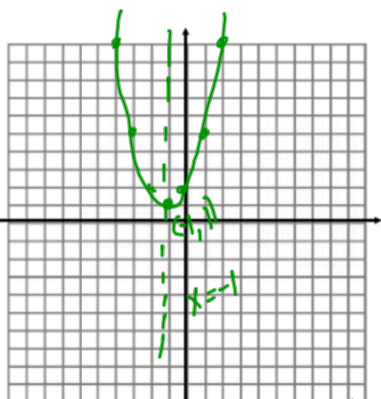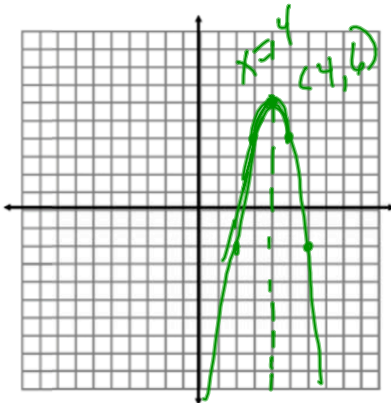# Unit 5 CA Answers

<u>Directions:</u> Graph. Label the vertex and axis of symmetry. Make sure you include as many points as possible on the graph (at least 3). 3 points each.
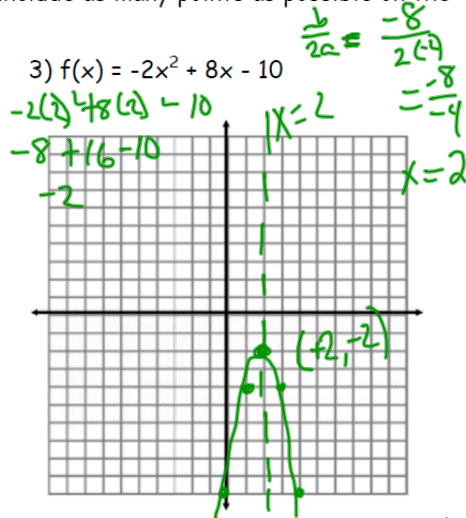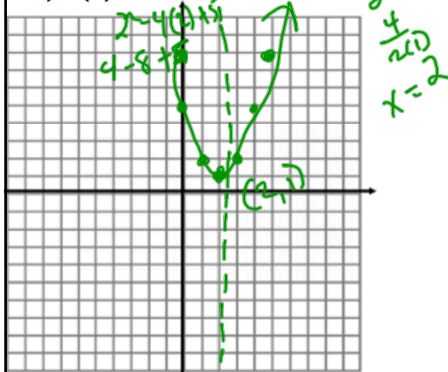
1) $f(x) = (x + 1)^2 + 1$

$x = -1$
$(-1, 1)$

2) $f(x) = -2(x - 4)^2 + 6$

$x = 4$
$(4, 6)$

3) $f(x) = -2x^2 + 8x - 10$

$\frac{b}{2a} = \frac{-8}{2(-4)}$
$= \frac{-8}{-4}$
$-2(2)^2 + 8(2) - 10$
$-8 + 16 - 10$
-2
$x = 2$
$x = 2$

$(2, -2)$

4) $f(x) = x^2 - 4x + 5$

$\frac{-b}{2a}$
$\frac{-(-4)(1)(5)}{4-8+5}$
$\frac{4}{2(1)} = 2$
$x = 2$

$(2, 1)$

<u>DIRECTIONS:</u> Tell whether the function has a minimum value or a maximum value. Find the minimum or maximum value. 2 points each.

5) $y = -0.54(x - 0.52)^2 - 0.85$

MAXIMUM VALUE OF
-0.85

6) $y = 45x^2 + 630x - 235$

$x = \frac{-b}{2a} = \frac{-630}{2(45)} = -7 = x$

$y = 45(-7)^2 + 630(-7) - 235$

MINIMUM VALUE AT
-2440

<u>DIRECTIONS:</u> Factor each completely. 3 points each.

9) $3x^2 - 24x - 60$

$3(x^2 - 8x - 20)$

$\boxed{3(x - 10)(x + 2)}$

10) $9n^2 + 24n + 16$

↑   ↑

$(3n + 4)^2$

PERFECT SQUARE TRINOMIAL

11) $8p^2 - 10p - 3$ $x \cdot -24$ $+ -6$
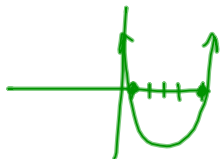
$(8p - 12)(8p + 2)$
$4(2p - 3)^2(4p + 1)$

$\boxed{(2p - 3)(4p + 1)}$

<u>DIRECTIONS:</u> Solve AND sketch each answer. 4 points each.
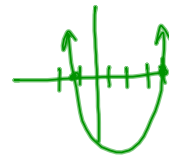
15) $x^2 + 10 = 5 + 6x$

$-6x - 5 \mid -5 - 6x$

$x^2 - 6x + 5 = 0$

$(x - 5)(x - 1) = 0$

$x - 5 = 0$ $x - 1 = 0$

$\boxed{x = 5 \text{ OR } x = 1}$

16) $5x^2 - 24 = 14x$ $x \rightarrow 120$
$-14x \quad -14x$ $+ \rightarrow -14$

$5x^2 - 14x - 24 = 0$

$(5x - 20)(5x + 6) = 0$

$(x - 4)(5x + 6) = 0$

$x - 4 = 0$ $5x + 6 = 0$
                      $5x = -6$
$x = 4 \text{ OR}$ $x = \frac{-6}{5}$

<u>DIRECTIONS:</u> Simplify

19) $2\sqrt{20} \cdot -5\sqrt{10}$

$-10\sqrt{200}$

$-10\sqrt{100}\sqrt{2}$

$-10 \cdot 10\sqrt{2}$

$\boxed{-100\sqrt{2}}$

20) $\dfrac{3}{3+2\sqrt{5}} \dfrac{(3-2\sqrt{5})}{(3-2\sqrt{5})}$

$\dfrac{9-6\sqrt{5}}{9-6\sqrt{5}+6\sqrt{5}-4\sqrt{25}} = \dfrac{9-6\sqrt{5}}{9-20} = \boxed{\dfrac{9-6\sqrt{5}}{-11}}$

<u>DIRECTIONS:</u> Solve each equation by taking square roots. 3 points each.

21) $\dfrac{1}{2}(x+10)^2 = 40 \quad)2$

$\sqrt{(x+10)^2} = \sqrt{80}$

$x+10 = \pm\sqrt{16}\sqrt{5}$

$x+10 = \pm 4\sqrt{5}$

$-10 \quad -10$

$\boxed{x = -10 \pm 4\sqrt{5}}$

22) $4(x+21)^2 - 114 = 142$

$\quad +114 \quad +114$

$\dfrac{4(x+21)^2}{4} = \dfrac{256}{4}$

$\sqrt{(x+21)^2} = \sqrt{64}$

$x+21 = \pm 8$

$\quad -21 \quad -21$

$x = -21 \pm 8$

$-21+8 \quad \text{or} \quad -21-8$

$\boxed{-13 \quad \text{or} \quad -29}$

Unit 6 Applications

1) One morning Mr. Brust wakes up realizes how ridiculous his man-pris look on him. He decides to sell all of his man-pris and that he'll offer a discount to people who buy in bulk. He's going to offer a $6 discount for each pair of man-pris bought…so the more you buy the cheaper each item is. He came up with formula for his profit of P(x) = x (216 – 6x), where P is the profit and x is the number of items bought.

a) Find Brust's man-pris selling formula in standard form.

$P(x) = x(216 - 6x)$

$= 216x - 6x^2$

$P(x) = -6x^2 + 216x$

b) What is the maximum profit Brust can make? How many items would he have to sell?

$x = \dfrac{-b}{2a} = \dfrac{-216}{-12} = \boxed{18 \text{ items}}$

$y = -6(18)^2 + 216(18)$

$\boxed{= \$1944 \text{ max profit}}$

c) How many pairs of man-pris will he need to sell if he makes nothing? (HINT: Find the zeroes of the function)

$0 = x(216 - 6x)$

$\boxed{x = 0} \quad \text{or} \quad 216 - 6x = 0$

$-6x = -216$

$\boxed{x = 36 \text{ manpris}}$

2) Bean realizes that he's going to need more room at his house for his ever expanding family. He decides to give his kids more room in their play room. Currently the room is 5 meters by 15 meters and he decides that he'll add 300 square meters to that by adding the same distance, x, to both the length and width of the room.

a) Find the current area of the room. $A = 5 \times 15 = \boxed{75 \text{ square meters}}$

b) Write an equation that models adding 300 square meters to the area by adding the same distance x to both the length and the width.

$75 + 300 = (x+15)(x+5)$

$375 = x^2 + 5x + 15x + 75$

$\boxed{375 = x^2 + 20x + 75}$

$-375 \qquad -375$

c) Solve the equation and find the new dimensions of the room that Bean is going to build.

$0 = x^2 + 20x - 300$

$= (x-10)(x+30)$

$x = 10 \quad \text{or} \quad x = -30$

$5+10 \qquad 15+10$

$\boxed{15 \text{ meters by } 25 \text{ meters}}$