Math 10

Lesson 7-4 Answers

Lesson Questions

Question 1

Solving a triangle means that we solve for the acute angles and the sides of the triangle. In this case we are solving for side KN and for ∠K and ∠N. The strategy I chose is just one variation among many. First, I calculate KN using the Pythagorean equation
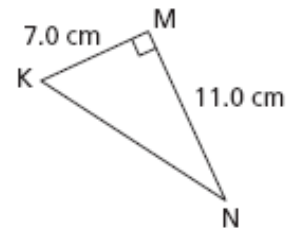
$$\overline{KN}^2 = 7.0^2 + 11.0^2$$

$$\overline{KN} = \sqrt{7.0^2 + 11.0^2}$$

$$\overline{KN} = \sqrt{170}$$

$$\overline{KN} = 13.0384$$

$$\overline{KN} = 13.0$$

Now that I have all three sides of the triangle, I could calculate the angles using various trig functions, but where possible I always choose the solution that does not use a value that I have calculated. Why? If I made a mistake in the first calculation, the mistake will mess up the subsequent calculations.

To find ∠K we use the tangent function.

$$\angle K = \tan^{-1}\left(\frac{opp}{adj}\right)$$

$$\angle K = \tan^{-1}\left(\frac{11.0}{7.0}\right)$$

$$\angle K = 57.5^{\circ}$$

To find ∠N we either (a) remember that the angles of a triangle add up to 180 or (b) use the tangent function.

∠N = 180 – 90 – 57.5 = 32.5

The side KN = 13.0 cm, ∠N = 32.5° and ∠K = 57.5°.

Question 2

∠G + ∠H + ∠J = 180

90 + 39 + ∠J = 180

∠J = 51°

$$\tan 39 = \frac{9.0}{GH}$$

$$GH = \frac{9.0}{\tan 39}$$

GH = 11.1 cm

$$\sin 39 = \frac{9.0}{HJ}$$

$$HJ = \frac{9.0}{\sin 39}$$

HJ = 14.3 cm

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L6-4

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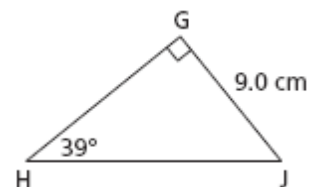
Question 3

For a hexagon the circle is divided into 6 triangular pies. The angle for each pie will be

$$\frac{360}{6} = 60$$

Each pie can be divided into two resulting in an angle of 30°.

Using the sin function we get	Using the cos function we get
$\sin 30 = \dfrac{x}{3}$	$\cos 30 = \dfrac{h}{3}$
$x = 3\sin 30$	$h = 3\cos 30$
$x = 1.5$	$h = 2.598108...$
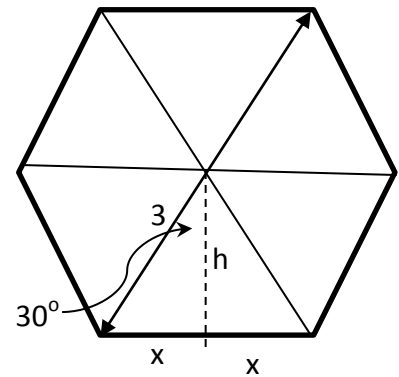
There are six sides, each with a length of 2x

$$perimeter = 6 \cdot 2x$$
$$perimeter = 12x$$
$$perimeter = 12(1.5)$$
$$perimeter = \mathbf{18\,ft.}$$

There are 6 pies, each with height h and base x

$$area = 6 \cdot \frac{1}{2}bh$$
$$area = 3bh$$
$$area = 3(2 \cdot 1.5)2.598108...$$
$$area = \mathbf{23.4\,ft^2}$$

Assignment

1. a) Pythagorean Theorem b) Sine ratio
    c) Pythagorean Theorem d) Pythagorean Theorem

2. a) $\angle T = 57°$, TU = 23.0 cm, VU = 19.2 cm
    b) $\angle Y = 43°$, WY = 8.7 cm, XY = 6.3 cm
    c) ZB = 11.3 cm, $\angle B = 60.3°$, $\angle Z = 29.7°$
    d) $\angle E = 61°$, CD = 12.0 cm, CE = 6.6 cm

3. 173 ft.

4. a) 68 km b) 31°

5. a) 4° b) 15.0 m

6. a) 31° b) 118°

7. 7.3 cm

8. a) 3 in.^{2} b) 15 in.^{3}

9. 36 cm

10. 15.6 cm; 11.6 cm^2