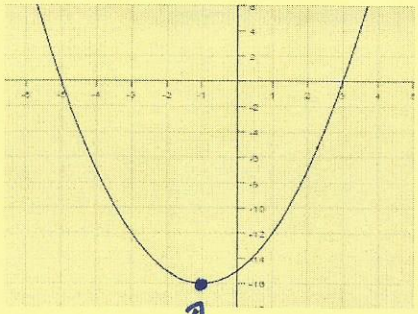
For questions 3-5, use the three different functions given in different forms below:

**A)**



-16 minimum y-value

**B)**

$f(x) = x^2 - 10x + 25$

$a=1$, $b=-10$, $c=25$

$25 = -5 \cdot -5$, $-10 = -5 + -5$

$(x-5)(x-5)$

**C)**

| x | y |
|---|---|
| -2 | 0 |
| -1 | -2 |
| 0 | -2 |
| 1 | 0 |
| 2 | 4 |
| 3 | 10 |
| 4 | 18 |

Minimum y value

3. Which function, A or C, has the least (smallest) minimum value? Explain your reasoning and show your work.

A has the smallest minimum. A minimum is $k = -16$. Look at the vertex. C Minimum is $-2$ (smallest y value in the table)

4. Which function, A or B, has the largest zero? Explain your reasoning and show your work.

Zeros are X-intercepts.
A: X-intercepts $-5$ and $3$
B: X-intercepts are $5$
} B has the largest zero.

5. Which function, A, B, or C, has the largest y-intercept? Explain your reasoning and show your work.

A: y intercept $(0, -15)$ where the graph crosses the y-axis
B y intercept $(0, 25)$ $(0, c)$ from standard form
C y intercept $(0, -2)$ point where $x = 0$.
} B has the largest y intercept

6. Solve using a method of your choice: factoring, completing the square, quadratic formula, taking square roots, graphing.

a) $(x + 4)^2 = -50$

$\sqrt{(x+4)^2} = \sqrt{50\, i^2}$

$x + 4 = \pm i\sqrt{50}$

$x = -4 \pm i\sqrt{50}$

b) $5x^2 - 15x = -20$

$\frac{5x^2 - 15x + 20}{5} = \frac{0}{5}$

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

Non factorable

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

$x = \frac{3 \pm \sqrt{9 - 4(1)(4)}}{2}$

$x = \frac{3 \pm \sqrt{-7}}{2}$

c) $x^2 - 3x - 8 = 0$ $x = -4 \pm 5\sqrt{2}\, i$

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

$x = \frac{3 \pm \sqrt{9 - 4(1)(-8)}}{2}$

$x = \frac{3 \pm \sqrt{41}}{2}$

d) $2x^2 = 4x - 1$

$2x^2 - 4x + 1 = 0$

$a=2$, $b=-4$, $c=1$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{4 \pm \sqrt{16 - 4(2)(1)}}{2(2)}$

$\div 2$

$x = \frac{4 \pm \sqrt{8}}{4} = \frac{4 \pm 2\sqrt{2}}{4 \div 2} = \frac{2 \pm \sqrt{2}}{2}$

Quadratic formula

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

7) Simplify the following complex expressions. Leave your answer in $a + bi$ form. **Show your work.**

a. $(-3 + 8i)(-2 - 7i)$

$6 + 21i - 16i - 56i^2$

$= 6 + 5i + 56 = 62 + 5i$

b. $(7 - 3i) - (8 + 3i)$

$= 7 - 3i - 8 - 3i$

$= -1 - 6i$

c. $(-2 - 4i)(-8 - 2i)$

$= 16 + 4i + 32i + 8i^2$

$= 16 + 36i - 8$

$= 8 + 36i$

d. $(4 - 2i) + (7 - 5i)$

$= 4 - 2i + 7 - 5i$

$= 11 - 7i$