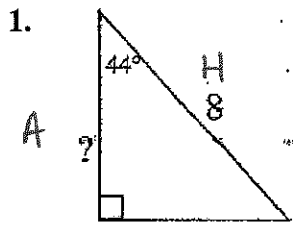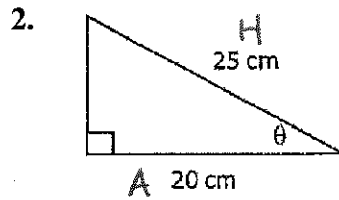# UNIT 2 REVIEW FOR ANALYTIC GEOMETRY MIDTERM

Find the missing side or angle for each of the following: $\sin \theta = \dfrac{opp}{hyp}$ $\cos \theta = \dfrac{adj}{hyp}$ $\tan \theta = \dfrac{opp}{adj}$
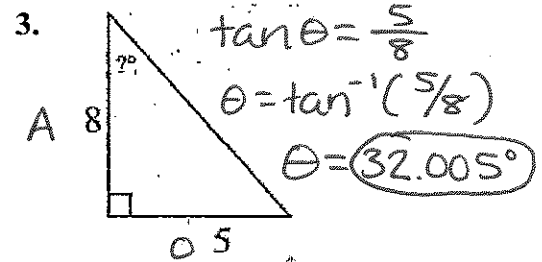
1.

$\cos 44 = \dfrac{x}{8}$

$x = 8 \cdot \cos 44 = \boxed{5.755}$

2.

$\cos \theta = \dfrac{20}{25}$
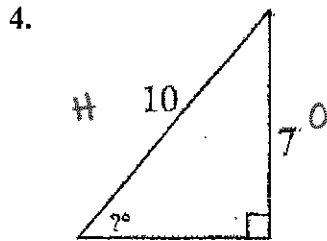
$\cos^{-1}\left(\dfrac{20}{25}\right) = \theta$

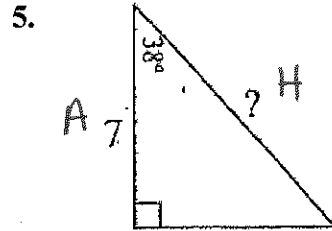$\theta = \boxed{36.870°}$

3.

$\tan \theta = \dfrac{5}{8}$

$\theta = \tan^{-1}\left(\dfrac{5}{8}\right)$
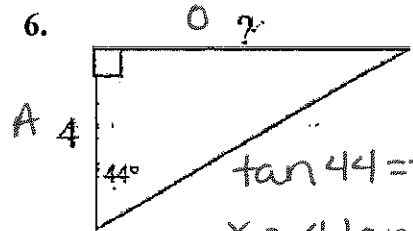
$\theta = \boxed{32.005°}$

4.

$\sin \theta = \dfrac{7}{10}$

$\theta = \sin^{-1}\left(\dfrac{7}{10}\right) = \boxed{44.427°}$
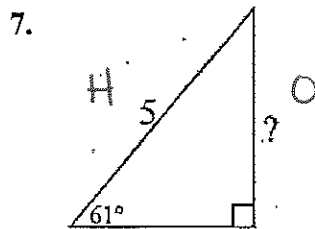
5.

$\cos 38 = \dfrac{7}{x}$

$x = \dfrac{7}{\cos 38} = \boxed{8.883}$
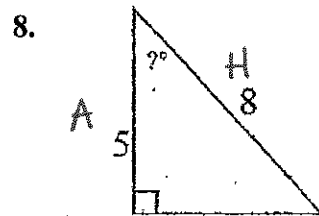
6.

$\tan 44 = \dfrac{x}{4}$

$x = 4 \cdot \tan 44$

$x = \boxed{3.863}$

7.

$\sin 61 = \dfrac{x}{5}$
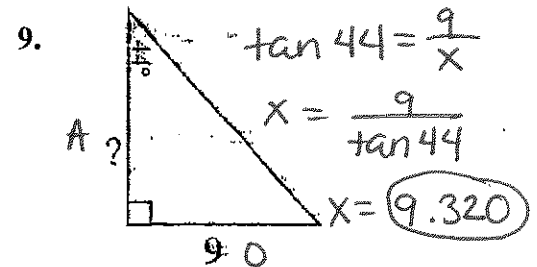
$x = 5 \cdot \sin 61 = \boxed{4.373}$

8.

$\cos \theta = \dfrac{5}{8}$
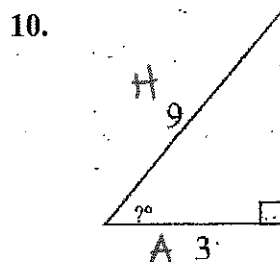
$\theta = \cos^{-1}\left(\dfrac{5}{8}\right)$

$\theta = \boxed{51.318°}$

9.

$\tan 44 = \dfrac{9}{x}$
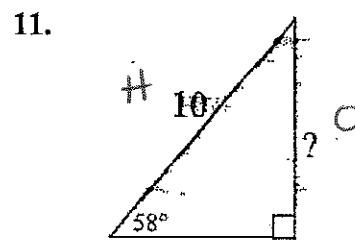
$x = \dfrac{9}{\tan 44}$

$x = \boxed{9.320}$

10.

$\cos \theta = \dfrac{3}{9}$

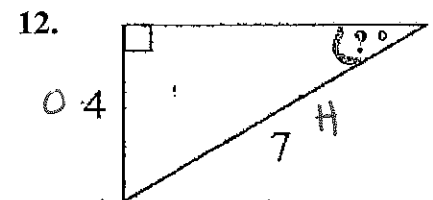$\theta = \cos^{-1}\left(\dfrac{3}{9}\right)$

$\theta = \boxed{70.529°}$

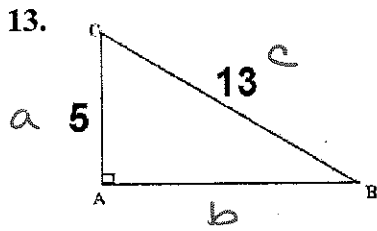**11.**

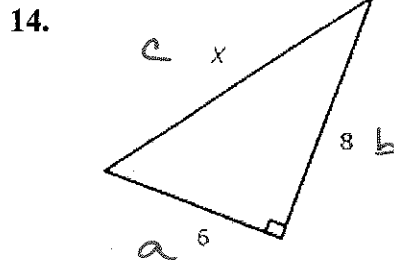$\sin 58 = \dfrac{x}{10}$

$x = 10 \cdot \sin 58$

$x = \boxed{8.480}$

12.

$\sin \theta = \dfrac{4}{7}$
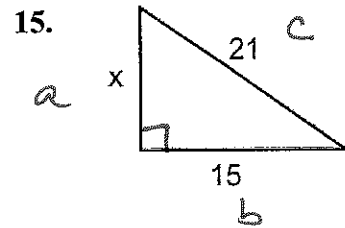
$\theta = \sin^{-1}\left(\dfrac{4}{7}\right)$

$\theta = \boxed{34.850°}$

13.

$$5^2 + x^2 = 13^2$$
$$25 + x^2 = 169$$
$$-25 \qquad -25$$
$$x^2 = 144$$
$$x = \sqrt{144} = \boxed{12}$$

14.

$$6^2 + 8^2 = x^2$$
$$36 + 64 = x^2$$
$$100 = x^2$$
$$x = \sqrt{100} = \boxed{10}$$

15.

$$x^2 + 15^2 = 21^2$$
$$x^2 + 225 = 441$$
$$-225 \qquad -225$$
$$x^2 = 216$$
$$x = \sqrt{216} = \boxed{6\sqrt{6}}$$

16. Two telephone poles are supported by **90** -foot cables as shown below. The cables are attached at a height of 50 feet. How far apart are the telephone poles?

50 ft   90 ft   90 ft   50 ft
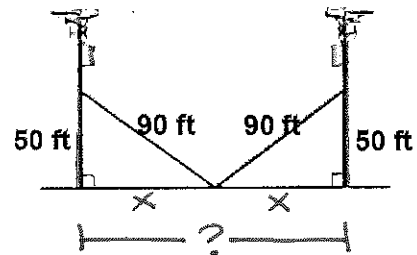
$$x^2 + 50^2 = 90^2$$
$$x^2 + 2500 = 8100$$
$$-2500 \quad -2500$$
$$x^2 = 5600$$
$$x = \sqrt{5600} = 74.833 \ (2) = \boxed{149.666 \ ft}$$

Don't forget to double it.

17. If the shadow of this building is 50 meters long when the angle of elevation to the sun is **30°** what is the approximate height, in meters, of the building?
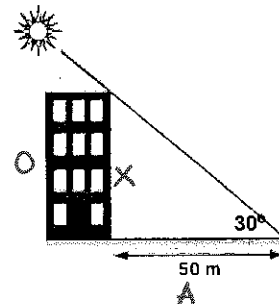

50 m

$$\tan 30 = \frac{x}{50}$$
$$x = 50 \cdot \tan 30$$
$$x = \frac{50\sqrt{3}}{3} = \boxed{28.868 \ m}$$

could also use special Right △ rules. to get the short leg, divide 50 by √3 so $\frac{50}{\sqrt{3}} = \frac{50\sqrt{3}}{3} = \boxed{28.868 \ m}$

18. Given $\triangle HIJ \sim \triangle KLM$ and sin $(\angle J) = 2/9$, find sin $(\angle M) = \boxed{\frac{2}{9}}$

same position.
same trig function
same ratio.

**19.** If $\cos(x) = \sin(45°)$, what is the value of x? $\underline{90-45 = \boxed{45°}}$

20. If $\sin(x) = \cos(27°)$, what is the value of x? $\underline{90-27 = \boxed{63°}}$

21. If $\cos(x) = \sin(45°)$, what is the value of x? $\underline{90-45 = \boxed{45°}}$

22. What is the relationship between the sin and cos functions that you used to answer #'s 19-21?

They are complements of each other.

22. A bridge is built across a stream as shown in this diagram. The top of the bridge is 6 meters above the stream. Find the length of the bridge in meters.
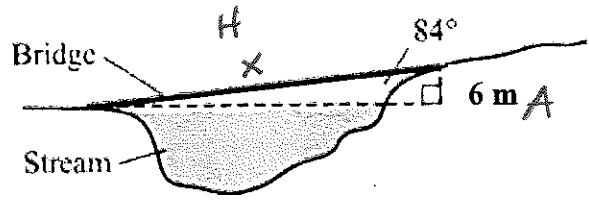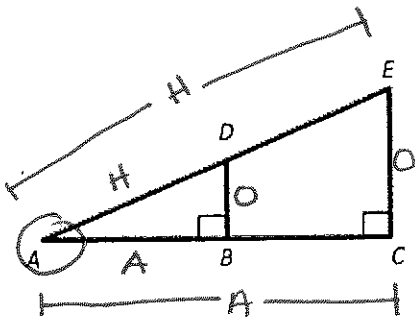

$$\cos 84 = \frac{6}{x}$$

$$x = \frac{6}{\cos 84} = \boxed{57.401\,m}$$

23. In the drawing below, $\triangle ACE \sim \triangle ABD$.

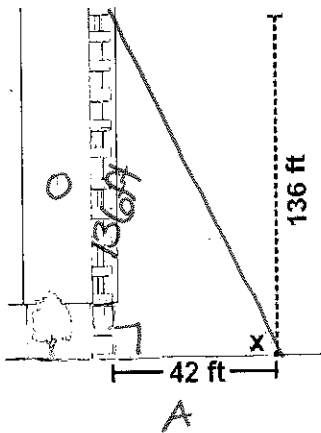Identify the following trig ratios using corresponding sides of the following:

$$\text{Sin A} = \frac{DB}{AD} = \frac{EC}{AE}$$

$$\text{Cos A} = \frac{AB}{AD} = \frac{AC}{AE}$$

$$\text{Tan A} = \frac{DB}{AB} = \frac{EC}{AC}$$

24. Which equation can be used to determine the value of x? Find the value of x.

$$\tan \theta = \frac{136}{42}$$

$$\theta = \tan^{-1}\left(\frac{136}{42}\right)$$

$$\theta = \boxed{72.838^{\circ}}$$

25. What is the exact length of the diagonal of a square with a side length of 8 in?

spec Right $\triangle$

$H = leg \cdot \sqrt{2}$ or
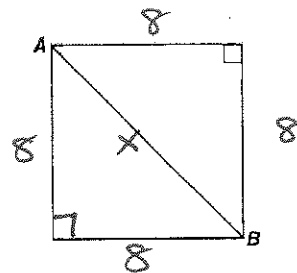
$\boxed{8\sqrt{2}\ in}$

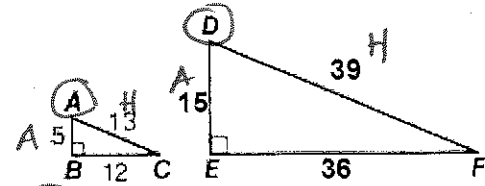Pyth. Theorem

$$8^2 + 8^2 = x^2$$
$$64 + 64 = x^2$$
$$128 = x^2$$
$$x = \sqrt{128} = \boxed{8\sqrt{2}\ in}$$

26. Right triangle ABC has sides of length 5, 12, and 13. Right triangle DEF is similar to ABC, but each side is three times longer than the corresponding side of ABC

Which fractions represent the cosine of $\angle A$ and the cosine of $\angle D$?

$$\cos A = \boxed{\frac{5}{13}}$$

$$\cos D = \frac{15}{39} = \boxed{\frac{5}{13}}$$