Answers

1. a)

vertex: $(0, -4)$
axis of symm: $x = 0$
y-int: $(0, -4)$
x-int: $(-4, 0)$ and $(4, 0)$
Domain: $\{x | x \in R\}$
Range: $\{y | y \geq -4, y \in R\}$
max or min: $\min \text{of} -4 \text{ when } x = 0$

b)

vertex: $(1, 8)$
Axis of symm: $x = 1$
y-int: $(0, 6)$
x-int: $(-1, 0)$ and $(3, 0)$
Domain: $\{x | x \in R\}$
Range: $\{y | y \leq 8, y \in R\}$
max or min: $\max \text{of } 8 \text{ when } x = 1$

2. a) $y = \frac{1}{4}x^2 - 4$

b) $y = -2(x - 1)^2 + 8$

3. $y = -2(x + 3)^2 + 5$

4. a) $(2, -16)$
b) $(-2, 3)$
c) $(4, -2)$
d) $(3, -2)$

5. a) $y = x^2 - 2x + 4$
b) $y = x^2 + 6x - 2$
c) $y = 3x^2 - 12x + 16$
d) $y = -4x^2 - 8x - 7$

6. The two numbers are 30 and 30.

7. a) $x = -7 \text{ and } x = 4$
b) $x = 0 \text{ and } x = \frac{3}{4}$
c) $x = -9 \text{ and } x = \frac{3}{2}$
d) $x = -3 \text{ and } x = \frac{1}{2}$
e) $x = -\frac{7}{4} \text{ and } x = \frac{7}{4}$
f) $x = -\frac{3}{2} \text{ and } x = \frac{3}{2}$
g) $x = -\sqrt{17} \text{ and } x = \sqrt{17}$
h) $x = -7 \text{ and } x = 11$
i) $x = -\frac{\sqrt{19}}{5} \text{ and } x = \frac{\sqrt{19}}{5}$
j) $x = \frac{-1 \pm \sqrt{33}}{4}$
k) $x = \frac{7 \pm \sqrt{89}}{20}$

8. a) 0; one distinct real root
b) −107; no real roots

9. $10cm$ by $27cm$

10. 2 $seconds$ after diving