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## DAY 1 - Pythagorean Theorem

1. 

Find the length of the hypotenuse to the nearest tenth of a unit.

b)

2.

Find the length of the indicated side to the nearest tenth of a metre.


c)

15 m
3.

Jie-ling walks home from school by walking around two sides of a rectangular park. The length of the park is 125 m and the width is 121 m . If Jie-ling were to walk diagonally across the park, how far would she walk?
d)

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4.

Brook is flying a kite while standing 24 m from the base of a tree at the park. Her kite is directly above the $3-\mathrm{m}$ tree and the $25-\mathrm{m}$ string is fully extended. Approximately how far above the tree is her kite flying?
5.

Natalya is playing baseball. She catches a ground ball at third base. The player on the opposing team is running toward first base. How far does Natalya have to throw the ball to throw the runner out?

7.

Darlene goes camping with her children. As they set up the tent, they discover that the vertical support poles are missing. What length of pole does Darlene need to buy?

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## IF there's time

Investigation:
Complete the table below using the triangles provided. Round answers to one decimal place.


| Triangle | $\frac{\text { opposite }}{\text { hypotenuse }}$ | $\sin A$ | $\frac{\text { adjacent }}{\text { hypotenuse }}$ | $\cos A$ | $\frac{\text { opposite }}{\text { adjacent }}$ | $\tan \mathrm{A}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\Delta \mathrm{ABC}$ |  |  |  |  |  |  |
| $\Delta X Y Z$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1. What do you notice about the ratios of lengths of sides and the trigonometric ratios in both triangles?
2. Ways to label triangle angles and sides. Small case vs capitals, inside triangle vs outside, where angles and sides go in equations, how to round
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## DAY 2 - Primary Trig Ratios - SOH CAH TOA - solving for sides

1. Practice labelling tiangles using side names: opposite, adjacent, hypotenuse.
a)

b)

c)

d)

e)

f)


MAKE SURE your calculator is in DEGREE mode!
2. Use a scientific calculator to find each value to four decimal places.
a) $\sin 65^{\circ}$
b) $\quad \sin 48^{\circ}$
c) $\cos 35^{\circ}$
d) $\quad \cos 58^{\circ}$
e) $\tan 75^{\circ}$
f) $\quad \tan 39^{\circ}$
3. Solve for side $x$
a.

b.

C.

$\qquad$
4.

Hannah wants to make a lean-to shelter against a tree. She starts with a plank that is 2.1 m long. If she wants to have a $45^{\circ}$ angle between the ground and the lower end of the plank, how far away from the base of the tree should the lower end of the lean-to be?

5.

Jeff will use right triangles in his design for the elevator to take resort guests down the cliff. He plans to have an angle of $45^{\circ}$, and a diagonal length of 1.2 m . How long will the vertical piece for this part of the elevator be?

7.

The hypotenuse of a right triangle is 17.9 cm long.
a) How long is the side opposite an angle that measures $27^{\circ}$, to the nearest tenth of a centimetre?
b) What is the measure of the third angle in this triangle?
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## DAY 3 - More Practice SOH CAH TOA

## 1.

Label the hypotenuse, the opposite side, and the adjacent side relative to the marked angle.
a) A

b) D

c)

d)


MAKE SURE your calculator is in DEGREE mode!
2. Use a scientific calculator to find the measure of each $\angle$ to the nearest degree.
a) $\sin A=0.8192$
b) $\quad \sin A=0.9962$
c) $\tan \mathrm{B}=0.9063$
d) $\quad \cos B=-0.8480$
e) $\cos B=0.1233$
f) $\quad \tan B=0.6680$
3. Solve for angle $\Theta$
a.

b.


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4. Solve the following for $x$.
a.

b.

d.

6.
. Write the ratio comparing the length of the adjacent side to the length of the hypotenuse for the marked angle. Then, express the ratio as a decimal, rounded to three decimal places. Compare answers with a classmate.
Then find angle $H$

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## DAY 4 - Similar Triangles

1. Write a proportionality statement for each pair of similar triangles
a) $\triangle \mathrm{ABC} \sim \triangle \mathrm{DEF}$

b) $\triangle \mathrm{PQR} \sim \triangle \mathrm{UTS}$

2. For each pair of similar triangles find the missing measures
a) $\triangle \mathrm{DEF} \sim \triangle \mathrm{XYZ}$
b) $\triangle \mathrm{ABC} \sim \triangle \mathrm{BDE}$

c) $\triangle \mathrm{ABC} \sim \triangle \mathrm{PQR}$

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3. For each pair of similar triangles find the measure asked
a) Find the length of side DE .

4. 

Given that DE is parallel to $\mathrm{AC}, \mathrm{AD}=6.8, \mathrm{DB}=9.3$, and $B C=12.8$, find the length of BE to the nearest tenth of a unit.

6.

In $\triangle V W X, W X=28 \mathrm{~cm}, \mathrm{VX}=35 \mathrm{~cm}$, and $\mathrm{VW}=14 \mathrm{~cm}$. In $\triangle \mathrm{PQR}, \mathrm{QR}=20 \mathrm{~cm}, \mathrm{PR}=25 \mathrm{~cm}$, and $\mathrm{PQ}=10 \mathrm{~cm}$. Are triangles VWX and PQR similar? How do you know?
b) Find the length of $x$.

5.

A person 1.9 m tall casts a shadow 3.8 m long. At the same time a tree casts a shadow 18 m long. Find the height of the tree.
7.

Given $\triangle \mathrm{DEF} \sim \triangle \mathrm{RPQ}, \mathrm{EF}=10 \mathrm{in} ., \mathrm{DF}=9 \mathrm{in}$., $\mathrm{DE}=8 \mathrm{in}$., and $R Q=0.5 \mathrm{ft}$. Find the length of side PQ .
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## DAY 5 - More Similar Triangles

Are the triangles similar? If so, write a similarity statement and the ratio proportion statement

$\triangle A B E \sim \triangle A D C$
$\qquad$
7. Find the unknown angle if $\triangle A B C \approx \triangle D E F$

8. Find the unknown sides
a.

9. The tips of the shadows of a flagpole and a $1.5-\mathrm{m}$ fence post meet at the point S . The following lengths are measured: $\mathrm{ST}=2.7 \mathrm{~m}$ and $\mathrm{QT}=7.4 \mathrm{~m}$. Use this information to find the height of the flagpole. Round your answer to the nearest tenth of a metre.

b.

10.

In the diagram, DE is parallel to $\mathrm{AC} \cdot \mathrm{BD}=4, \mathrm{DA}=6$, and $\mathrm{BE}=5$. Find the length of BC to the nearest tenth of a unit.

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## DAY 6 - Solve Word Problems

1. 

A wheelchair ramp is 2.5 m . The horizontal distance from the end of the ramp to the building is 2 m . What angle does the ramp make with the ground?

3.

Ralph is on the roof of a building, while his friend Ajay is on the ground. Ralph can see Ajay at a $50^{\circ}$ angle of depression. The vertical height of the building is 20 m . What is the diagonal distance from Ralph to where Ajay is standing?
5.


From a point 4.5 m from the base of a wind turbine, the angle of elevation to the top of the turbine is $87^{\circ}$. Find the height of the wind turbine to the nearest tenth of a metre.
2.

Sheryl's tree house is 3 m above the ground. Sheryl looks down at an angle of depression of $30^{\circ}$ and can see her poodle's doghouse. What is the horizontal distance from the doghouse to the tree house?
4.

From a point 6.5 m from the base of the school flagpole, the angle of elevation to the top of the flagpole is $46^{\circ}$. What is the height of the flagpole?
6.

A flagpole 3 meters tall casts a shadow 5 meters long at the same time that a building nearby casts a shadow 62 meters long. How tall is the building?
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7.

The angle of depression from the top of a castle to a boat is $25^{\circ}$. If the distance from the top of the castle to the boat is determined to be 100 m , how high is the castle?

## 9.

A forest ranger is in a fire tower 120 ft above the ground. She sights a fire at an angle of depression of $3^{\circ}$. How far is the fire from the base of the tower, to the nearest foot?

11.

Marlene is making a pen in her backyard for her daughter's pet rabbits. She makes the pen in the shape of a right triangle. Two sides of the pen each measure 3 m . What is the length of the third side?
8.

From a point 9.3 m from the base of a billboard, the angle of elevation to the top of the billboard is $28^{\circ}$. Find the height of the billboard to the nearest tenth of a metre.
10.

A 4-m long ladder is leaning up against the side of a garage. It reaches 3.8 m up the side of the garage wall. Find the angle the ladder makes with the ground, to the nearest degree.
12.

Ron is building a skateboard ramp for his granddaughter Alexis. Ron wants the ramp to rise at an angle of $12^{\circ}$. If he also wants the ramp to rise vertically 0.5 m how long will the ramp need to be?
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## Practice TEST

1. $\tan 47^{\circ}$ is
2. $\cos 55^{\circ}$ is
3. $\sin 49^{\circ}$ is
4. If $\sin A=0.8829$, then $\angle A$ is approximately
5. If $\cos A=0.8290$, then $\angle A$ is approximately
6. A slide in a park has a vertical height of 1.5 m . The horizontal distance covered by the slide is 2 m . The length of the slide is

7. A cat lying on the ground is 1.5 m away from his owner. The angle of elevation from the cat to his owner's head is $48^{\circ}$. How tall is his owner?
8. Thi's model boat has a base 60 cm long. The horizontal length of the sail is half the length of the base of the boat. $\angle \mathrm{C}$ is $45^{\circ}$. What is the diagonal side of the sail?

9. From a point 9.8 m from the base of a flagpole, the angle of elevation to the top of the pole is $48^{\circ}$. What is the height of the flagpole?
10. Jan's tree house is 4.8 m above the ground. When he looks down at an angle of depression of $40^{\circ}$, he can see over the fence and into his neighbour's backyard. What is the diagonal distance from tree house to the neighbour's backyard?
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11. In $\triangle \mathrm{JKL}$ below, JK is 4 cm , JL is 16 cm , and KL is 16.49 cm .

a) Write the 3 trig ratios for angle $L$
b) Find angle L
12. In $\triangle \mathrm{GHI}$ below, GI is 3.5 m and GH is 3 m . Determine the angle $\angle \mathrm{G}$ to the nearest degree.

13. Beatriz lives on Arc Avenue, which is 200 m long. Her aunt's house is on Tumble Street, which is 150 m long.

a) Determine the distance that Beatriz travels if she goes along both streets from her house to her aunt's house.
b) What is the distance that Beatriz travels if she takes a diagonal shortcut?
c) How much shorter is the shortcut?
14. The height of Melvin's house is 12 m . His friend, Matt, lives in a house that is 15 m tall. If Matt's house casts a shadow that is 16 m long, what is the length of the shadow cast by Melvin's house to the nearest tenth of a metre?
