FULL NAME ______________________
ID NUMBER ______________________

Read the directions.

1. (3 points) Find the constant of variation if y varies inversely as x and $y = 34$ when $x = 0.5$.
   A. $k = 23$
   B. $k = 0$
   C. $k = -856$
   D. $k = 17$
   E. $k = 1$

2. (4 points) Solve the quadratic equation by **factoring.**

$$2x^2 + 5x - 3 = 0 \tag{1}$$

Solution.

$$\begin{aligned} 2x^2 + 5x - 3 = 0 &\implies 2x^2 + 6x - x - 3 = 0 \\ &\implies 2x(x+3) - (x+3) = 0 \\ &\implies (2x-1)(x+3) = 0 \\ &\implies 2x - 1 = 0 \text{ or } x + 3 = 0 \\ &\implies x = \frac{1}{2} \text{ or } x = -3. \end{aligned}$$

3. (3 points) Multiply and simplify.

$$(3 - 4i)(6 + 2i) \tag{2}$$

   A. $26 - 18i$
   B. 0
   C. 57
   D. $2 + 5i$
   E. $7i$

Total: ______/10

4. (1 point) **BONUS** Solve $x^2+4=0$. **Solution.** $x^2+4=0 \implies x^2=-4 \implies x=\pm\sqrt{-4} \implies x=\pm 4i$. It might be ambiguous whether the last or second-to-last step is the solution here. If one makes the convention that answers can never contain negative numbers under square roots, then $\pm 4i$ is correct.

USEFUL FORMULAS

- $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
- $y = mx + b$
- $Ax + By = C$
- $y - y_1 = m(x - x_1)$
- $a^2 - b^2 = (a+b)(a-b)$
- $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
- $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
- $(a+b)^2 = a^2 + 2ab + b^2$
- $(a-b)^2 = a^2 - 2ab + b^2$
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
- $(x-h)^2 + (y-k)^2 = r^2$
- $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $I = Prt$
- $A = P + Prt$
- $a^2 + b^2 = c^2$
- $\dfrac{f(x+h) - f(x)}{h}$
- $d = rt$
- $a^m a^n = a^{m+n}$
- $a^0 = 1$
- $\dfrac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{m \cdot n}$
- $(ab)^m = a^m b^m$
- $\dfrac{1}{a^n} = a^{-n}$
- $\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}, (b \neq 0)$
- $i = \sqrt{-1}$
- $i^2 = -1$