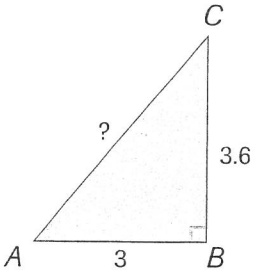
Name: _____

INVESTMENT 1

1. Using the Pythagorean Theorem, calculate the missing measure in each right triangle.

a)



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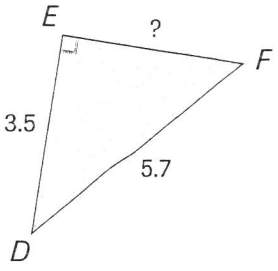

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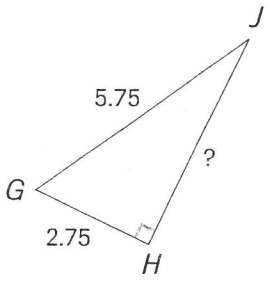
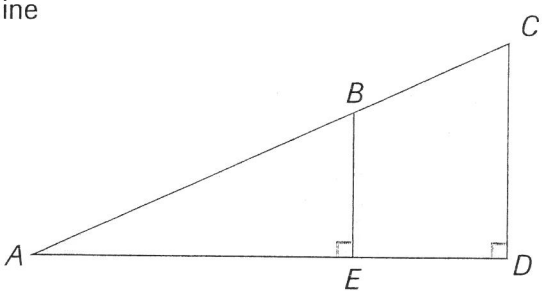


2. True or false?

a) All right triangles that contain a 20° angle are similar.

b) All right triangles with a leg measuring 5 cm are similar.

3. Two similar right triangles are shown. Determine whether the given ratios are proportional.



a) $\frac{\text{m } \overline{CD}}{\text{m } \overline{BE}}$ and $\frac{\text{m } \overline{AC}}{\text{m } \overline{AB}}$

b) $\frac{\text{m } \overline{CD}}{\text{m } \overline{AC}}$ and $\frac{\text{m } \overline{BE}}{\text{m } \overline{AB}}$

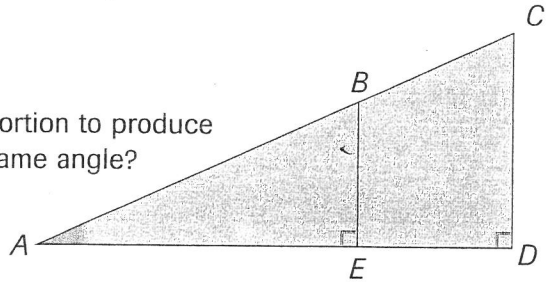
4. Two similar right triangles are shown.

a) What must be done to the following proportion to produce an equality between two sines of the same angle?

$$\frac{\text{m } \overline{CD}}{\text{m } \overline{BE}} = \frac{\text{m } \overline{AC}}{\text{m } \overline{AB}}$$

b) What must be done to the following proportion to produce an equality between two cosines of the same angle?

$$\frac{\text{m } \overline{AD}}{\text{m } \overline{AE}} = \frac{\text{m } \overline{AC}}{\text{m } \overline{AB}}$$



c) What must be done to the following proportion to produce an equality between two tangents of the same angle?

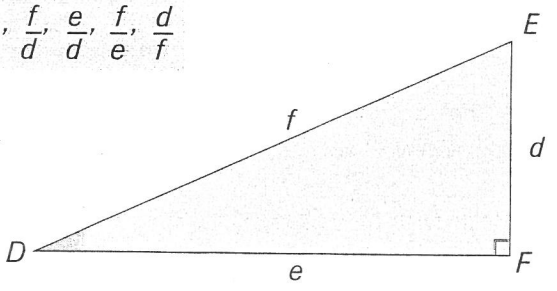
$$\frac{\text{m } \overline{CD}}{\text{m } \overline{BE}} = \frac{\text{m } \overline{AD}}{\text{m } \overline{AE}}$$

5. Here are six ratios in a right triangle: $\frac{d}{e}, \frac{e}{f}, \frac{f}{d}, \frac{e}{d}, \frac{f}{e}, \frac{d}{f}$

Find the one that represents:

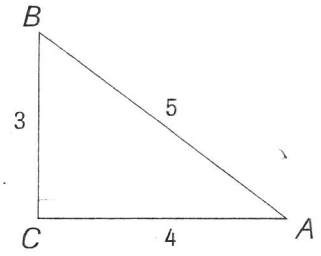
a) sin D ***b)*** cos D ***c)*** tan E

d) cos E ***e)*** sin E ***f)*** tan D



6. Find sin A in each of the following right triangles.

a)



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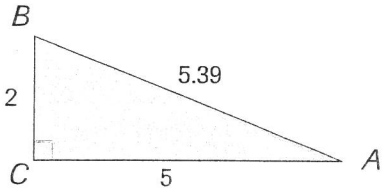

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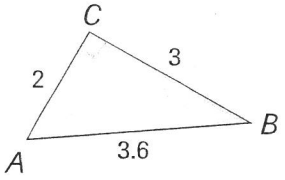

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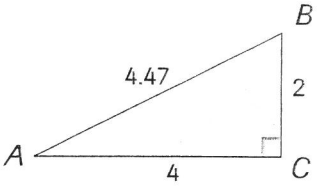
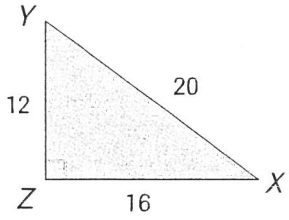


Trigonometry dates from the beginnings of mathematics. The Egyptians and the Babylonians studied problems that included elements of trigonometry.

7. For each right triangle, find the value of the sine, cosine and tangent of angle X.

a)



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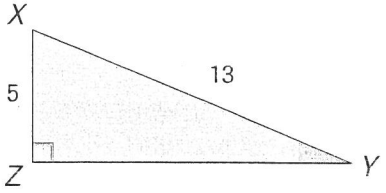

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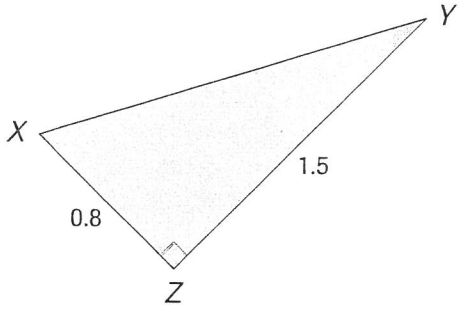
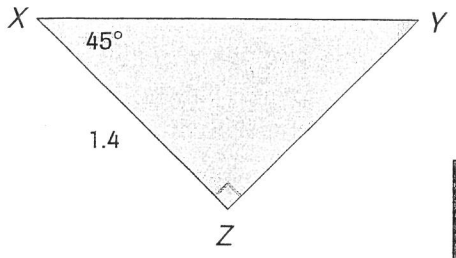


d)

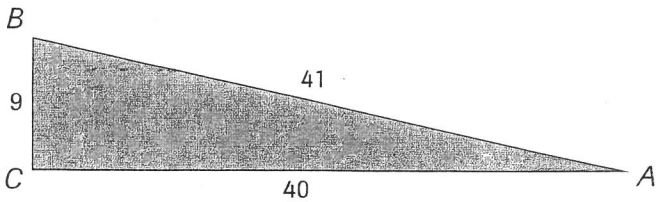


The first Greek mathematicians were not aware of trigonometric ratios.

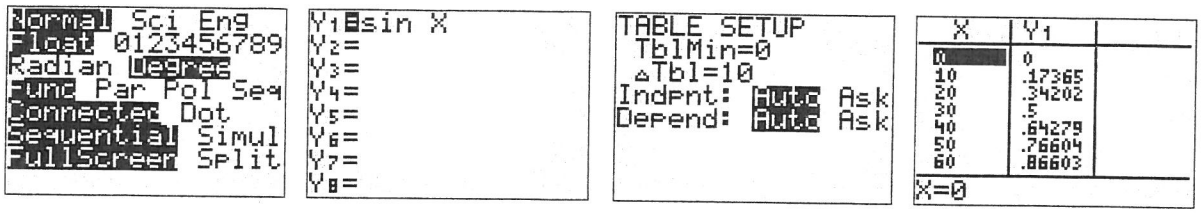
8. Give the possible names of each ratio.

a) $\frac{9}{40}$ ***b)*** $\frac{40}{41}$

c) $\frac{9}{41}$ ***d)*** $\frac{40}{9}$



9. Complete the table using a calculator.



a)

m ∠ A	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
sin A	■	■	■	■	■	■	■	■	■	■

b)

m ∠ A	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
cos A	■	■	■	■	■	■	■	■	■	■

c)

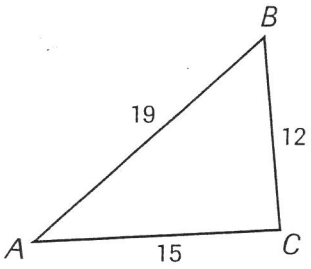
m ∠ A	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
tan A	■	■	■	■	■	■	■	■	■	■

10. Consider the triangle shown on the right.

a) Which side is opposite angle A?

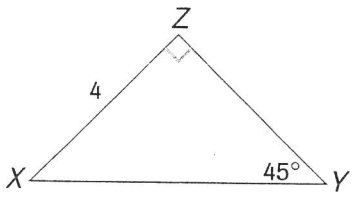
b) Which side is adjacent to angle A?

c) Can you calculate sin A? Why?

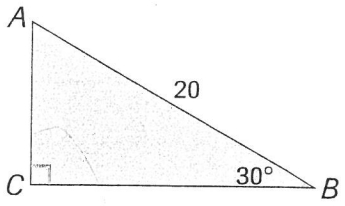


Indian mathematicians of the 4th to 6th centuries were primarily responsible for developing trigonometric ratios.

11. Is it possible to calculate tan 45° using the given right triangle? Justify your answer.



12. In a right triangle, a side measuring one-half the hypotenuse is opposite a 30° angle. Find the missing measures and calculate cos 60°.

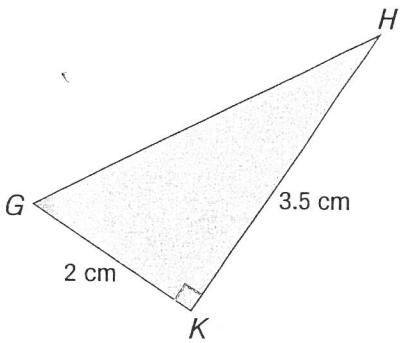


13. Using the information indicated on the figure, find:

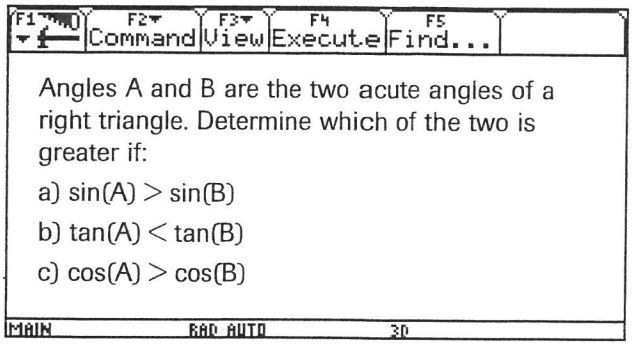
a) m $\overline{GH}$ ***b)*** tan G ***c)*** tan H

d) sin G ***e)*** cos H ***f)*** sin H

g) cos G



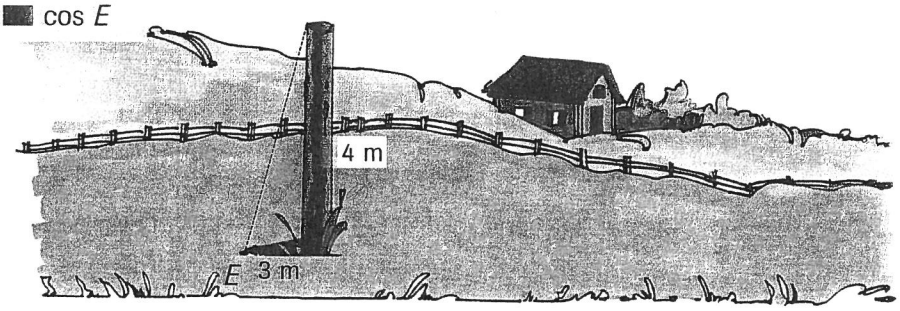
14.



15. At a given time of day, a 4 m pole casts a 3 m shadow. Express these two measures in terms of the sun's angle of elevation.

$4 = \blacksquare \sin E$

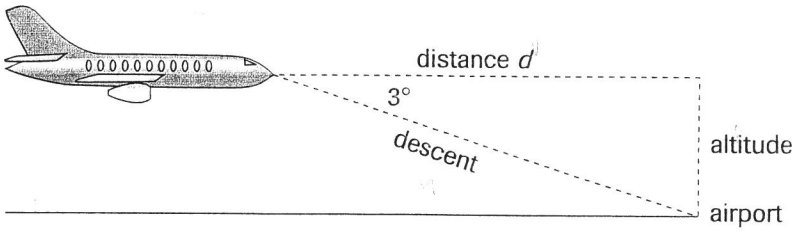
$3 = \blacksquare \cos E$



An angle of elevation is an angle above the horizontal.

16. A plane is at a horizontal distance d from an airport. To land at the airport, it must begin its descent at an angle of depression of 3°. Express the altitude of the plane in terms of d.

altitude = ■

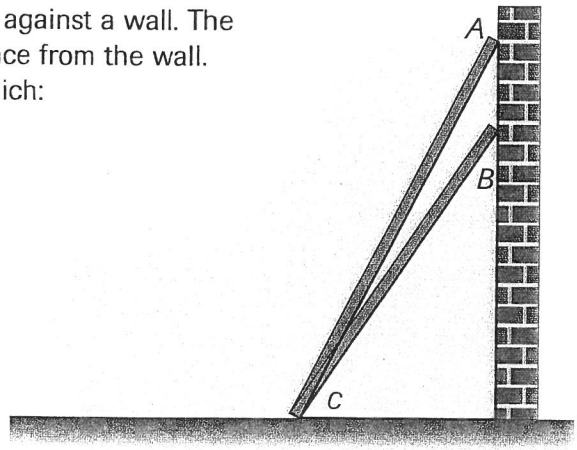


An angle of depression is an angle below the horizontal.

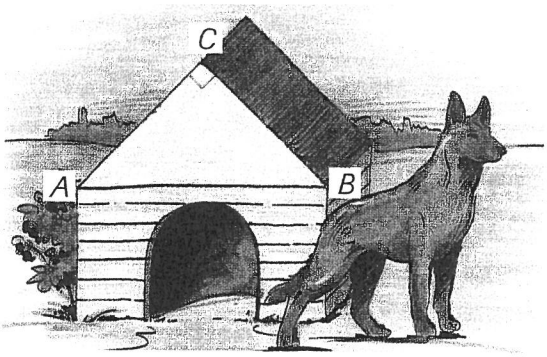
17. Two ladders of different lengths are placed against a wall. The bases of the ladders are at the same distance from the wall. Which of the ladders forms a triangle in which:

a) sin C is greater?

b) cos C is smaller?



18. Nadia builds a doghouse whose roof has the shape of an isosceles right triangle. The length of leg BC is 1 m.



a) What is the measure of $\overline{AC}$?

b) What is the length of the hypotenuse?

c) Find the value of each trigonometric ratio for angle A.

d) What are the values of these ratios if the shape of the roof is identical, but m $\overline{BC} = 1.2$ m?

e) What is the measure of angle A?

f) Using a calculator, express the following in decimal form:

1) $\sin 45°$ 2) $\cos 45°$ 3) $\frac{1}{\sqrt{2}}$ 4) $\frac{\sqrt{2}}{2}$ 5) $\tan 45°$

19. A right triangle has a 30° angle. Its hypotenuse measures 2 units.

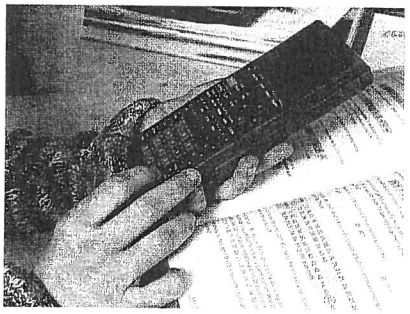
a) Find the length of the other two sides. Justify each step of your method.

b) Find the three trigonometric ratios for the 30° angle and the other acute angle.

c) Use a calculator to find the decimal form of:

1) $\cos 30°$ 2) $\sin 60°$ 3) $\frac{\sqrt{3}}{2}$

4) $\tan 30°$ 5) $\frac{1}{\sqrt{3}}$ 6) $\frac{\sqrt{3}}{3}$



THINK TANK

a) In triangle ABC, right-angled at C, $\tan A = \frac{3}{4}$. Find the value of $\tan B$. Justify your answer.

b) In triangle ABC, right-angled at C, $\tan A = \tan B$. What can be said about angles A and B? Explain.

c) In triangle ABC, right-angled at C, can $\sin A = \cos A$? Explain.

d) Using the given right triangle, show that:

1) $\tan A = \frac{\sin A}{\cos A}$

2) $(\sin A)^2 + (\cos A)^2 = 1$