Student Name: _____   **Class: _____**

Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)

Chapter 2 – Quadratic Functions and Relations

*Instructions: Read all questions carefully. Answer all questions.*

Section A (Multiple Choice)

1) Tell whether the function $y + 2x^2 = -2$ is quadratic. Explain.

   A. This is not a quadratic function because the *x*-term is missing.
   B. This is a quadratic function because it can be written in standard form as $y = -2x^2 - 2$.
   C. This is not a quadratic function because it is not written in standard form.
   D. This is a quadratic function because it has an x^2 term.

2) Tell whether the graph of the quadratic function $y = -x^2 - 10x + 1$ opens upward or downward. Explain.

   A. Because $a > 0$, the parabola opens downward.
   B. Because $a < 0$, the parabola opens downward.
   C. Because $a < 0$, the parabola opens upward.
   D. Because $a > 0$, the parabola opens upward.

3) Identify the vertex of the parabola. Then give the minimum or maximum value of the function.
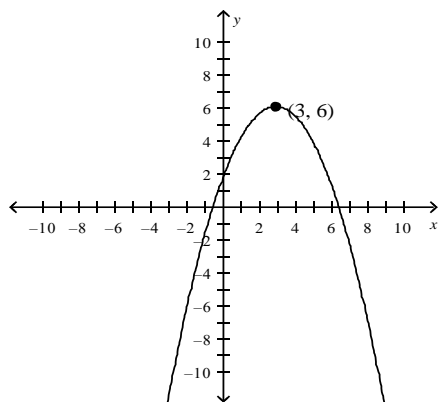
   A. The vertex is $(3, 6)$, and the minimum is 6.
   B. The vertex is $(3, 6)$, and the maximum is 6.
   C. The vertex is $(3, 6)$, and the maximum is 3.
   D. The vertex is $(3, 6)$, and the minimum is 3.

4) Find the domain and range.
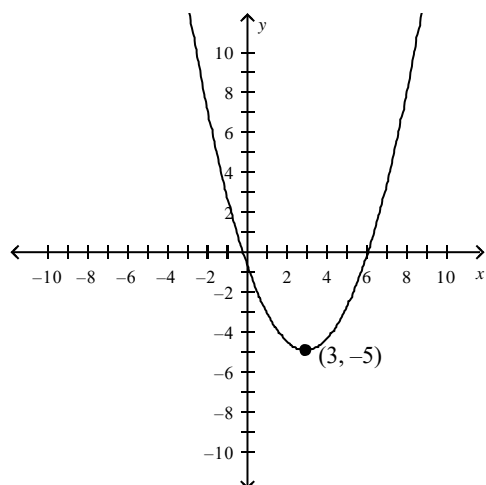
  A. D: all real numbers   **C.** D: all real numbers
      R: $y \geq 3$ R: $y \geq -5$
  B. D: $-10 \leq x \leq 10$ **D.** D: $x \geq -5$
      R: $y \geq -5$ R: all real numbers

5) A rectangular picture measuring 5 in. by 9 in. is surrounded by a frame with uniform width x. Write a quadratic function in standard form to show the combined area of the picture and frame.
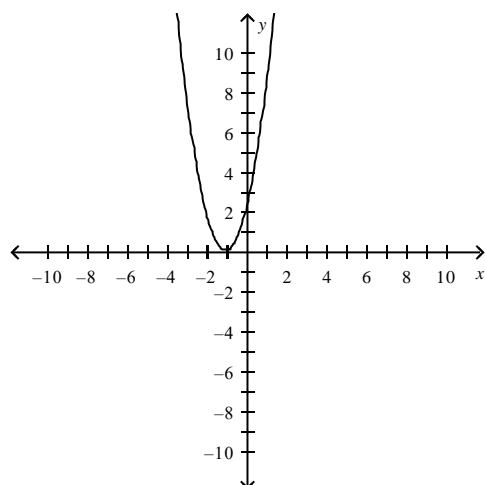
  A. $f(x) = x^2 + 14x + 45$ **C.** $f(x) = 8x + 28$
  B. $f(x) = 4x + 28$ **D.** $f(x) = 4x^2 + 28x + 45$

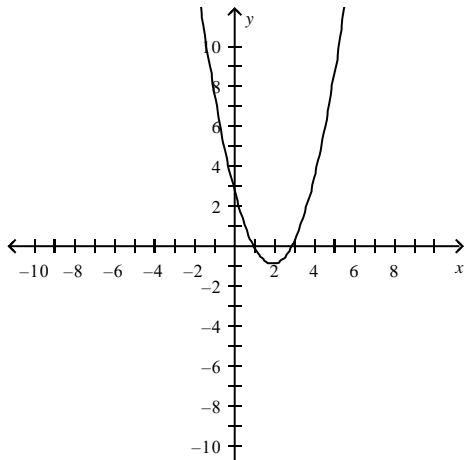**6)** Find the axis of symmetry of the parabola.

  A. $y = -1$ **C.** $y = 0$
  B. $x = -1$ **D.** $x = 0$

7) Graph $y = -x^2 - 4x - 3$.

A.

C.
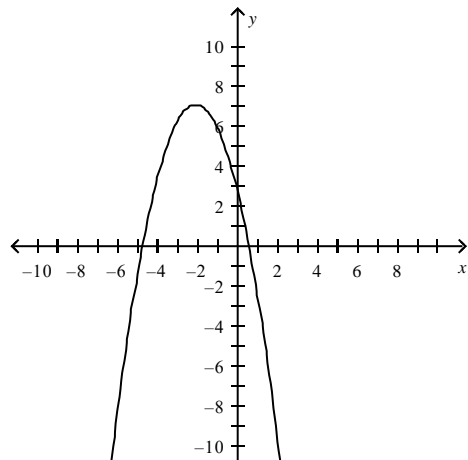
B.
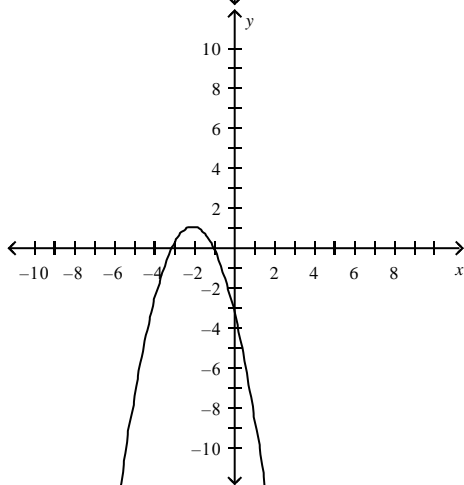
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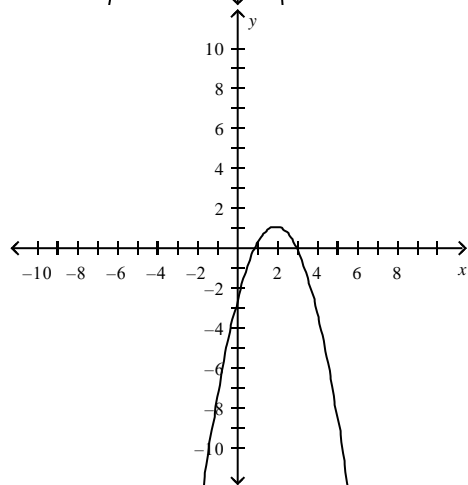
8) Solve the quadratic equation $12z^2 + 24z + 12 = 0$ by factoring.

A. $-\frac{1}{3}$

C. -1

B. 1

D. $\frac{1}{2}$

9) Solve $x^2 = -4$ by using square roots.

A. The solutions are 2 and –2.

C. There is no solution.

B. The solution is 2.

D. The solution is –2.

10) Complete the square for $x^2 - 14x + \ ?$ to form a perfect square trinomial.

A. $x^2 - 14x - 196$ **C.** $x^2 - 14x + 196$

B. $x^2 - 14x + 49$ **D.** $x^2 - 14x - 49$

11) Solve $8x = x^2 - 9$ by using the Quadratic Formula.

A. $x = 9$ or $x = -1$ **C.** $x = 54$ or $x = -46$

B. $x = 1$ or $x = -9$ **D.** $x = 18$ or $x = -2$

12) Find the number of solutions of the equation $6x^2 + 4x + 4 = 0$ by using the discriminant.

A. There is one solution.

B. Cannot determine the number of solutions. The discriminant can only be used for a quadratic equation, and $6x^2 + 4x + 4 = 0$ is not a quadratic equation.

C. There are no real solutions.

D. There are two solutions.

13) Find the minimum or maximum value of $f(x) = x^2 - 2x - 6$. Then state the domain and range of the function.
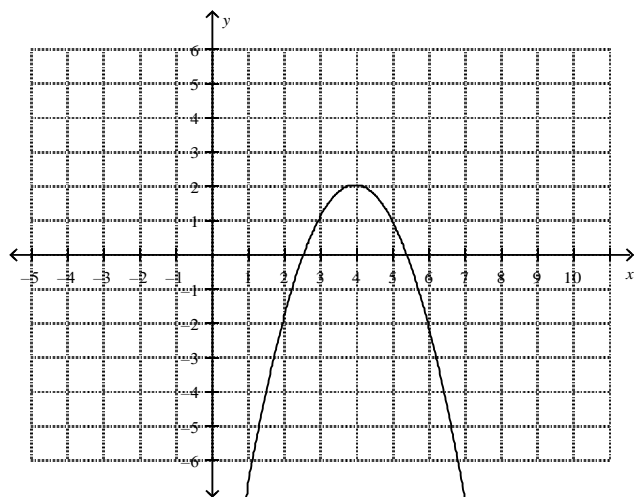
A. The maximum value is 1. D: {all real numbers}; R: $\{y \,/\, y \geq -7\}$

B. The minimum value is –7. D: $\{x \,/\, x \geq -7\ \}$; R: {all real numbers}

C. The maximum value is 1. D: $\{x \,/\, x \geq -7\ \}$; R: {all real numbers}

D. The minimum value is –7. D: {all real numbers}; R: $\{y \,/\, y \geq -7\}$

14) What quadratic function does the graph represent?

A. $f(x) = x^2 + 8x - 14$ **C.** $f(x) = -x^2 + 8x + 14$

B. $f(x) = -x^2 + 8x - 14$ **D.** $f(x) = -x^2 - 8x - 14$

15) Find the roots of the equation $30x - 45 = 5x^2$ by factoring.
   A. $x = 9$
   B. $x = -9$
   C. $x = 3$
   D. $x = -3$

16) Solve the equation $x^2 - 10x + 25 = 54$.
   A. $x = 5 \pm 3\sqrt{6}$
   B. $x = 5 + 3\sqrt{6}$
   C. $x = 5 - 3\sqrt{6}$
   D. $x = 5 \pm 6\sqrt{3}$

17) Write the function $f(x) = -5x^2 - 60x - 181$ in vertex form and identify its vertex.
   A. $f(x) = (x + 12)^2 - 181$;
      vertex: $(-12, -181)$
   B. $f(x) = -5(x + 6)^2 - 1$;
      vertex: $(-6, -1)$
   C. $f(x) = (x + 6)^2 - 1$;
      vertex: $(-6, -1)$
   D. $f(x) = -5(x + 12)^2 - 181$;
      vertex: $(-12, -181)$

18) Express $8\sqrt{-84}$ in terms of i.
   A. $-16i\sqrt{21}$
   B. $\sqrt{-5376}$
   C. $-16\sqrt{21}$
   D. $16i\sqrt{21}$

19) Solve the equation $2x^2 + 18 = 0$.
   A. $x = 3 \pm i$
   B. $x = \pm 3$
   C. $x = \pm 3i$
   D. $x = \pm 3 + i$

20) Find the values of x and y that make the equation $-9x + 8i = -54 + (16y)i$ true.
   A. $x = 6, y = 2$
   B. $x = \frac{1}{6}, y = 2$
   C. $x = \frac{1}{6}, y = \frac{1}{2}$
   D. $x = 6, y = \frac{1}{2}$
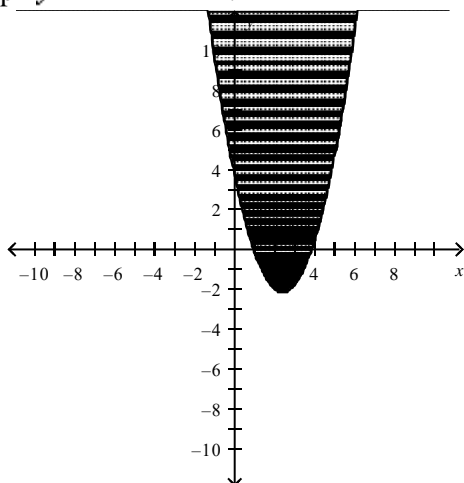
21) Find the complex conjugate of $3i + 4$.

    A. $-4 - 3i$ **C.** $4 + 3i$

    B. $-4 + 3i$ **D.** $4 - 3i$

22) Find the number and type of solutions for $x^2 - 9x = -8$.
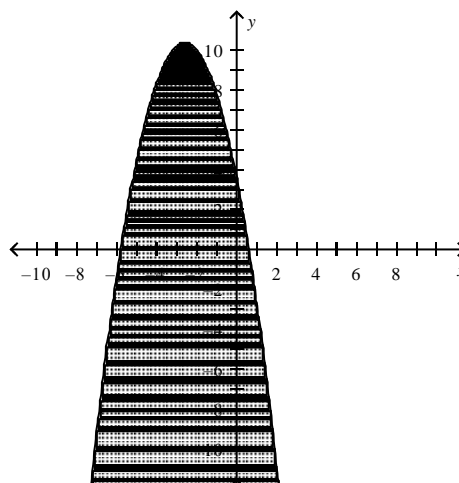
    A. Cannot determine without graphing.

    B. The equation has one real solution.

    C. The equation has two nonreal complex solutions.

    D. The equation has two real solutions.
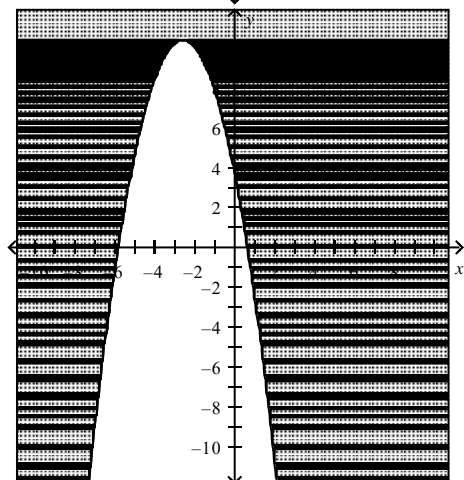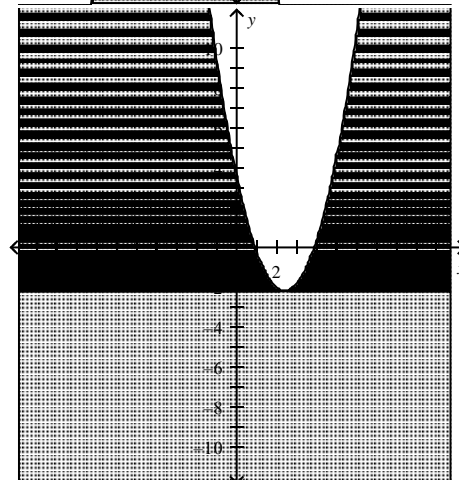
23) Graph $y \leq -x^2 - 5x + 4$.

    A.

    C.

    B.

    D.

24) Solve the inequality $x^2 + x - 6 \geq -4$ by using a table and a graph.
- **A.** $x \leq -2$ or $x \geq 1$
- **B.** $-2 \leq x \leq 1$
- **C.** $-3 \leq x \leq 2$
- **D.** $x \leq -3$ or $x \geq 2$

25) Solve the inequality $x^2 - 14x + 45 \leq -3$ by using algebra.
- **A.** $x \leq 5$ or $x \geq 9$
- **B.** $x \leq 6$ or $x \geq 8$
- **C.** $6 \leq x \leq 8$
- **D.** $5 \leq x \leq 9$

26) Solve the inequality $-8x^2 - 14x + 4 > -11$.
- **A.** $-2 < x < 0.25$
- **B.** $-2.5 > x > 0.75$
- **C.** $-2 > x > 0.25$
- **D.** $-2.5 < x < 0.75$

27) Multiply $6i(4 - 6i)$. Write the result in the form $a + bi$.
- **A.** $-36 + 24i$
- **B.** $-36 - 24i$
- **C.** $36 - 24i$
- **D.** $36 + 24i$

28) Simplify $-8i^{20}$.
- **A.** $8i$
- **B.** $-8i$
- **C.** 8
- **D.** -8

29) Simplify $\dfrac{-2 + 2i}{5 + 3i}$.
- **A.** $-\frac{2}{17} + \frac{8}{17}i$
- **B.** $-\frac{2}{5} + \frac{2}{3}i$
- **C.** $-\frac{2}{17} - \frac{8}{17}i$
- **D.** $-\frac{2}{5} - \frac{2}{3}i$

30) What expression is equivalent to $(3 - 2i)^2$?
- **A.** $13 - 12i$
- **B.** 13
- **C.** $5 - 12i$
- **D.** $9 + 4i$

Section B (Open Response – must show steps)

Chapter 2.1

1) Graph each function by making a table of values.

   a) $f(x) = -3x^2 + 6x - 3$ **b)** $g(x) = 2x^2 - 6x + 1$

2) Consider $h(x) = -3x^2 - 12x + 7$.

   a) Find the y-intercept, the equation of the axis of symmetry, and the x-coordinates of the vertex.

   b) Make a table of values that includes the vertex.

   c) Use this information to graph the function.

3) Consider $h(x) = 3x^2 - 24x + 9$.

    a) Determine whether the function has a maximum or minimum value.

    b) State the maximum or minimum value of the function.

    c) State the domain and range of the function.

4) A store rents 1400 videos per week at AED 2.25 per video. The owner estimates that they will rent 100 fewer videos for each 0.25 increase in price. What price will maximize the income of the s?

Chapter 2.2

5) Solve $x^2 - 8x + 6 = 0$ by graphing. If the exact root cannot be found, state the consecutive integers between which the roots are located.

6) How much it would it take to reach the ground if the height is modeled by the equation $h(t) = -16t^2 + 48t + 400$

7) Write a quadratic equation in standard form with $\frac{4}{5}$ and -5 as its roots.

Chapter 2.3

8) Solve each equation.

    a) $x^2 + 9x + 20 = 0$ **b)** $6y^2 - 23y + 20 = 0$

9) The height of a javelin in meters is modeled by $h(t) = -16t^2 + 96t + 10,$
where t is the time in seconds after the javelin is thrown. How long is it in the ai

10) Simplify.

a) $\sqrt{-121}$

b) $3\sqrt{-12}.\sqrt{-24}$

c) $(4i)(-7i)$

d) i^{48}

e) i^{65}

f) $(6 - 8i) + ((-2 - 3i)$

g) $(7 - 9i) - (-2 + 3i)$

h) $(5 - 8i)(2 - 3i)$

j) $\dfrac{(6-8i)}{(-2-3i)}$

11) Solve each equation.

    a) $4x^2 + 48 = 0$ **b)** $6y^2 + 6 = 0$

12) Find the values of a and b that make each equation true.

a) $3a + (4b + 2)i = 9 - 6i$ **b)** $3b - 5 + (-a - 3)i = 7 - 8i$

13) In an AC circuit, the voltage V, current C, and impedance I are related by the formula $V = I.C$. Find the voltage in a circuit with current $2 + 4i$ amps and impedance $9 - 3i$ ohms.

14) Solve each equation by using the Square Root Property.

$a)$ $x^2 - 12x + 36 = 25$ **b)** $x^2 - 16x + 64 = 49$

15) Solve each equation by completing the square.

$a)$ $x^2 - 10x + 24 = 0$ **b)** $2x^2 - 7x + 5 = 0$

16) Solve each equation by using the Quadratic Formula.

    a) $x^2 + 6x = 16$ **b)** $2x^2 + 25x + 33 = 0$

17) Solve each equation by using the Quadratic Formula.

    a) $3x^2 + 5x + 4 = 0$ **b)** $x^2 - 4x = -13$

18) Find the .value of the discriminant for each quadratic equation. Then describe the number and type of roots for the equation

    a) $-5x^2 + 8x - 1 = 0$ **b)** $-7 x^2 + 15x - 4 = 0$

Chapter 2.7

19) Write each function in vertex form.

a) $y = x^2 + 4x + 6$ **b)** $y = 2x^2 - 12x + 17$

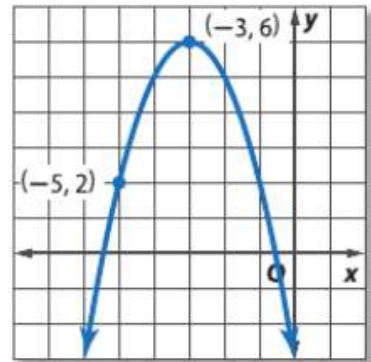**20)** Graph $y = 4x^2 - 16x - 40$.

21)

MULTIPLE CHOICE Which function is shown in the graph?

A $y = -(x + 3)^2 + 6$

B $y = -(x - 3)^2 - 6$

C $y = -2(x + 3)^2 + 6$

D $y = -2(x - 3)^2 - 6$

22) Graph $y > x^2 + 2x + 4.$

23) Graph $y < -4x^2 + 3x + 5.$

24) Solve each inequality by graphing.

    a) $x^2 - 6x + 2 > 0$ **b)** $-4x^2 + 5x + 7 \geq 0$

25) The height of a model rocket in meters t seconds after its launch can be represented by the function $h(t) = -16t^2 + 82t + 0.25.$ During what interval is the rocket at least 100 meters above the ground?