Unit 1 Review Quadratic Functions

Topics:



- Properties of Quadratic Functions
- Forms of a Quadratic Equation
- Review of Factoring
- Zeros of a Quadratic
- Determining Max and Min Values
- Problem Solving with Quadratics
- Writing Quadratic Equations
- Linear-Quadratic Systems
- Transformations

Nelson Page 206 #s 9 - 14 & 26 - 30



Solutions

9. Given the quadratic function
$$f(x) = 3x^2 - 6x + 15$$
, identify the coordinates of the vertex.

a) $(1,12)$ c) $(12,1)$
b) $(-1,-12)$ d) $(12,-1)$

Ci ther complete the $(-1,-12)$ d) $(12,-1)$

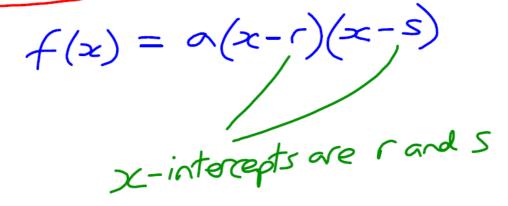
Square

 $(-1,-12)$ d) $(12,-1)$
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Square

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- 10. When the equation of a quadratic function is in factored form, which feature is most easily determined?
 - a) y-intercepts
- c) vertex
- b) x-intercepts
- d) maximum value



- **11.** The height, *b*, in metres, of a baseball after Bill hits it with a bat is described by the function $h(t) = 0.8 + 29.4t - 4.9t^2$, where t is the time in seconds after the ball is struck. What is the maximum height of the ball? a) 4.9 m b) 29.4 m c) 44.9 m d) 25 m

Using
$$-\frac{b}{2a} = \frac{-29.4}{2(-4.9)}$$

$$= \frac{-29.4}{-9.8}$$

$$= 3$$

$$= 3$$

$$= h(3) = 0.8 + 29.4(3) - 4.9(3)^{2}$$

$$= 44.9m$$

12. It costs a bus company \$2.5 to run a minubus on a ski trip, plus \$30 per passenger. The bus has seating for 22 passengers, and the company charges \$60 per fare if the bus is full. For each empty seat, the company has to increase the ticker price by \$5. How many empty seat should the bus run with to maximize profit from this trip?

(a) 8) b) 6 c) 10 d) 2

Cost =
$$225 + 30(22 - x)$$

Revenue = $(60 + 5x)(22 - x)$

Where $x = 4$ of empty Seadts

Profit = Revenue - (ost = $(60 + 5x)(22 - x) - (885 - 30x)$

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= $(60 + 5x)(22 -$

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

a) $k = 1$ or $k = 8$

b) $k = -4$ or $k = 8$

c) $k = 0$ or $k = 1$

Think of it as $f(x) = x^2 - kx + k + 8$

where $a = 1$, $b = -k$, $c = k + 8$

for one zero $= b^2 - 4$ and $= 0$
 $(-k)^2 - 4(1)(k + 8) = 0$
 $(-k)^2 - 4(1)(k + 8) = 0$
 $(-k)^2 - 4(1)(k + 8) = 0$

And values of k that $(k - 8)(k + 4) = 0$

of k that $(k - 8)(k + 4) = 0$

where $k = 8$, $k = -4$

water brackets $k = 8$, $k = -4$

water $k = 8$

26. The vertex form of the equation
$$y = -2x^{2} - 12x - 19 \text{ is}$$
a) $y = -2x(x + 6) - 19$
b) $y = -2(x - 3)(x + 6)$
c) $y = -2(x - 3)(x + 6)$
c) $y = -2(x - 3)^{2} + 1$

$$y = -2\left(x^{2} + 6x\right) - 19$$

27. The coordinates of the vertex for the graph of

$$y = (x + 2)(x - 3)$$
 are

a) $(-2, 3)$

b) $\left(-\frac{1}{2}, -\frac{21}{4}\right)$
 $y = (x + 2)(x - 3)$
 $y = (x +$

28. The profit function for a new product is given by
$$P(x) = -4x^2 + 28x - 40$$
, where x is the number sold in thousands. How many items must be sold for the company to hreak even?

a) $2000 \text{ or } 5000$
c) $5000 \text{ or } 7000$
b) $2000 \text{ or } 3500$
d) $3500 \text{ or } 7000$

Break even when p of $t = 0$

$$0 = -4x^2 + 28x - 40$$

$$0 = -4(x^2 - 7x + 10)$$

$$0 = -4(x - 5)(x - 2)$$

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- 29. Which of the following statements is not true for the equation of a quadratic function?
 - a) In standard form, the y-intercept is clearly visible.
 - In vertex form, the break-even points are clearly visible
 - In factored form, the x-intercepts are clearly visible.
 - d) In vertex form, the coordinates of the vertex are clearly visible.

$$y = ax^{2} + bx + C$$

$$y = a(x-h)^{2} + k$$

$$y = a(x-0)(x-0)$$

$$y = a(x-0)^{2} + k$$

$$y = \alpha(x-b)^2 + k$$

- **30.** State the value of the discriminant, D, and the number of roots for $7x^2 + 12x + 6 = 0$.
 - a) D = 312, n = 2 c) D = 312, n = 1

 - **b)** D = 24, n = 2 **d)** D = -24, n = 0

$$5^{2} - 4ac$$

$$\Rightarrow (12)^{2} - 4(7)(6)$$

$$= 144 - 168$$

$$= -24 \leftarrow negative \Rightarrow 0 zeros$$

$$= -24 \leftarrow negative \Rightarrow 1 zero$$

$$positive \Rightarrow 2 zeros$$