hourly wage $ per hr = 12 $ ÷ 2 1/2 hr

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Mathematics & Literacy

Students can't Do Algebra if they ...
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Students can't **Do Algebra** if they ...

1. can't read and write.
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2. aren't familiar with the basic mathematical models and their rules.

   - linear equation:
     
     \[2x + 3 = 7\]

   - linear inequality:
     
     \[x - 4 < 8\]

   - quadratic equation:
     
     \[x^2 + 2x - 3 = 0\]
Mathematics & Literacy

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   - linear equation: $2x + 3 = 7$
   - linear inequality: $x - 4 < 8$
   - quadratic equation: $x^2 + 2x - 3 = 0$

3. can't do unit analysis.
   - $\frac{7 \text{ dollars}}{1 \text{ hour}} \times 4 \text{ hours} = 28 \text{ dollars}$
You were baby-sitting for $2 \frac{1}{2}$ hours and got paid $12. What was your hourly wage?
You were baby-sitting for $2 \frac{1}{2}$ hours and got paid $12$. What was your hourly wage?

Solution

\[
\frac{12}{2 \frac{1}{2}} = \frac{12}{\frac{5}{2}}
\]

\[
= 12 \cdot \frac{2}{5}
\]

\[
= \frac{24}{5}
\]

\[
= $4.80 \text{ per hr}
\]
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\[
\begin{align*}
\text{hourly wage} & \quad \text{\$ per hr} \\
= & \quad 12 \text{ \$} \\
\div & \quad 2 \frac{1}{2} \text{ hr}
\end{align*}
\]
Write equation for hourly wage.

Rewrite denominator as improper fraction.

To divide, multiply by reciprocal of denominator.

Multiply fraction by whole number.

Rewrite fraction as a decimal and add units.
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Cost of Meal (dollars) + Tip (dollars) = Total Cost (dollars)

Amount earned ($) + Hourly wage ($ per hr) = Time worked (hrs)

= + − × ÷
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cost of meal $ \quad \text{total cost} \quad \text{tip}$ $

= \quad + \quad - \quad \div \quad \times$
The cost of your meal in a restaurant is $19.72. You want to give a tip of about 20%. What is your total cost?
You are a food server. Your customer leaves you $35.00 for a meal that cost $27.54. How much is your tip?
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You are a food server. Your customer leaves you $35.00 for a meal that cost $27.54. How much is your tip?

You are a food server. Your customer leaves you $35.00 for a meal that cost $27.54. Did you get a 20% tip?
A jet pilot is flying from Los Angeles to Chicago at a speed of 500 miles per hour. When the plane is 600 miles from Chicago, an air traffic controller tells the pilot that it will be 2 hours before the plane can get clearance to land. The pilot knows the speed of the jet must be greater than 322 miles per hour or the jet will stall.

a. At what speed would the jet have to fly to arrive in Chicago in 2 hours?

b. Is it reasonable for the pilot to fly to Chicago at the reduced speed or must the pilot take some other action?
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a. At what speed should a plane fly to go 600 miles in 2 hours?

b. The plane will stall if it flies at less than 322 miles per hour. Can it fly at the speed you found in part a?
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a. At what speed should a plane fly to go 600 miles in 2 hours?
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distance $\text{mi}$ = speed $\frac{\text{mi}}{\text{hr}}$ • time $\text{hr}$
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a. At what speed should a plane fly to go 600 miles in 2 hours?

\[
\text{distance \, mi} = \text{speed \, \frac{mi}{hr}} \times \text{time \, hr}
\]

\[
(600 \, \text{mi}) = (x \, \frac{\text{mi}}{\text{hr}})(2 \, \text{hr})
\]

300 = x

The plane should fly 300 miles per hour.
b. The plane will stall if it flies at less than 322 miles per hour. Can it fly at the speed you found in part a?

Answer

At 300 miles per hour the plane will stall. So, the pilot needs to take some other action, such as making the trip longer.
What Are the Basic Math Models?
What Are their Rules?
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Linear  \[ 2x + 4 = 7 \]
What Are the Basic Math Models?
What Are their Rules?

Linear \[2x + 4 = 7\]
Quadratic \[x^2 + 3x - 7 = 0\]
What Are the Basic Math Models? What Are their Rules?

Linear $2x + 4 = 7$
Quadratic $x^2 + 3x - 7 = 0$
Cubic $2x^3 + 7 = 23$
What Are the Basic Math Models? What Are their Rules?

Polynomial

- Linear: $2x + 4 = 7$
- Quadratic: $x^2 + 3x - 7 = 0$
- Cubic: $2x^3 + 7 = 23$
What Are the Basic Math Models?
What Are their Rules?

**Polynomial**

- **Linear**
  \[2x + 4 = 7\]
- **Quadratic**
  \[x^2 + 3x - 7 = 0\]
- **Cubic**
  \[2x^3 + 7 = 23\]

**Radical**

- **Square Root**
  \[\sqrt{x} = 9\]
What Are the Basic Math Models? What Are their Rules?

**Polynomial**
- Linear $2x + 4 = 7$
- Quadratic $x^2 + 3x - 7 = 0$
- Cubic $2x^3 + 7 = 23$

**Radical**
- Square Root $\sqrt{x} = 9$

**Rational**
- $\frac{1}{x} = 4$
- $\frac{2}{x} = \frac{x + 3}{x - 4}$
What Are the Basic Math Models? What Are their Rules?

**Polynomial**

- Linear: \(2x + 4 = 7\)
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What Are the Basic Math Models? What Are their Rules?

**Exponential & Log**

**Exponential** \(2^x = 8\)

**Logarithmic** \(\log_2 x = 3\)
What Are the Basic Math Models? What Are their Rules?

**Exponential & Log**
- Exponential: $2^x = 8$
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**Trigonometric**
- Tangent: $\tan x = 1$
- Sine: $\sin 2x = \frac{1}{2}$
- Cosine: $\cos x = 0$
What Are the Basic Math Models?
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**Exponential & Log**
- Exponential: $2^x = 8$
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DIRECTIONS

Sketch the graph of each function over its given domain.

Identify the shape that is formed by the collection of all 15 graphs.

Relation | Domain or Range
--- | ---
1. \(y = 0\) | \(3 \leq y \leq 5\)
2. \(y = 5\) | \(-2 \leq x \leq 0\)
3. \(y = -2\) | \(1 \leq y \leq 5\)
4. \(y = 1\) | \(-5 \leq x \leq -2\)
5. \(3y = 2x^2 + 21x^2 + 60x + 34\) | \(-5 \leq x \leq -2\)
6. \(y = x^2 - 2x - 2\) | \(-2 \leq x \leq 0\)
7. \(y = -2x - 2\) | \(0 \leq x \leq 1\)
8. \(y = -x - 7\) | \(1 \leq x \leq 3\)
9. \(y = -4x + 7\) | \(2.5 \leq x \leq 3\)
10. \(3y = 2x - 14\) | \(2.5 \leq x \leq 5.5\)
11. \(x = 5.5\) | \(-1 \leq y \leq 0\)
12. \(y = -2x + 11\) | \(5 \leq x \leq 5.5\)
13. \(x = 5\) | \(1 \leq y \leq 2.5\)
14. \(18y = -2x^2 + 14x + 25\) | \(2 \leq x \leq 5\)
15. \(4y = -x + 12\) | \(0 \leq x \leq 2\)
The diagram shows a graph with the state of Texas outlined on a grid. The graph includes the x and y axes, with the number 15 marked at a specific point on the outline.
You are traveling at a speed of 60 miles per hour. What is your speed in feet per second?

Solution
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**Solution**

\[
\frac{60 \text{ mi}}{1 \text{ hr}} = \frac{\text{ft}}{\text{sec}}
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**Solution**

\[
\frac{60 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = \text{ ft} \text{ sec}^{-1}
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\frac{60 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = \frac{5280 \text{ ft}}{60 \text{ sec}} = \frac{88 \text{ ft}}{1 \text{ sec}}
\]
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