Name: $\qquad$ Date:

## Unit 3: Right Triangle Trigonometry <br> Foundations and Pre-Calculus 10

| 3.1a Tangent Ratio | I am now able to |
| :--- | :--- |
| P107 \#1, 2, 3, 4,5,6,7,8 |  |
|  |  |
|  |  |


| 3.1b Tangent Ratio |  |
| :--- | :--- |
| P107 \#9, 10, 11, 12, 13 *14*15 |  |
| Mini Lab |  |
|  |  |
|  |  |


| 3.2 The Sine and Cosine Ratios | I am now able to |
| :--- | :--- |
| P120 \#1, 2, 3, 4, 5, 6ace |  |
| $\# 7,8,9,10,11,12 * 15 * 16$ |  |
|  |  |


| 3.3a Solving Right Triangles | I am now able to |
| :--- | :--- |
| P131 \#1, 2, 3, 4,5,6 |  |
|  |  |

3.3b Solving Right Triangles

P131 \#7, 8, 11, 12, 13 *14

| 1.4 Unit 1 Review | Vocabulary |
| :--- | :--- |
| P135 \#16 |  |
| P136 \#1, 2, 3, 4, 5, 6, 7, 8,9 <br> Practice Test p138-139 | Questions I expect to see on the test |
|  |  |


| Unit 1 Test | Strengths |
| :--- | :--- |
|  | Needing improvement |
|  |  |

## \#1, 4-10

Show all your work.

1. Which angle has a measure of about $75^{\circ}$ ?

2. Draw an angle that you estimate has the given measure. Then, measure each of your angles to see how close your estimate is to the actual measure.
a) $30^{\circ}$
b) $65^{\circ}$
c) $90^{\circ}$
d) $130^{\circ}$
3. Sketch $\triangle \mathrm{EFG}$ with $\angle \mathrm{E}=90^{\circ}$ and $\angle \mathrm{F}=40^{\circ}$. Do not use a protractor. Label your sketch.

4. Consider $\triangle \mathrm{DEF}$ with $\angle \mathrm{D}=90^{\circ}$ and $\angle \mathrm{E}=50^{\circ}$ :

a) Name side $D E$ another way. $f$
b) What is the size of $\angle \mathrm{F}$ ? $40^{\circ}$
c) What is the shortest side of $\triangle D E F$ ? DE or $f$
d) Name $\angle \mathrm{F}$ another way. $\angle D F E$
5. Right triangle PQR has the following properties:

- an angle of $30^{\circ}$
- the shortest side is labelled PQ

a)

b)

c)


8. Solve for $x$.
a) $3 x-2=13 \quad x=5$
b) $x^{2}=3^{2}+4^{2}$ $x=5$
c) $169=x^{2}+25$ $x=12$

## similar = proportional

9. Sort the following figures into sets so that all the figures in each set are similar. Explain your thinking.

10. $\triangle \mathrm{ABC}$ is similar to $\triangle \mathrm{DEF}$.

a) Show how the angles of the two triangles are related.
$A=D$ $\angle C=\angle F$

$$
\angle B=\angle E
$$

b) Which sides of the triangles are proportional? Explain what this means. $A B: A C: B C=D E: D F: E F$
c) Complete the proportion to make a true statement: $\frac{\mathrm{AB}}{\mathrm{DE}}=\frac{x}{\mathrm{DF}} \mathrm{AC}$
11.

a) How many triangles are in the figure?
b) How many different triangles are in the figure?
$\qquad$

### 3.1 The Tangent Ratio

Chris and Aimee are trying to canoe across Lake Isaac and reach the picnic area. However, due to the wind, they are getting blown off course. Find the ratio of their distance off course to the distance of their intended direction and complete the table:


| Triangle | Off course <br> distance | Intended distance | $\frac{\text { Off Course }}{\text { Intended }}$ |
| :---: | :---: | :---: | :---: |
| $\# 1$ | 15 | 26.2 | $\frac{15}{26.2}=.57$ |
| $\# 2$ | 25.4 | 45.6 | $\frac{25.4}{45.6}=.56$ |
| $\# 3$ | 38.2 | 68 | $\frac{38.2}{68}=.56$ |
| $\# 4$ | 48.8 | 88.6 | $\frac{48.8}{88.6}=.55$ |

How should the ratio of the off course distance and the intended distance change?
The ratios should be the same because they are similar Use your calculator to find the tangent of $27.1^{\circ}$, the angle which they are being triangles. blown off course.
tan
$27.1=$
or
27.1
$\operatorname{Han}$
$\tan 27.1^{\circ}=0.5117$.

The tangent ratio is found in a right triangle, and shows the ratio of the opposite \& adjacent sides from the acute angle being considered


1. Finding the tangent ratio

Find the tangent ratios for each triangle:

$\tan A=\frac{\text { opposite }}{\text { adjacent }}$

$$
\tan A=\frac{5}{8} \text { or } 0.625
$$

$$
\tan B=\frac{8}{5} \text { or } 1.6
$$

Your calculator can also work backwards and tell you what angle corresponds to your tangent ratio.


Determine the tangent ratio of angle $A$ and use the inverse function to find out how big angle $A$ is.

$$
\begin{aligned}
\tan A=\frac{5}{8} & \tan ^{-1}\left(\frac{5}{8}\right)=32.0^{\circ} \\
& \tan ^{-1}(.625)=32^{\circ}
\end{aligned}
$$

$\tan \left(\tan ^{-1}(A)\right)=A \quad$ You can use decimal values for your ratio or fractions $\tan ^{-1}(\tan (A))=A$

Complete the table:

| $\theta$ | $\tan \theta$ |
| :---: | :---: |
| $30^{\circ}$ |  |
| $52^{\circ}$ |  |
| $72.8^{\circ}$ |  |


| $\theta$ | $\tan \theta$ |
| :---: | :---: |
|  | 0.5 |
|  | $\frac{1}{5}$ |

## Using the Tangent Ratio

A ladder is leaning against a wall. If the base of the ladder is 3 m from the wall and forms a $68^{\circ}$ angle with the ground, how high does the ladder reach?


$$
\begin{aligned}
& \tan 68^{\circ}=\frac{x}{3} \\
& \frac{2.48}{1}=\frac{x}{3}
\end{aligned}
$$

$$
x=7.44
$$

Sam Surveyor is using a theodolite to measure the angle to the top of the really, really tall glacier. He knows that the horizontal distance to the base of the glacier is 24 m , and the angle to the top of glacier is $30^{\circ}$. If the theodolite is resting on a platform that is 1.4 m tall, what is the height of the glacier?
(is it really really, really tall?)

$$
\begin{array}{r}
h=x+1.4 \quad \tan 30^{\circ}=\frac{x}{24} \\
\frac{0.577}{1}=\frac{x}{24} \\
x=13.85 \\
h=13.85+1.4 \\
h=15.25 \mathrm{~m}
\end{array}
$$



Two of Sam's helpers are messing around and decide to try and measure the angle from the theodolite to the top of the tower. They know that the tower is 8 m tall, and they are approximately 15 m from the base of the tower. If the theodolite was placed at ground level, what angle would it be measuring?


$$
\begin{aligned}
\tan A & =\frac{8}{15} \\
\tan ^{-1}(\tan A) & =\tan ^{-1}\left(\frac{8}{15}\right) \\
A & =\tan ^{-1}\left(\frac{8}{15}\right) \quad A=28.1^{\circ}
\end{aligned}
$$

