

IMAGINARY/COMPLEX NUMBERS

1) Write in a + bi form:

$$6 + \sqrt{-9} + \sqrt{49} - \sqrt{-16}$$

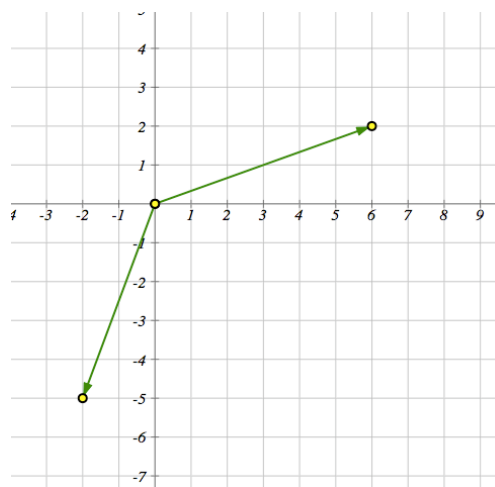
2) If $X = YZ$ and $Y = 2 + 4i$ and $Z = -3 + 5i$, then find X.

3) Simplify: $i^{14} \cdot i^{13}$

4) Find the sum of $(-2 + \sqrt{-27})$ and $5 - 2\sqrt{-48}$ in simplest a+bi form.

5) Find $(3 + 4i) - (6 + 7i)$ 6) Simplify: $\frac{2 + 3i}{4 + 7i}$

7) Express the sum of the following two complex numbers in a+bi form **and** graph it on the following graph.

8) $(6 - 3i)^2$ 9) $\frac{4}{1 - \sqrt{3}}$

QUADRATICS

10) Find the sum and the product of the roots: $f(x) = 3x^2 - 12x + 18$

11) Find the vertex: $y = (x - 2)^2 - 3$

12) $x^2 + 5x + k = 0$, $x_1 = -8$. Find k, x_2

13) Find the axis-of-symmetry:
 $y = 2x^2 - 16x + 30$

14) Match the equation with the nature of its roots.

(i) $x^2 + 6x - 9 = 0$ ans: _____

(ii) $x^2 - 8x + 16 = 0$ ans: _____

(iii) $2x^2 - 5x - 3 = 0$ ans: _____

(iv) $5x^2 + 6x + 8 = 0$ ans: _____

(a) real, rational, unequal

(b) real, irrational, unequal

(c) real, rational, equal

(d) imaginary

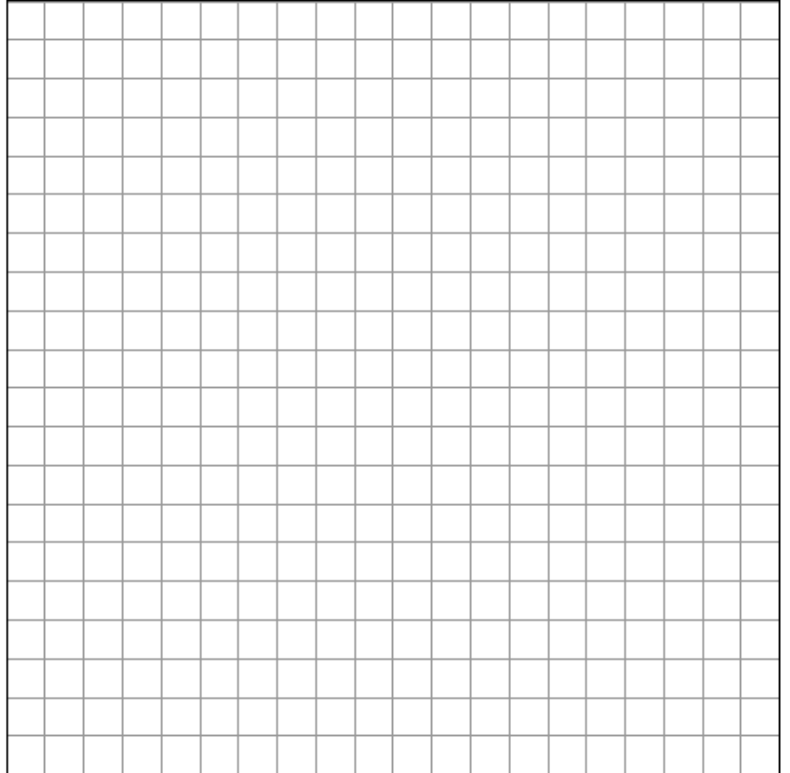
15) Find the roots using the quadratics formula: $x^2 - 8x - 6 = 0$

16) Solve by completing the square:
 $2x^2 + 16x - 22 = 0$ (remember $2x^2$ is bad)

17) Solve for the roots using any method: $5x^2 - 6x + 3 = 14x - 37$

18) The MVA student council is selling T-shirts to raise funds. The profit, $P(x)$, and the price of a T-shirt, x , can be represented by the equation $P(x) = -0.4x^2 + 28x - 100$.

Graph and label the equation. What is the maximum profit that the student council can earn? What prices would result in the council breaking even?



INEQUALITIES

19) Express the solution in any way:

$$x^2 - 3x - 10 \leq 0$$

20) Express the solution in any way:

$$-5x^2 - 7x + 6 < 0$$

21) Express the solution in any way:

$$|x - 4| < 9$$

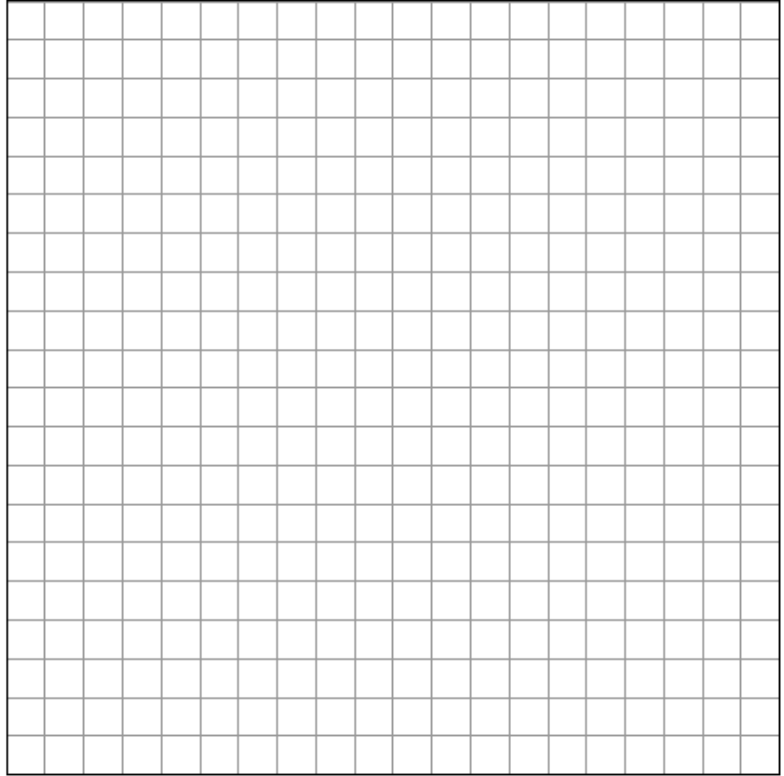
22) Express the solution in any way:

$$|3x - 15| > 24$$

23) For a certain number of seconds, t , a rocket's height is modeled by the equation:

$$H(t) = -16t^2 + 96t + 15$$

During what interval of time (t) is the rocket *at or above* 100 feet? Graph the parabola and mark the intersection points. Round time values to the *nearest 10th of a second*.



FUNCTIONS

24) $f(x) = 4x - 3$ and $g(x) = 2x^2 - 5x + 8$

a) Find $(f \circ g)(x)$

b) $g(f(x))$

c) $f(x) - g(x)$

d) $f(x) \cdot g(x)$

25) Find the inverse function algebraically:

$$f(x) = \frac{3}{5}x - 27$$