Additional Problems: Polynomial Functions & Graphs

**Modeling with Polynomials**

**Some problems include the solution. Please remove before sharing with students.**

1. A ball is thrown directly upward from the ground with an initial velocity of 5.5 ft./sec. Represent the height of the ball from the ground $t$ seconds after it was thrown upward using the model $h(t)$.

\*\*Solution: $h\left(t\right)=-16t^{2}+5.5t$

1. A ball is thrown directly upward from the ground with an initial velocity of 7.3 ft./sec. Represent the height of the ball from the ground $t$ seconds after it was thrown upward using the model $h(t)$.

\*\*Solution: $h\left(t\right)=-16t^{2}+7.3t$

1. Use $x=1+r$, where $r$ is the interest rate paid each year. Write a model polynomial, $C(x)$. Represent the final amount of a 10-year investment if $3,000 was deposited at the beginning of the first year, and $1,500 was deposited at the beginning of the fifth year.

\*\*Solution:$C\left(x\right)=3,000x^{10}+1,500x^{6}$

1. Use $x=1+r$, where $r$ is the interest rate paid each year. Write a model polynomial, $C(x)$. Represent the final amount of a 5-year investment if $4,000 was deposited at the beginning of the first year, and $1,000 was deposited at the beginning of the fourth year.

\*\*Solution: $C\left(x\right)=4,000x^{5}+1,000x^{2}$

1. Use $x=1+r$, where $r$ is the interest rate paid each year. Write a model polynomial, $C(x)$. Represent the final amount of a 6-year investment if $6,000 was deposited at the beginning of the first year, and $3,000 was deposited at the beginning of the second year.

\*\*Solution: $C\left(x\right)=6,000x^{6}+3,000x^{5}$

1. The equation $B\left(x\right)=x^{2}+8x$ represents the relationship between the area in square units and the width of a rectangle whose length is 8 units longer than its width. Select the sentence that describes an accurate relationship between $B$ and $x$.

a. $B(x)$ has a minimum value at $x=8$.

b.$B(x)$ increases as $x$ increases when $x>0$.

c.$B(x)$ increases as $x$ increases for$0<x<8$*.*

d. $B\left(x\right) $has a maximum value at $x=8$.

\*\*Solution: $B(x)$ increases as $x$ increases when $x>0$.

1. The equation $C\left(y\right)=y^{2}+6y$ represents the relationship between the area in square units and the width of a rectangle whose length is 6 units longer than its width. Select the sentence that describes an accurate relationship between$C$ and $y$.

a. $C(y)$has a minimum value at$ y=6$.

b.$C(y)$ increases as $y$ increases when $y>0$.

c.$ C(y)$ increases as$ y$ increases for $0<y<6$.

d.$C(y)$ has a maximum value at $y=6$.

\*\*Solution:$C(y)$ increases as $y$ increases when $y>0$.

1. Use $x=1+r$, where $r$ is the interest rate, and the equation $C\left(x\right)=2500x^{6}+3000x^{5}+2800x^{4}+3500x^{3}$. The equation represents the relationship between $C(x)$, the value of the investment after 6 years, and its annual interest rate, $r$. Find the value of the investment account if the interest rate is 4.1%.
2. Use $x=1+r$, where $r$ is the interest rate, and the equation $C\left(x\right)=2000x^{4}+2500x^{3}+2300x^{2}+2700x.$ The equation represents the relationship between $C(x)$, the value of the investment after 4 years, and its annual interest rate, $r$. Find the value of the investment account if the interest rate is 2.65%.
3. Use $x=1+r$, where $r$ is the interest rate, and the equation $C\left(x\right)=1800x^{3}+2200x^{2}+2100x+2400. $ The equation represents the relationship between $C(x)$, the value of the investment after 3 years, and its annual interest rate, $r$. Find the value of the investment account if the interest rate is 1.95%.