

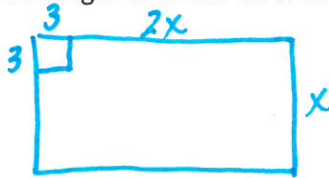
Task #1:

Victoria is having trouble factoring special-case polynomials. Point out the errors she has made correct the mistakes.

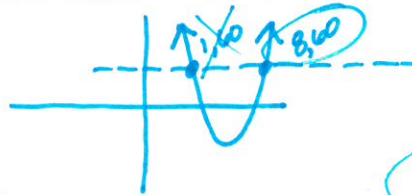
- a. $4a^2 - 100$
 $= (2a-10)(2a+10)$
 $= (2a-10)^2$
 Handwritten: $4(a^2 - 25)$
 $4(a-5)(a+5)$
- b. $81m^4 + 72m^2n + 16n^2$
 $= (9m^2 + 8n)(9m^2 + 8n)$
 $= (9m^2 + 8n)^2$
 Handwritten: $(9m^2 + 4n)(9m^2 + 4n)$
 $(9m^2 + 4n)^2$
- c. $a^{10}b^4 - 16$
 $= (a^5b^2 - 4)(a^5b^2 + 4)$
 Handwritten: $(a^5b^2 - 4)(a^5b^2 + 4)$
- d. $4d^2 + 36d + 81$
 $= (2d+9)(2d+9)$
 $= (2d+9)^2$
 Handwritten: $(2d+9)(2d+9)$
 $(2d+9)^2$

Task #2:

A box with an open top is to be constructed by cutting 3-inch squares from the corners of a rectangular sheet of tin whose length is twice its width. What size sheet will produce a box having a volume of 60 in^3 ? Illustrate.



$$(2x-6)(x-6)(3) = 60$$



$$x = 8$$

$$2x = 16$$

8×16

Task #3:

Solve the quadratic equation $4x^2 + x - 14 = 0$ by:

a) Factoring $(4x-7)(x+2) = 0$
 $x = \frac{7}{4}$ or $x = -2$



c) Quadratic Formula

$$\frac{-1 \pm \sqrt{1 - 4(4)(-14)}}{2(4)} = \frac{-1 \pm \sqrt{1 + 224}}{8} = \frac{-1 \pm \sqrt{225}}{8}$$

d) Completing the Square

$$\frac{4x^2 + x}{4} = \frac{14}{4}$$

$$x^2 + \frac{1}{4}x + \frac{1}{64} = \frac{14}{4} + \frac{1}{64}$$

$$(x + \frac{1}{8})^2 = \frac{224}{64} + \frac{1}{64}$$

$$\sqrt{(x + \frac{1}{8})^2} = \sqrt{\frac{225}{64}}$$

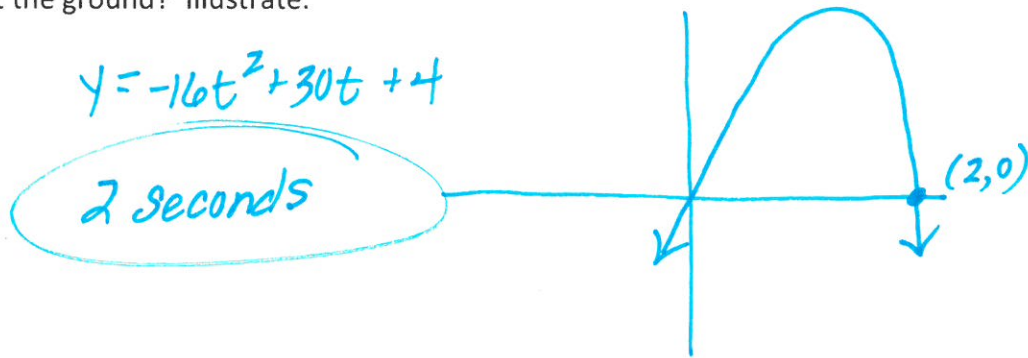
$$x + \frac{1}{8} = \pm \frac{15}{8}$$

$$x = -\frac{1}{8} \pm \frac{15}{8}$$

$$x = \frac{7}{4} \text{ or } x = -2$$

Task #4:

A baseball is thrown straight upward from 4 feet above the ground with an initial speed of 30 ft/sec. When will the ball hit the ground? Illustrate.



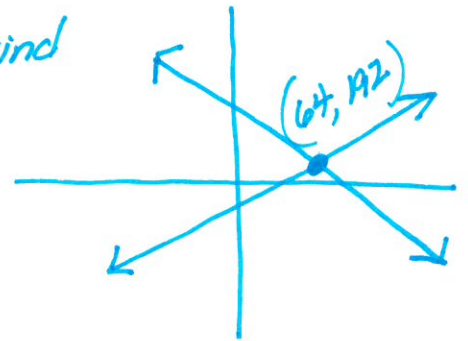
Task #5:

An airplane flew with the wind for 30 minutes and returned the same distance in 45 minutes. If the cruising speed of the airplane was 320 mi/hr, what was the speed of the wind?

distance with wind = distance against wind

$$(320 + x) \left(\frac{1}{2}\right) = (320 - x) \left(\frac{3}{4}\right)$$

x



Task #6: Find the value of the discriminant and the number of solutions. Verify your results by solving each quadratic equation using either the quadratic formula or completing the square.

a. $2y^2 + 7y = -3$

$$2y^2 + 7y + 3 = 0$$

$$b^2 - 4ac$$

$$49 - 4(2)(3)$$

$$49 - 24$$

$$25 > 0$$

∴ 2 real roots

$$y = \frac{-7 \pm \sqrt{25}}{4}$$

$$y = -.5 \text{ or } -3$$

b. $p^2 - 8p + 16 = 0$

$$b^2 - 4ac$$

$$64 - 4(1)(16)$$

$$64 - 64$$

$$0 = 0$$

1 real d.r.

$$x = \frac{8 \pm \sqrt{0}}{2}$$

$$x = 4 \text{ d.r.}$$

c. $3x^2 = 2x - 5$

$$3x^2 - 2x + 5 = 0$$

$$b^2 - 4ac$$

$$4 - 4(3)(5)$$

$$-56 < 0$$

2 imag. roots

$$x = \frac{2 \pm \sqrt{-56}}{6}$$

$$x = \frac{2 \pm i\sqrt{4 \cdot 14}}{6}$$

$$x = \frac{2 \pm 2i\sqrt{14}}{6} = \frac{1 \pm i\sqrt{14}}{3}$$