7-6 Growth and Decay

1. **SALARY** Ms. Acosta received a job as a teacher with a starting salary of $34,000. According to her contract, she will receive a 1.5% increase in her salary every year. How much will Ms. Acosta earn in 7 years?

   SOLUTION:

   Using the equation for exponential growth, let a = 34,000 and let r = 1.5% = 0.015.

   $$\begin{aligned} y &= a(1+r)^t \\ &= 34{,}000(1+0.015)^t \\ &= 34{,}000(1.015)^t \end{aligned}$$

   Let t = 7 in the salary equation above.

   $$\begin{aligned} y &= 34{,}000(1.015)^t \\ &= 34{,}000(1.015)^7 \\ &\approx 37{,}734.73 \end{aligned}$$

   So, Ms. Acosta will earn about $37,734.73 in 7 years.

2. **MONEY** Paul invested $400 into an account with a 5.5% interest rate compounded monthly. How much will Paul's investment be worth in 8 years?

   SOLUTION:

   Using the equation for compound interest, let P = 400, r = 5.5% = 0.055, n = 12, and t = 8.

   $$\begin{aligned} A &= P\left(1+\frac{r}{n}\right)^{nt} \\ &= 400\left(1+\frac{0.055}{12}\right)^{12(8)} \\ &\approx 400(1.004583)^{96} \\ &\approx 620.46 \end{aligned}$$

   So, Paul's investment will be worth about $620.46 in 8 years.

3. **ENROLLMENT** In 2000, 2200 students attended Polaris High School. The enrollment has been declining 2% annually.

   a. Write an equation for the enrollment of Polaris High School t years after 2000.

   b. If this trend continues, how many students will be enrolled in 2015?

   SOLUTION:

   a. Using the equation for exponential decay, let a = 2200 and r = 2% = 0.02.

   $$\begin{aligned} y &= a(1-r)^t \\ &= 2200(1-0.02)^t \\ &= 2200(0.98)^t \end{aligned}$$

   b. Using the equation from part a, let t = 15.

   $$\begin{aligned} y &= 2200(0.98)^t \\ &= 2200(0.98)^{15} \\ &\approx 1624 \end{aligned}$$

   So, the enrollment of Polaris High School will be about 1624 in 2015.

4. **MEMBERSHIPS** The Work-Out Gym sold 550 memberships in 2001. Since then the number of memberships sold has increased 3% annually.
   a. Write an equation for the number of memberships sold at Work-Out Gym *t* years after 2001.
   b. If this trend continues, predict how many memberships the gym will sell in 2020.

   SOLUTION:

   a. Using the equation for exponential growth, let a = 550 and let r = 3% = 0.03.

   $$y = a(1+r)^t$$
   $$= 550(1+0.03)^t$$
   $$= 550(1.03)^t$$

   b. Using the equation from part a, let t = 19.

   $$y = 550(1.03)^t$$
   $$= 550(1.03)^{19}$$
   $$\approx 964$$

   So, the gym will sell about 964 memberships in 2020.

5. **COMPUTERS** The number of people who own computers has increased 23.2% annually since 1990. If half a million people owned a computer in 1990, predict how many people will own a computer in 2015.

   SOLUTION:

   Using the equation for exponential growth, let a = 500,000, r = 23.2% = 0.232, and t = 25.

   $$y = a(1+r)^t$$
   $$= 500{,}000(1+0.232)^{25}$$
   $$= 500{,}000(1.232)^{25}$$
   $$\approx 92{,}095{,}349$$

   So, about 92,095,349 people will own a computer in 2015.

6. **COINS** Camilo purchased a rare coin from a dealer for $300. The value of the coin increases 5% each year. Determine the value of the coin in 5 years.

   SOLUTION:

   Using the equation for exponential growth, let a = 300, r = 5% = 0.05, and t = 5.

   $$y = a(1+r)^t$$
   $$= 300(1+0.05)^5$$
   $$= 300(1.05)^5$$
   $$\approx 382.88$$

   So, the value of the coin will be about $382.88 in 5 years.

7. **INVESTMENTS** Theo invested \$6600 at an interest rate of 4.5% compounded monthly. Determine the value of his investment in 4 years.

SOLUTION:

Using the equation for compound interest, let P = 6600, r = 4.5% = 0.045, n = 12, and t = 4.

$$\begin{aligned} A &= P\left(1+\frac{r}{n}\right)^{nt} \\ &= 6600\left(1+\frac{0.045}{12}\right)^{12(4)} \\ &= 6600(1.00375)^{48} \\ &\approx 7898.97 \end{aligned}$$

So, the value of Theo's investment in 4 years is about \$7898.97.

8. **FINANCE** Paige invested \$1200 at an interest rate of 5.75% compounded quarterly. Determine the value of her investment in 7 years.

SOLUTION:

Using the equation for compound interest, let P = 1200, r = 5.75% = 0.0575, n = 4, and t = 7.

$$\begin{aligned} A &= P\left(1+\frac{r}{n}\right)^{nt} \\ &= 1200\left(1+\frac{0.0575}{4}\right)^{4(7)} \\ &= 1200(1.014375)^{28} \\ &\approx 1789.54 \end{aligned}$$

So, the value of Paige's investment in 7 years is about \$1789.54.

9. **CCSS PRECISION** Brooke is saving money for a trip to the Bahamas that costs \$295.99. She puts \$150 into a savings account that pays 7.25% interest compounded quarterly. Will she have enough money in the account after 4 years? Explain.

SOLUTION:

Using the equation for compound interest, let P = 150, r = 7.25% = 0.0725, n = 4, and t = 4.

$$\begin{aligned} A &= P\left(1+\frac{r}{n}\right)^{nt} \\ &= 150\left(1+\frac{0.0725}{4}\right)^{4(4)} \\ &= 150(1.018125)^{16} \\ &\approx 199.94 \end{aligned}$$

No, Brooke will have about \$199.94 in the account in 4 years.

10. **INVESTMENTS** Jin's investment of $4500 has been losing its value at a rate of 2.5% each year. What will his investment be worth in 5 years?

SOLUTION:

Using the equation for exponential decay, let *a* = 4500, *r* = 2.5% = 0.025, and *t* = 5.

$$\begin{aligned} y &= a(1-r)^t \\ &= 4500(1-0.025)^5 \\ &= 4500(0.975)^5 \\ &\approx 3964.93 \end{aligned}$$

So, Jin's investment will be about $3964.93 in 5 years.

11. **POPULATION** In the years from 2010 to 2015, the population of the District of Columbia is expected to decrease about 0.9% annually. In 2010, the population was about 530,000. What is the population of the District of Columbia expected to be in 2015?

SOLUTION:

This is an exponential decay problem since the population is decreasing. Use the equation for exponential decay, let *a* = 530,000, *r* = 0.9% = 0.009, and *t* = 5.

$$y = a(1-r)^t$$

$$y = 530,000(1-0.009)^5$$

$$y = 506,575.45$$

The population in 2015 will be about 506,575.

12. **CARS** Leonardo purchases a car for $18,995. The car depreciates at a rate of 18% annually. After 6 years, Manuel offers to buy the car for $4500. Should Leonardo sell the car? Explain.

SOLUTION:

Using the equation for exponential decay, let *a* = 18,995, *r* = 18% = 0.18, and *t* = 6.

$$\begin{aligned} y &= a(1-r)^t \\ &= 18,995(1-0.18)^6 \\ &= 18,995(0.82)^6 \\ &\approx 5774.61 \end{aligned}$$

No, Leonardo should not sell the car for $4500. The car is worth about $5774.61.

13. **HOUSING** The median house price in the United States increased an average of 1.4% each year between 2005 and 2007. Assume that this pattern continues.

Source: *Real Estate Journal*

a. Write an equation for the median house price for *t* years after 2004.

b. Predict the median house price in 2018.

SOLUTION:

a. This is an exponential growth problem since prices are increasing. Use the equation for exponential growth, let *a* = 247,900 and *r* = 1.4% = 0.014.

$y = a(1 + r)^t$

$y = 247,900(1 + 0.14)^t$

$y = 247,900(1.14)^t$

b. To find the price in 2018, let $t = 11$.

$y = 247,900(1.14)^t$

$y = 247,900(1.14)^{11}$

$y = 288,864.41$

Thus in 2018, median house price will be about $288,864.

14. **ELEMENTS** A radioactive element's half-life is the time it takes for one half of the element's quantity to decay. The half-life of Plutonium-241 is 14.4 years. The number of grams A of Plutonium-241 left after t years can be modeled by $A = p(0.5)^{\frac{t}{14.4}}$, where p is the original amount of the element.

a. How much of a 0.2-gram sample remains after 72 years?

b. How much of a 5.4-gram sample remains after 1095 days?

SOLUTION:

a. Let p = 0.2 and t = 72.

$$\begin{aligned} A &= p(0.5)^{\frac{t}{14.4}} \\ &= 0.2(0.5)^{\frac{72}{14.4}} \\ &= 0.2(0.03125) \\ &= 0.00625 \end{aligned}$$

So, 0.00625 gram of Plutonium-241 remains after 72 years.

b. Let p = 5.4 and $t = \frac{1095}{365} = 3$.

$$\begin{aligned} A &= p(0.5)^{\frac{t}{14.4}} \\ &= 5.4(0.5)^{\frac{3}{14.4}} \\ &= 5.4(0.865536561) \\ &\approx 4.7 \end{aligned}$$

So, about 4.7 grams of Plutonium-241 remains after 1095 days.

15. **COMBINING FUNCTIONS** A swimming pool holds a maximum of 20,500 gallons of water. The water is evaporating at a rate of 0.5% per hour. The pool currently contains 19,000 gallons of water.
a. Write an exponential function $w(t)$ to express the amount of water remaining in the pool after time t where t is the number of hours after the pool reached 19,000 gallons.
b. At this same time, a hose is turned on to refill the pool at a rate of 300 gallons per hour. Write a function $p(t)$ where t is time in hours the hose is running to express the amount of water that is pumped into the pool.
c. Find $C(t) = p(t) + w(t)$. What does this new function represent?
d. Use the graph of $C(t)$ to determine how long the hose must run to fill the pool to its maximum amount.

SOLUTION:

a. Since the amount of water is decreasing, use the formula for exponential decay and replace a with 19,000 and r with 0.005.

$y = a(1 - r)^t$

$w(t) = 19{,}000(1 - 0.005)^t$

$w(t) = 19{,}000(0.995)^t$

b. Since the hose is running at a constant rate, use a linear function in slope-intercept form to express the amount of water pumped into the pool. At $t = 0$ no water is being put into the pool, so the y-intercept is 0. The hose is running at a rate of 300 gallons per hour, so replace m with 300.

$y = mx + b$

$p(t) = 300x + 0$

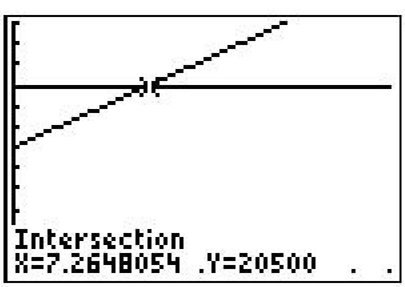
$p(t) = 300t$

c. $C(t) = p(t) + w(t)$

$C(t) = 300t + 19{,}000(0.995)^t$;

The function $C(t)$ represents the number of gallons of water in the pool at any time after the hose is turned on.

d. Use a graphing calculator to graph **Y1=** $300x + 19000(0.995)x$ and **Y2=** 20500. Select the **intersect** option on the **2nd [CALC]** function.



[0, 20] scl: 2 by [16000, 22000] scl: 500

Therefore, the hose will fill the pool to its maximum after about 7.3 hours.

16. **REASONING** Determine the growth rate (as a percent) of a population that quadruples every year. Explain.

SOLUTION:

Since the population is increasing, use a exponential growth model.

$y = a(1 + r)^t$

If the population starts at 1, a = 1. If the population quadruples, it will be at 4, or y = 4. Let t = 1.

$4 = 1(1 + r)^1$

$4 = 1 + r$

$3 = r$

Then r = 3 or 300%. The rate for the population to quadruple is 300%.

17. **CCSS PRECISION** Santos invested $1200 into an account with an interest rate of 8% compounded monthly. Use a calculator to approximate how long it will take for Santos's investment to reach $2500.

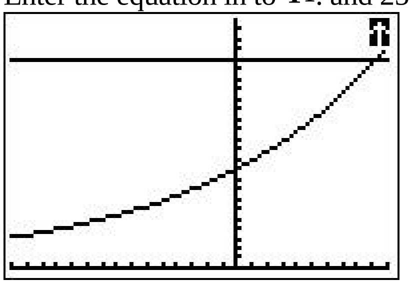
SOLUTION:

Using the equation for compound interest, let P = 1200 and r = 8% = 0.08.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$= 1200\left(1 + \frac{0.08}{12}\right)^{12t}$$

Enter the equation in to **Y1**. and 2500 for **Y2**. Adjust the viewing window.



[-15, 10] scl: 1 by [-2, 2998] scl: 120

Use a table to find a value of t such that A = 2500.

X	Y1
6	1936.2
7	2096.9
8	2270.9
9	2459.4
10	2663.6
11	2884.6
12	3124.1

X=12

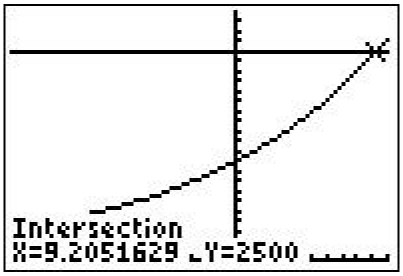
From the table, 2500 is between 9 and 10. Adjust the step on the table to narrow to intervals.

X	Y1
9	2459.4
9.1	2479.1
9.2	2499
9.3	2519
9.4	2539.1
9.5	2559.5
9.6	2580

Press + for ΔTbl

The investment reaches $2500 after 9.2 years.

Use the **intersect** function from the **2nd CALC** menu to find the exact value.



[-15, 10] scl: 1 by [-2, 2998] scl: 120

So, it will take Santos' investment about 9.2 years to reach $2500.

18. **REASONING** The amount of water in a container doubles every minute. After 8 minutes, the container is full. After how many minutes was the container half full? Explain.

SOLUTION:

7; Sample answer: Since the amount of water doubles every minute, the container would be half full a minute before it was full.

19. **WRITING IN MATH** What should you consider when using exponential models to make decisions?

SOLUTION:

Sample answer: Exponential models can grow without bound, which is usually not the case of the situation that is being modeled. For instance, a population cannot grow without bound due to space and food constraints. Therefore, when using a model, the situation that is being modeled should be carefully considered when used to make decisions.

20. **WRITING IN MATH** Compare and contrast the exponential growth formula and the exponential decay formula.

SOLUTION:

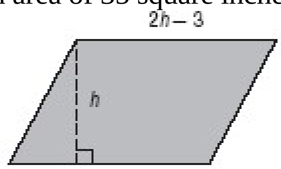
The exponential growth formula is $y = a(1 + r)^t$, where a is the initial amount, t is time, y is the final amount, and r is the rate of change expressed as a decimal.
The exponential decay formula is basically the same except the rate is subtracted from 1 and r represents the rate of decay.
Consider an exponential growth model with r = 5% and a = 2.

$$y = a(1 + r)^t$$
$$y = 2(1 + 0.5)^t$$
$$y = 2(1.5)^t$$

Consider an exponential decay model with r = 5% and a = 2.

$$y = a(1 - r)^t$$
$$y = 2(1 - 0.5)^t$$
$$y = 2(0.95)^t$$

21. **GEOMETRY** The parallelogram has an area of 35 square inches. Find the height h of the parallelogram.



A 3.5 inches
B 4 inches
C 5 inches
D 7 inches

SOLUTION:

Using the formula for the area of the parallelogram, let $A = 35$ and $b = 2h - 3$.

$$A = bh$$
$$35 = (2h - 3)h$$
$$35 = 2h^2 - 3h$$
$$0 = 2h^2 - 3h - 35$$
$$0 = (2h + 7)(h - 5)$$
$$h = -\frac{7}{2} \text{ or } 5$$

The height cannot be negative, so the height is 5 inches. The correct choice is C.

22. Which is greater than $64^{\frac{1}{3}}$?

F 2^2
G $64^{\frac{1}{6}}$
H $64^{\frac{1}{2}}$
J 64^{-3}

SOLUTION:

$2^2 = 2 \times 2$ or 4; $64^{\frac{1}{6}} = \sqrt[6]{2^6}$ or 2; $64^{\frac{1}{2}} = \sqrt{64}$ or 8; and $64^{-3} = \frac{1}{64^3}$ or about 0.0000038

$64^{\frac{1}{3}} = \sqrt[3]{4^3}$ or 4; Only $64^{\frac{1}{2}}$ or 8 is greater than 4. Therefore, the correct choice is H.

23. Thi purchased a car for $22,900. The car depreciated at an annual rate of 16%. Which of the following equations models the value of Thi's car after 5 years?

A $A = 22{,}900(1.16)^5$

B $A = 22{,}900(0.16)^5$

C $A = 16(22{,}900)^5$

D $A = 22{,}900(0.84)^5$

SOLUTION:

Using the equation for exponential decay, let a = 22,900, r = 16% = 0.16, and t = 5.

$$y = a(1 - r)^t$$
$$y = 22{,}900(1 - 0.16)^5$$
$$y = 22{,}900(0.84)^5$$

So, the correct choice is D.

24. **GRIDDED RESPONSE** A deck measures 12 feet by 18 feet. If a painter charges $2.65 per square foot, including tax, how much will it cost in dollars to have the deck painted?

SOLUTION:

To find the cost of painting the deck C, first find the area of the deck.

$$A = \ell w$$
$$= 12(18)$$
$$= 216$$

Then multiply the area by the cost per square foot.

$C = 216(2.65) = 572.4$

So, the cost to have the deck painted is $572.40. Grid in 572.4.

Graph each function. Find the y-intercept, and state the domain and range.

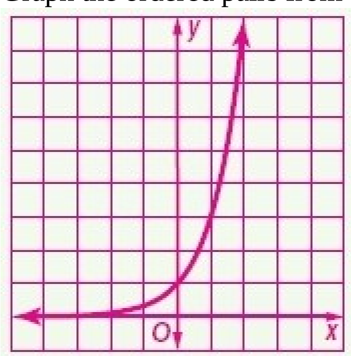
25. $y = 3^x$

SOLUTION:

Complete a table of values for $-2 < x < 2$. Connect the points on the graph with a smooth curve.

x	3^x	y
−2	3^{-2}	$\frac{1}{9}$
−1	3^{-1}	$\frac{1}{3}$
0	3^0	1
1	3^1	3
2	3^2	9

Graph the ordered pairs from the table, and connect the points with a smooth curve.



The graph crosses the y-axis at 1, so the y-intercept is 1. The domain is all real numbers, and the range is all positive real numbers.

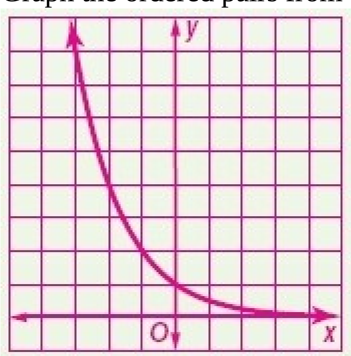
26. $y = \left(\frac{1}{2}\right)^x$

SOLUTION:

Complete a table of values for $-2 < x < 2$. Connect the points on the graph with a smooth curve.

x	$\left(\frac{1}{2}\right)^x$	y
−2	$\left(\frac{1}{2}\right)^{-2}$	4
0	$\left(\frac{1}{2}\right)^{0}$	1
2	$\left(\frac{1}{2}\right)^{2}$	$\frac{1}{4}$

Graph the ordered pairs from the table, and connect the points with a smooth curve.



The graph crosses the y-axis at 1, so the y-intercept is 1. The domain is all real numbers, and the range is all positive real numbers.

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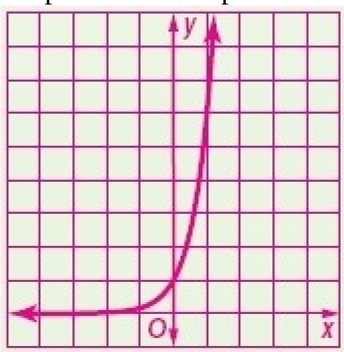
27. $y = 6^x$

SOLUTION:

Complete a table of values for $-2 < x < 2$. Connect the points on the graph with a smooth curve.

x	6^x	y
-2	6^{-2}	$\frac{1}{36}$
-1	6^{-1}	$\frac{1}{6}$
0	6^0	1
1	6^1	6
2	6^2	36

Graph the ordered pairs from the table, and connect the points with a smooth curve.



The graph crosses the y-axis at 1, so the y-intercept is 1. The domain is all real numbers, and the range is all positive real numbers.

Evaluate each product. Express the results in both scientific notation and standard form.

28. $(4.2 \times 10^3)(3.1 \times 10^{10})$

SOLUTION:

$$\begin{aligned}
(4.2 \times 10^3)(3.1 \times 10^{10}) &= (4.2 \times 3.1)(10^3 \times 10^{10}) && \text{Commutative and Associative Properties} \\
&= 13.02 \times 10^{3+10} && \text{Product of Powers} \\
&= 13.02 \times 10^{13} && \text{Simplify.} \\
&= (1.302 \times 10^1) \times 10^{13} && 13.02 = 1.302 \times 10^1 \\
&= 1.302 \times 10^{14} && \text{Product of Powers} \\
&= 130,200,000,000,000 && \text{Standard form}
\end{aligned}$$

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29. $(6.02 \times 10^{23})(5 \times 10^{-14})$

SOLUTION:

$$
\begin{aligned}
\left(6.02\times10^{23}\right)\left(5\times10^{-14}\right) &= (6.02\times5)\left(10^{23}\times10^{-14}\right) && \text{Commutative and Associative Properties} \\
&= 30.1\times10^{23+(-14)} && \text{Product of Powers} \\
&= 30.1\times10^{9} && \text{Simplify.} \\
&= \left(3.01\times10^{1}\right)\times10^{9} && 30.1=3.01\times10^{1} \\
&= 3.01\times10^{10} && \text{Product of Powers} \\
&= 30,100,000,000 && \text{Standard form}
\end{aligned}
$$

30. $(7 \times 10^{5})^{2}$

SOLUTION:

$$
\begin{aligned}
\left(7\times10^{5}\right)^{2} &= \left(7\times10^{5}\right)\left(7\times10^{5}\right) \\
&= (7\times7)\left(10^{5}\times10^{5}\right) && \text{Commutative and Associative Properties} \\
&= 49\times10^{10} && \text{Product of Powers} \\
&= \left(4.9\times10^{1}\right)\times10^{10} && 49=4.9\times10^{1} \\
&= 4.9\times10^{11} && \text{Product of Powers} \\
&= 490,000,000,000 && \text{Standard form}
\end{aligned}
$$

31. $(1.1 \times 10^{-2})^{2}$

SOLUTION:

$$
\begin{aligned}
\left(1.1\times10^{-2}\right)^{2} &= \left(1.1\times10^{-2}\right)\left(1.1\times10^{-2}\right) \\
&= (1.1\times1.1)\left(10^{-2}\times10^{-2}\right) && \text{Commutative and Associative Properties} \\
&= 1.21\times10^{-4} && \text{Product of Powers} \\
&= 0.000121 && \text{Standard form}
\end{aligned}
$$

32. $(9.1 \times 10^{-2})(4.2 \times 10^{-7})$

SOLUTION:

$$\begin{aligned}
(9.1\times10^{-2})(4.2\times10^{-7}) &= (9.1\times4.2)(10^{-2}\times10^{-7}) && \text{Commutative and Associative Properties}\\
&= 38.22\times10^{-2+(-7)} && \text{Product of Powers}\\
&= 38.22\times10^{-9} && \text{Simplify.}\\
&= (3.822\times10^{1})\times10^{-9} && 38.22 = 3.822\times10^{1}\\
&= 3.822\times10^{-8} && \text{Product of Powers}\\
&= 0.00000003822 && \text{Standard form}
\end{aligned}$$

33. $(3.14 \times 10^{2})(6.1 \times 10^{-3})$

SOLUTION:

$$\begin{aligned}
(3.14\times10^{2})(6.1\times10^{-3}) &= (3.14\times6.1)(10^{2}\times10^{-3}) && \text{Commutative and Associative Properties}\\
&= 19.154\times10^{2+(-3)} && \text{Product of Powers}\\
&= 19.154\times10^{-1} && \text{Simplify.}\\
&= (1.9154\times10^{1})\times10^{-1} && 19.154 = 1.9154\times10^{1}\\
&= 1.9154\times10^{0} && \text{Product of Powers}\\
&= 1.9154 && \text{Standard form}
\end{aligned}$$

34. **EVENT PLANNING** A hall does not charge a rental fee as long as at least $4000 is spent on food. For the prom, the hall charges $28.95 per person for a buffet. How many people must attend the prom to avoid a rental fee for the hall?

SOLUTION:

Let x be the number of people who attend the prom.

$$\begin{aligned}
28.95x &\geq 4000\\
x &\geq 138.2
\end{aligned}$$

So, at least 139 people must attend the prom to avoid the rental fee.

Determine whether the graphs of each pair of equations are *parallel*, *perpendicular*, or *neither*.

35. $y = -2x + 11$

$y + 2x = 23$

SOLUTION:

Write both lines in slope-intercept form.

$y = -2x + 11$

$y = -2x + 23$

The slope of both lines is −2, so the lines are parallel.

36. $3y = 2x + 14$
$-3x - 2y = 2$

SOLUTION:
Write both lines in slope-intercept form.
$y = \frac{2}{3}x + \frac{14}{3}$
$y = -\frac{3}{2}x - 1$
The slopes of the lines are negative reciprocals of each other, so the lines are perpendicular.

37. $y = -5x$
$y = 5x - 18$

SOLUTION:
The slopes of the lines are −5 and 5. Because these slopes are not the same and are not negative reciprocals, the lines are neither parallel nor perpendicular.

38. **AGES** The table shows equivalent ages for horses and humans. Write an equation that relates human age to horse age and find the equivalent horse age for a human who is 16 years old.

Horse age (x)	0	1	2	3	4	5
Human age (y)	0	3	6	9	12	15

SOLUTION:
According to the table, human age y is always 3 times the horse age x. This can be represented as a direct variation.
$y = 3x$
Let $y = 16$.
$16 = 3x$
$\frac{16}{3} = x$
The equivalent horse age for a human who is 16 years old is $\frac{16}{3}$ years, or 5 years 4 months.

Find the total price of each item.
39. umbrella: $14.00
tax: 5.5%

SOLUTION:
Find the tax.
$$\begin{aligned} 5.5\% \text{ of } \$14.00 &= 0.055 \times 14 \\ &= 0.77 \end{aligned}$$
Add the tax to the original price.
$14.00 + $0.77 = $14.77
So, the total price of the umbrella is $14.77.

40. sandals: $29.99
tax: 5.75%

SOLUTION:

Find the tax.

$$\begin{aligned} 5.75\% \text{ of } \$29.99 &= 0.0575 \times 29.99 \\ &\approx 1.72 \end{aligned}$$

Add the tax to the original price.
$29.99 + $1.72 = $31.71
So, the total price of the sandals is $31.71.

41. backpack: $35.00
tax: 7%

SOLUTION:

Find the tax.

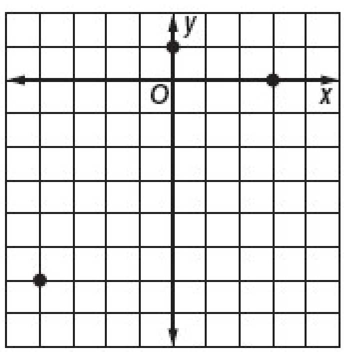
$$\begin{aligned} 7\% \text{ of } \$35.00 &= 0.07 \times 35 \\ &= 2.45 \end{aligned}$$

Add the tax to the original price.
$35.00 + $2.45 = $37.45
So, the total price of the backpack is $37.45.

Graph each set of ordered pairs.

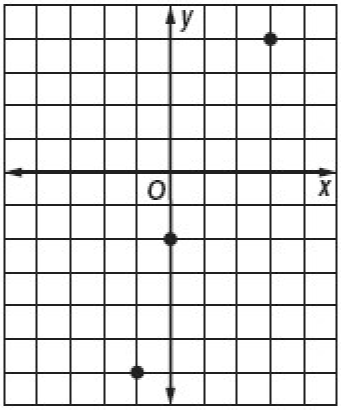
42. (3, 0), (0, 1), (−4, −6)

SOLUTION:



43. (0, −2), (−1, −6), (3, 4)

SOLUTION:



44. (2, 2), (−2, −3), (−3, −6)

SOLUTION: