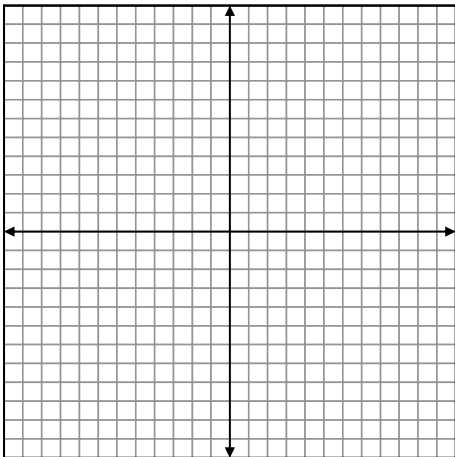
7. $y = -\frac{1}{2}(x-4)^2 - 3$



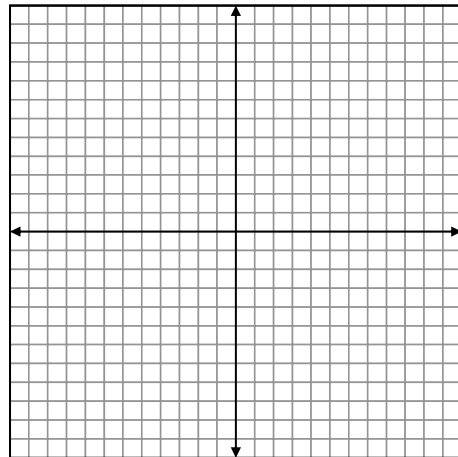
8. $y = (4x-16)^2$



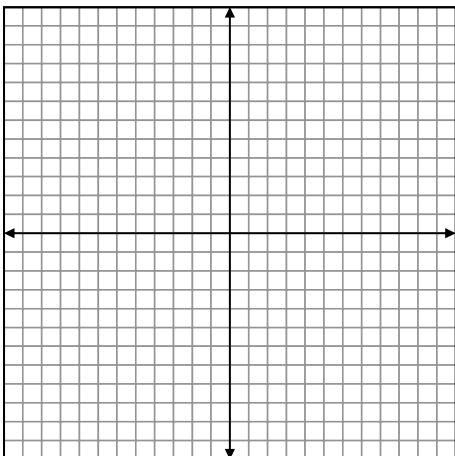
9. $y = 2x^2 - 8x + 5$



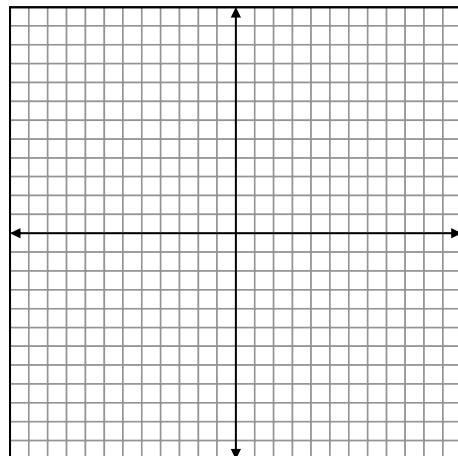
10. $y = 5x^2 + 20x - 8$



11. $y = -3x^2 + 9x + 1$



12. $y = -\frac{2}{3}(x+1)(x-5)$



Write the equation of the line described in POINT-SLOPE FORM.

13. Slope = $\frac{3}{4}$ and passes through $(-7, 1)$

14. Slope = -5 and passes through $(6, -4)$

15. Passes through $(-2, 1)$ and $(1, 4)$

16. Passes through $(5, -3)$ and $(-3, -7)$

17. Passes through $(5, 11)$ and is parallel to the line $3x + 4y = 10$.

18. Passes through $(-2, -3)$ and is perpendicular to the line $y + 4 = \frac{3}{2}(x - 1)$.

Write the equation of the line described in SLOPE-INTERCEPT FORM.

19. Slope = $-\frac{1}{3}$ and a y-intercept of -2 .

20. Slope = 4 and passes through $(1, 6)$

21. Passes through $(-3, 3)$ and $(6, -7)$

22. Passes through $(-5, 5)$ and $(1, 7)$

23. Passes through $(0, 6)$ and is perpendicular to the line $y = -\frac{4}{3}x - 7$.

24. Passes through $(4, -2)$ and is perpendicular to the line $2x - 5y = 15$.

Multiply the following to write the expression in the form $ax^2 + bx + c$.

25. $(x - 4)(x + 7)$

26. $(x + 8)(4x - 3)$

27. $(2x + 5)(2x - 5)$

28. $(5x - 4)(7x - 6)$

29. $(3x - 2)^2$

30. $(2x + 7)^2$

Factor the following quadratic functions completely, if possible.

31. $x^2 + 5x - 6$

32. $x^2 - 10x + 24$

33. $t^2 - 4t + 16$

34. $a^2 - 8a - 20$

35. $x^2 + 2x + 9$

36. $b^2 + 15b + 56$

37. $10x^2 + 7x - 20$

38. $24x^2 - 62x + 35$

39. $16x^2 - 100$

40. $4t^2 - 3t + 12$

Find all REAL solutions to the following equations.

41. $3x + 2 = 7$

42. $5x - 4 = 6$

43. $5(x - 7) = 125$

44. $5(x - 7)^2 = 125$

45. $x^2 + 9 = 17$

46. $4a^2 - 17 = 19$

47. $t^2 - 8t + 5 = -7$

48. $4b^2 + 6b - 11 = -7$

49. $25y^2 = 20y + 1$

50. $5x(x - 3) = 20$

Find the solution(s) to the following.

51. A radiator contains 8 quarts of fluid, 30% of which is antifreeze. How much fluid should be drained and then replaced in order to have a 50% mixture in the radiator?

52. You wish to build a rectangular enclosure against a wall of your house. (The wall is 50 ft in length, but that isn't important for this problem.) You have materials to build 30 ft of fence. What should the dimensions of the enclosure be in order to maximize its area?

53. The Road Runner runs past a billboard, behind which Wylie Coyote is waiting in his Acme Rocket Sled. Wylie Coyote, as usual, has difficulty starting the rocket sled and is not able to take off until an hour later. He travels at a speed that is 20 mph faster than the Road Runner is running. Three hours later, Wylie Coyote catches up to the Road Runner.



- (A) How fast is Wylie Coyote traveling?
(B) How far had the two traveled when Wylie Coyote caught up to the Road Runner?
54. A square region is changed into a rectangular one by making it 2 feet longer and twice as wide. If the area of the rectangular region has an area that is 3 times the area of the original square region, what was the length of a side of the square region before it was changed?
55. The radius of a circle is 10 inches. By how much should the radius be increased in order to increase its area by 5π square inches?

FACTS TO REMEMBER

Slope Intercept Form: $y = mx + b$

Point-Slope Form: $y - y_1 = m(x - x_1)$ [The line passes through the point (x_1, y_1)]

QUADRATIC FORMULA

Given a quadratic equation $ax^2 + bx + c = 0$, then the solution to the equation is obtained

by: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Given a quadratic function: $f(x) = ax^2 + bx + c$

- (1) The graph of the function is a parabola.
- (2) If $a > 0$, then the function opens upward and has a minimum.
- (3) If $a < 0$, then the function opens downward and has a maximum.
- (4) The x -coordinate of the vertex (and the equation of the axis of symmetry) is

given by: $x = -\frac{b}{2a}$.

Rate · Time = Distance