

Bellwork Hon Alg 2 Tuesday, November 22, 2016

Find the exact solutions to each by completing the square.

1. $2x^2 - 10x = 4$

2. $3x^2 + 7x - 8 = 0$

3. Write this quadratic function in Vertex Form: $y = -2x^2 + 12x - 20$

4. An 8 foot tall sign post casts a shadow. At the same time a 3 foot long shadow is cast by a small tree. The height of the tree is 2 feet less than the length of the sign posts shadow. How tall is the tree?

Claim:

Evidence:

Reasoning:

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ANSWERS

Find the exact solutions to each by completing the square.

1. $\frac{2x^2 - 10x}{2} = \frac{4}{2}$

$$x^2 - 5x + \frac{25}{4} = 2 + \frac{25}{4}$$

$$\sqrt{(x - \frac{5}{2})^2} = \sqrt{\frac{33}{4}} \rightarrow x - \frac{5}{2} = \pm \frac{\sqrt{33}}{2}$$

$$x = \frac{5}{2} \pm \frac{\sqrt{33}}{2}$$

2. $3x^2 + 7x - 8 = 0$

$$x^2 + \frac{7}{3}x + \frac{49}{36} = \frac{8}{3} + \frac{49}{36}$$

$$\sqrt{(x + \frac{7}{6})^2} = \sqrt{\frac{145}{36}}$$

$$x + \frac{7}{6} = \pm \frac{\sqrt{145}}{6}$$

$$x = \frac{-7 \pm \sqrt{145}}{6}$$

3. Write this quadratic function in Vertex Form: $y = -2x^2 + 12x - 20$

$$\frac{y+20}{-2} = \frac{-2x^2 + 12x}{-2}$$

$$\frac{y+20}{-2} + 9 = (x-3)^2$$

$$\frac{y+20}{-2} + 9 = x^2 - 6x + 9$$

$$\frac{y+20}{-2} = (x-3)^2 - 9$$

$$y+20 = -2(x-3)^2 + 18$$

$$y = -2(x-3)^2 - 2$$

4. An 8 foot tall sign post casts a shadow. At the same time a 3 foot long shadow is cast by a small tree. The height of the tree is 2 feet less than the length of the sign posts shadow. How tall is the tree?

Claim:

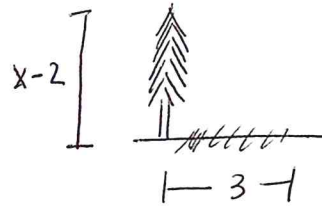
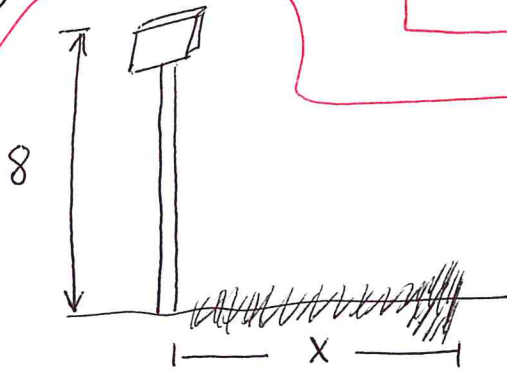
Evidence:

Reasoning:

Answers on
next sheet

#4

CLAIM: height of tree is 4 feet

Evidence

$$\frac{8}{x-2} = \frac{x}{3}$$

$$3 \cdot 8 = x(x-2)$$

$$24 = x^2 - 2x$$

$$0 = x^2 - 2x - 24$$

$$0 = (x-6)(x+4)$$

$$x = -4, 6$$

$$\begin{array}{r} -24 \\ -6 \times 4 \\ -2 \end{array}$$

$x=6$ is the only reasonable answer
therefore height of the tree is $6-2 = 4$ feet tall

Reasoning: The two Δ 's created in this situation are similar, therefore, corresponding sides are proportional. By cross multiplying a Quadratic is created. Factoring this Quadratic leads to two solutions. The negative solution doesn't make sense so $x=6$ is the solution. Since the height of the tree is defined as $x-2$ the height becomes $6-2 = 4$.