# Math 2 NCFE Practice: Quadratics and Solving Equations
(Units 2 and 3)

_____ 1. Simplify: $8\sqrt{20}$

     A. $16\sqrt{5}$ B. $32\sqrt{5}$ C. 160   D. $20\sqrt{8}$

_____ 2. In a direct relation, if y increases, what happens to x?

     A. Increases   B. Decreases

     C. Remains constant   D. Not enough information to determine

_____ 3. Simplify $(2x - 3)^2$.

     A. $2x^2 - 9$ B. $4x^2 + 9$

     C. $2x^2 - 6x - 9$ D. $4x^2 - 12x + 9$

_____ 4. The equation $2x^2 - 5x = -12$ is rewritten in the form of $2(x - p)^2 + q = 0$. What is the value of q?

     A. $\frac{167}{16}$ B. $\frac{71}{8}$ C. $\frac{25}{8}$ D. $\frac{25}{16}$

_____ 5. Write $2x^3 + 0x^2 - 72x$ in factored form.

     A. $2x(x + 6)(x - 6)$ C. $2x(x - 6)(x - 6)$

     B. $6x(x - 6)(x + 2)$ D. $-6x(x + 2)(x + 6)$

_____ 6. Carter is solving this equation by factoring: $10x^2 - 25x + 15 = 0$. Which expressions could be one of his correct factors?

     A. $x + 3$ C. $2x + 3$

     B. $x - 3$ D. $2x - 3$

_____ 7. Which graph displays the function $f(x) = (2x + 3)(x - 2)$?
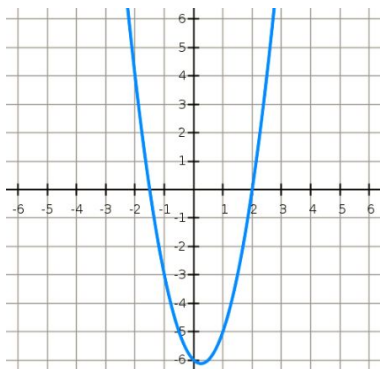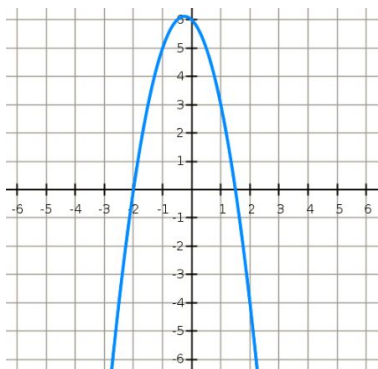
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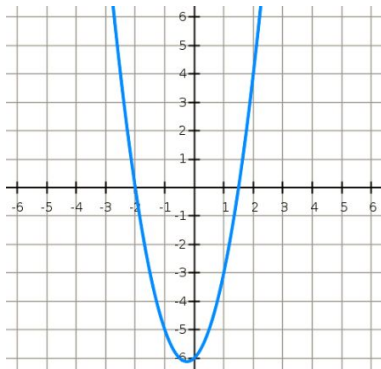
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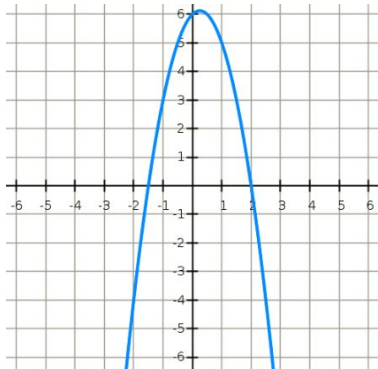
B.

D.

_____ 8. Which equation has exactly one real solution?

        A. $4x^2 - 12x - 9 = 0$

        B. $4x^2 + 12x + 9 = 0$

        C. $4x^2 - 6x - 9 = 0$

        D. $4x^2 + 6x + 9 = 0$

_____ 9. What are the solutions to the equation, $4x^2 = 36$?

    A. x = 6, -6   B. x = 2, -2   C. x = 9, -9   D. x = 3, -3

_____ 10. Given the quadratic function, $f(x) = 2x^2 + 3x - 2$, what are the zeros?

    A. $-\frac{1}{2}, 2$ C. $\frac{1}{2}, 2$

    B. $\frac{1}{2}, -2$ D. $-\frac{1}{2}, -2$

_____ 11. The solution to the quadratic equation $2x^2 + 5x - 1 = 0$ is:

    A. $\dfrac{5\pm\sqrt{17}}{4}$ C. $\dfrac{-5\pm\sqrt{17}}{4}$

    B. $\dfrac{5\pm\sqrt{33}}{4}$ D. $\dfrac{-5\pm\sqrt{33}}{4}$

_____ 12. What are the solutions to the quadratic equation, $y = x^2 + 3x + 3$?

    A. $x = \frac{3\pm\sqrt{3}}{2}$ B. $x = \frac{-3\pm i\sqrt{3}}{2}$

    C. $x = \frac{-3i\pm\sqrt{3}}{2}$ D. $x = \frac{3\pm i\sqrt{3}}{2}$

_____ 13. The number of bacteria in a culture can be modeled by the function $N(t) = 28x^2 - 30x + 160$, where t is the temperature, in degrees Celsius, at which the culture is being kept. A scientist wants to have fewer than 200 bacteria in a culture in order to test a medicine effectively. What is the **approximate** domain of temperatures that will keep the number of bacteria under 200?

        A. $-1.01°C < t < 2.03°C$

        B. $-0.90°C < t < 1.97°C$

        C. $-0.86°C < t < 1.93°C$

        D. $-0.77°C < t < 1.85°C$

_____ 14. The graph of $f(x) = x^2$ will be translated 5 units up and 2 units to the right. Which function describes the graph produced by the translation?

        A. $g(x) = x^2 - 4x + 9$ C. $g(x) = x^2 - 10x + 27$

        B. $g(x) = x^2 + 4x - 1$ D. $g(x) = x^2 + 10x + 23$

15. The time required to empty a tank varies inversely as the rate (in gallons per minute). If a pump can empty a tank in 3 hours at a rate of 420 gal/min, how long will it take to empty a tank at 500 gal/min?

        A. 3.6 hours   B. 4.2 hours   C. 2.52 hours   D. 2.1 hours

16. Solve the equation: $2\sqrt{x+5} - 3 = 9$

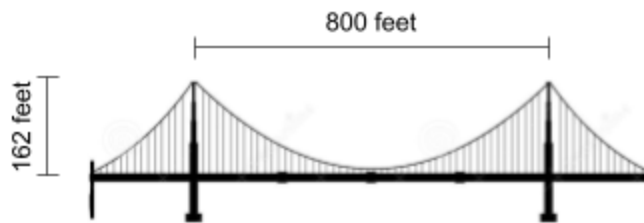   A. $x = 4$ B. $x = 31$ C. $x = 67$ D. $x = 139$

17. Solve the equation $\frac{x}{2} = \frac{x-3}{5}$

        A. $x = -1$ B. $x = 1$ C. $x = -2$ D. $x = 2$

18. Solve the equation $\sqrt{-5x+6} = x$

        A. $x = 1$ B. $x = -2$ C. $x = 1 \; and \; 6$ D. $x = -2 \; and \; -3$

19. The towers of a suspension bridge are 800 feet apart and rise 162 feet higher than the road. Suppose that the cable between the towers has the shape of a parabola and is 2 feet higher than the road at the point halfway between the towers.

What is the *approximate* height of the cable 120 feet from either tower?

        A. 80 feet   B. 74 feet   C. 22 feet   D. 16 feet

20. The amount of time it takes to build a road varies inversely with the number of workers building the road. Suppose it takes 50 workers 8 months to build the road.

- What is the constant of variation?
- Write an equation that could be used to determine how long it would take n workers to build the road. (Be sure to define the variables.)
- How much faster would 60 workers build the road than 50 workers?