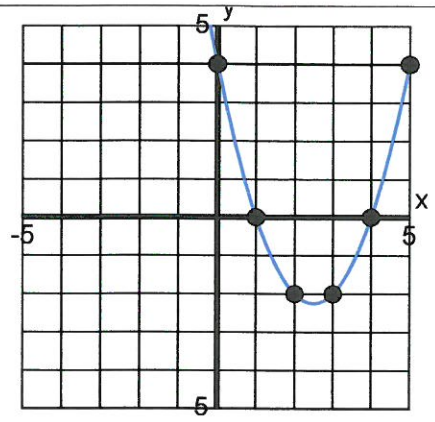
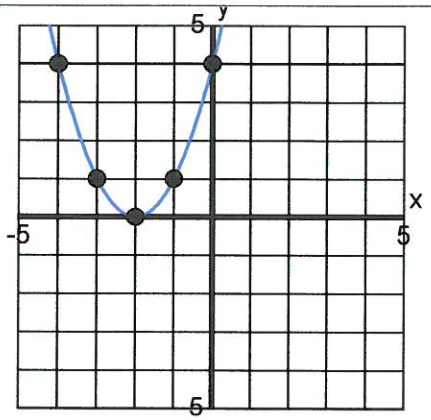
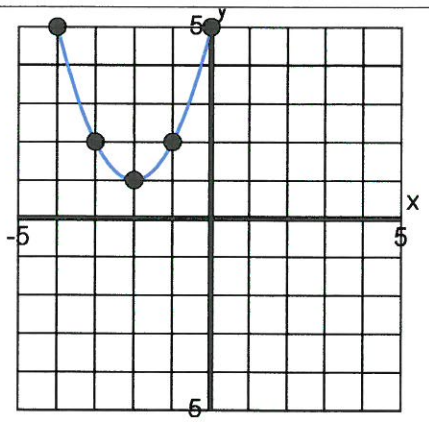
Name Solutions Sample Quiz Discriminant and Imaginary Numbers 1-14-16



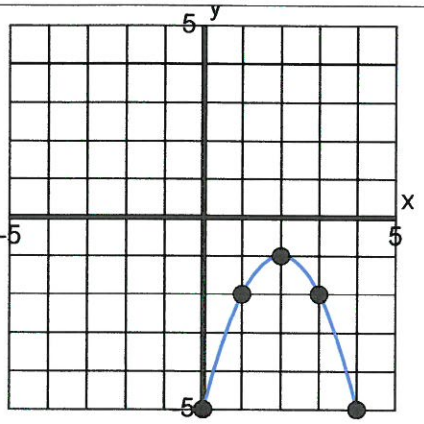
1. Circle the best discriminant for this graph
   a. D = 0
   (b.) D > 0 crosses twice
   c. D < 0



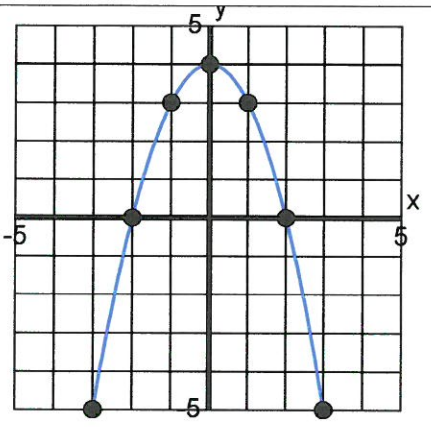
2. Circle the best discriminant for this graph
   (a.) D = 0 bounces off
   b. D > 0
   c. D < 0



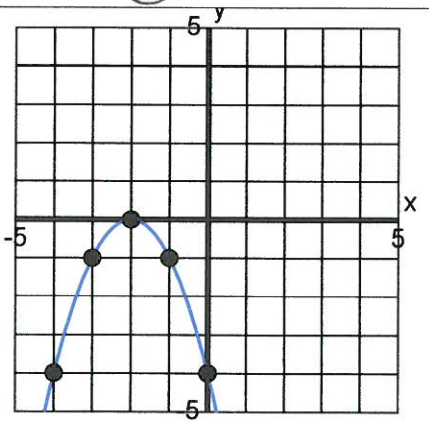
3. Circle the best discriminant for this graph
   a. D = 0
   b. D > 0 never touches
   (c.) D < 0



4. Circle the best discriminant for this graph
   a. D = 0
   b. D > 0
   (c.) D < 0 never touches



5. Circle the best discriminant for this graph
   a. D = 0
   (b.) D > 0 crosses twice
   c. D < 0



6. Circle the best discriminant for this graph
   - D = 0 bounces off
   - D > 0
   - D < 0

7. You have a quadratic equation that has a negative discriminant, then you have
   a. 2 real solutions
   b. 1 real solutions
   (c.) 0 real solutions (a.k.a. 2 imaginary solutions)

8. You have a quadratic equation that has a discriminant equal to 0, then you have
   a. 2 real solutions
   (b.) 1 real solutions
   c. 0 real solutions (a.k.a. 2 imaginary solutions)

9. You have a quadratic equation that has a positive discriminant, then you have
   (a.) 2 real solutions
   b. 1 real solutions
   c. 0 real solutions (a.k.a. 2 imaginary solutions)

10. Simplify the following expression completely

$$x = \frac{-4 \pm \sqrt{20}}{10}$$

$\frac{-4 \pm \sqrt{4}\sqrt{5}}{10} = \frac{-4 \pm 2\sqrt{5}}{10}$

$= \frac{-2 \cdot 2 \pm 2\sqrt{5}}{2 \cdot 5} = \frac{2 \pm \sqrt{5}}{5}$

11. Simplify the following expression completely

$$x = \frac{6 \pm \sqrt{24}}{15}$$

$\frac{6 \pm \sqrt{4}\sqrt{6}}{15} = \frac{6 \pm 2\sqrt{6}}{15}$

12. Simplify the following expression completely

$$x = \frac{6 \pm \sqrt{-18}}{15}$$

imaginary

$\frac{6 \pm \sqrt{9}\sqrt{2}}{15} = \frac{6 \pm 3i\sqrt{2}}{15}$

$\frac{3 \cdot 2 \pm 3i\sqrt{2}}{3 \cdot 5} = \frac{2 \pm i\sqrt{2}}{5}$

13. Joe's Box company has a revenue model of $y = -15x^2 + 250x + 150$ where y = revenue and x equals the price of the boxes that Joe sells. If the president of the company asks his CEO to find the price to charge for his boxes to earn $1200, then determine what price this CEO should charge for his boxes to generate this revenue of $1200?

a. Related Quadratic Equation $1200 = -15x^2 + 250x + 150$

b. Standard form Quadratic Equation $0 = -15x^2 + 250x - 1050$ a = -15 b = 250 c = -1050

c. Discriminant = -500 → no real solutions

$D = (250)^2 - 4(-15)(-1050) = -500$

d. The CEO should charge n/a for the boxes to get a revenue of 1200, or explain why it is impossible to reach the president's goal

impossible to reach goal because $D < 0$

14. Repeat the same task for Joe's Box Company with the revised revenue goal of $600

e. Related Quadratic Equation $600 = -15x^2 + 250x + 150$

f. Standard form Quadratic Equation $0 = -15x^2 + 250x - 450$ a = -15 b = 250 c = -450

g. Discriminant = 35500 $D = (250)^2 - 4(-15)(-450) = 35500$

h. The CEO should charge $2.05 or $14.61 for the boxes to get a revenue of $600, or explain why it is impossible to reach the president's goal

$$x = \frac{-250 \pm \sqrt{35500}}{-30} = \frac{-250 - \sqrt{35500}}{-30} \approx 14.61$$

15. Completely simplify the expression $5i(6+2i) - (3i-6)$ = $-4 + 27i$

$30i + 10i^2 - 3i + 6 = 10i^2 + 27i + 6 = 10(-1) + 27i + 6$

$\frac{-250 + \sqrt{35500}}{-30} \approx 2.05$

16. Completely simplify the expression $(6-2i)(3i+7)$ = $48 + 4i$

$18i - 6i^2 - 14i + 42 = -6i^2 + 4i + 42 = -6(-1) + 4i + 42$

$-10 + 27i + 6$

$6 + 4i + 42$

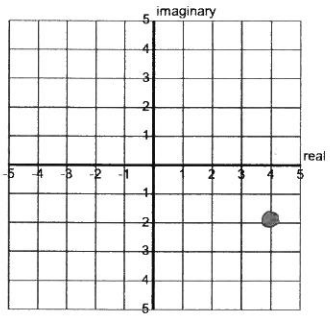
17. Determine the complex conjugate of $(3i-6)$ = $3i + 6$

18. State the first 10 powers of i

i $\quad i^2 = -1 \quad i^3 = -1i \quad i^4 = 1 \quad i^5 = i$

$i^6 = -1 \quad i^7 = -1i \quad i^8 = 1 \quad i^9 = i \quad i^{10} = -1$

19. Plot 4-2i on the provided complex number grid



20. Determine the absolute value of 4-2i (express the answer in simplest form)

$|4-2i| =$

$\sqrt{4^2+(-2)^2}$

$\sqrt{16+4} = \sqrt{20}$

$\sqrt{4}\sqrt{5} = 2\sqrt{5}$

21. Determine the number and type of solutions for $-1x^2 - 4x - 4 = 0$

$D = (-4)^2 - 4(-1)(-4)$

$= 0$

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

a. 0 real solutions (a.k.a. 2 imaginary solutions)
b. 1 real solution
c. 2 real solutions
d. 3 real solutions

22. Determine the number and type of solutions for $2x^2 + 4x + 5 = 0$

$D = (4)^2 - 4(2)(5)$

$= -24$

$2x^2 + 4x + 5 = 0$ has

a. 0 real solutions (a.k.a. 2 imaginary solutions)
b. 1 real solution
c. 2 real solutions
d. 3 real solutions

The following is DUE TOMORROW

- ICP 1-11-16 Quadratic formula review IF you scored less than 90% on quiz 1
- ICP 1-13-16 Complex Numbers
- ICP 1-14-16 Complex Numbers and Discriminant