

Handout 2.4B

Solutions

1. Use partial factoring to determine the vertex of each function. State if the vertex is a minimum or a maximum.

a) $f(x) = 3x^2 - 6x + 11$

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

c) $f(x) = \frac{1}{2}x^2 - 3x + 8$

d) $f(x) = -\frac{5}{3}x^2 + 5x - 10$

e) $f(x) = 0.3x^2 - 3x + 6$

f) $f(x) = -0.2x^2 - 2.8x - 5.4$

1. a) (1, 8); minimum b) (2, 5); maximum

c) $(3, \frac{7}{2})$; minimum d) $(\frac{3}{2}, \frac{25}{4})$; maximum

e) $(5, -\frac{3}{2})$; minimum f) $(-7, \frac{22}{5})$; maximum

2. a) (-5, -19); minimum b) (-3, -2); minimum

c) (1, 4); maximum d) (6, 31); maximum

e) (-1, 2); maximum f) $(-4, \frac{7}{3})$; minimum

3. a) $f(x) = x^2 + 10x + 6$

b) $f(x) = 2x^2 + 12x + 16$

c) $f(x) = -3x^2 + 6x + 1$

d) $f(x) = -x^2 + 12x - 5$

e) $f(x) = -\frac{1}{2}x^2 - x + \frac{3}{2}$

f) $f(x) = \frac{2}{3}x^2 + \frac{16}{3}x + \frac{25}{3}$

4. Determine the number of zeros. Do not use the same method for all four parts.

a) $f(x) = -3(x-2)^2 + 4$

c) $f(x) = 4x^2 - 2x$

b) $f(x) = 5(x-3)(x+4)$

d) $f(x) = 3x^2 - x + 5$

5. For each profit function, determine whether the company can break even. If the company can break even, determine in how many ways it can do so.

a) $P(x) = -2.1x^2 + 9.06x - 5.4$

b) $P(x) = -0.3x^2 + 2x - 7.8$

c) $P(x) = -2x^2 + 6.4x - 5.12$

d) $P(x) = -2.4x^2 + x - 1.2$

6. For what value(s) of k will the function $f(x) = 3x^2 - 4x + k$ have one x -intercept?

7. For what value(s) of k will the function $f(x) = kx^2 - 4x + k$ have no zeros?

8. For what values of k will the function $f(x) = 3x^2 + 4x + k = 0$ have no zeros? one zero? two zeros?

9. The graph of the function $f(x) = x^2 - kx + k + 8$ touches the x -axis at one point. What are the possible values of k ?

10. Is it possible for $n^2 + 25$ to equal $-8n$? Explain.

11. Write the equation of a quadratic function that meets each of the given conditions.

a) The parabola opens down and has two zeros.

b) The parabola opens up and has no zeros.

c) The parabola opens down and the vertex is also the zero of the function.

4. a) 2 b) 2 c) 2 d) 0

6. $k = \frac{4}{3}$

7. $k < -2, k > 2$

8. a) $k > \frac{4}{3}$ b) $k = \frac{4}{3}$ c) $k < \frac{4}{3}$

9. $k = 8$ or $k = -4$

10. No, this quadratic has no solutions

11. a) $a < 0$ & $k > 0$

b) $a > 0$ & $k > 0$

c) $a < 0$ & $k = 0$