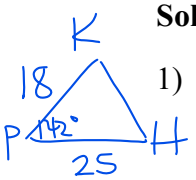
Precalculus Name_____

Solving Triangles Notes

$c^2 = a^2 + b^2 - 2ab\cos C$ Date_____ Period____

Solve each triangle. Round your answers to the nearest tenth.

1) In $\triangle PKH$, $h = 18$ yd, $m\angle P = 142°$, $k = 25$ yd



$p^2 = 18^2 + 25^2 - 2(18)(25)\cos 142°$

$\sqrt{p^2} = \sqrt{\text{something}}$

$p = 40.72$

$\frac{\sin H}{18} = \frac{\sin 142°}{40.72}$

$\sin H = \frac{18\sin 142°}{40.72}$

$\angle H = \sin^{-1}\left(\frac{18\sin 142°}{40.72}\right)$

$\angle H = 15.79°$

$\angle K = 22.21°$

2) In $\triangle FDE$, $m\angle F = 50°$, $e = 32$ km, $f = 31$ km

$\frac{\sin 50°}{31} = \frac{\sin E}{32}$

$\frac{32\sin 50°}{31} = \sin E$

$\sin^{-1}\left(\frac{32\sin 50°}{31}\right) = E$

$\angle E = 52.256°$

1st △	2nd △
$\angle E = 52.256°$	$\angle E = 127.744°$
$\angle D = 77.744$	$\angle D = 2.256°$
$d = 39.545$	$d = 1.593$

$\frac{\sin 50°}{31} = \frac{\sin 77.744}{d}$

$d = \frac{31\sin 77.744°}{\sin 50°}$ and $d = \frac{31\sin 2.256°}{\sin 50°}$

3) In $\triangle ZXY$, $x = 18$ in, $z = 20$ in, $y = 44$ in

$44^2 = 18^2 + 20^2 - 2(18)(20)\cdot\cos Y$

$\frac{44^2 - 18^2 - 20^2}{(-2)(18)(20)}$

$\cos^{-1}(\uparrow)$

Error

Not a △

4) In $\triangle FDE$, $m\angle D = 16°$, $m\angle E = 9°$, $d = 30$ mi

$\angle F = 155°$

$\frac{\sin 16°}{30} = \frac{\sin 9°}{e}$

$e = \frac{30\sin 9°}{\sin 16°} = 17.026 = e$

$\frac{\sin 16°}{30} = \frac{\sin 155°}{f}$

$f = \frac{30\sin 155°}{\sin 16°}$

~~$f = 45$~~ $f = 46$

1

5) In $\triangle DEF$, $e = 21$ in, $f = 13$ in, $d = 11$ in

$21^2 = 13^2 + 11^2 - 2(13)(11)\cos E$

$\frac{21^2 - 13^2 - 11^2}{(-2)(13)(11)} = \cos E$

$\cos^{-1}(\uparrow) = E = 121.9°$

$\frac{\sin F}{13} = \frac{\sin 121.9}{21}$

$\angle D = 26.41°$

$F = \sin^{-1}\left(\frac{13\sin 121.9}{21}\right)$

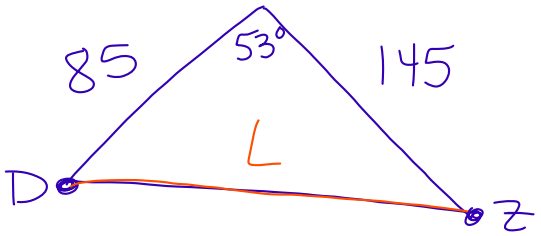
$\angle F = 31.72°$

6) Two straight roads diverge at an angle of 53°. Two cars leave the intersection at 4:15 P.M., one traveling at 34 mi/hr and the other at 58 mi/hr. To the nearest tenth of a mile, how far apart are the cars at 6:45 P.M.?

$R = \frac{D}{T}$

$34 = \frac{D}{2.5}$

$D = (34)(2.5)$



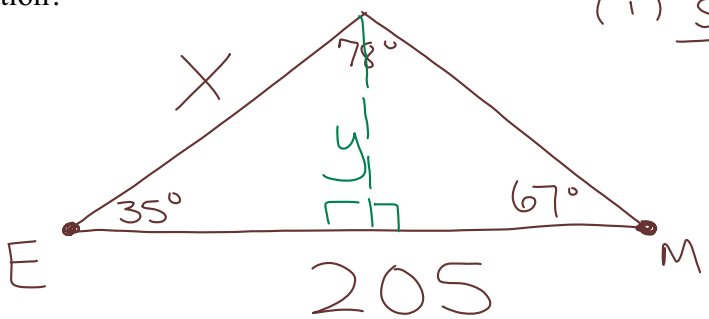
$\frac{58}{1} = \frac{Z}{2.5}$

$(58)(2.5) = Z$

$L^2 = 85^2 + 145^2 - 2(85)(145)\cos 53°$

115.8 mi

7) Elisa, facing east and standing at milepost 26 sights a plane in the sky at an angle of elevation of 35°. Michelle, facing west is standing at milepost 231 and sights the plane at an angle of elevation of 67°. (i) What is the distance of the plane from Elisa? (ii) What is the plane's elevation?



$231 - 26 = 205$

$180 - 102 = 78°$

$1 + 67 + 35 = 102$

(i) $\frac{\sin 67°}{X} = \frac{\sin 78°}{205}$

$\frac{205\sin 67°}{\sin 78°} = X = 192.92$ miles

(ii) $y = 110.65$ miles

$\frac{\sin 90°}{192.92} = \frac{\sin 35°}{y}$

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Solve each triangle. Round your answers to the nearest tenth.

1) In $\triangle PKH$, $h = 18$ yd, $m\angle P = 142°$, $k = 25$ yd

$m\angle K = 22.2°$, $m\angle H = 15.8°$, $p = 40.7$ yd

2) In $\triangle FDE$, $m\angle F = 50°$, $e = 32$ km, $f = 31$ km

$m\angle D = 77.7°$, $m\angle E = 52.3°$, $d = 39.5$ km
Or $m\angle D = 2.3°$, $m\angle E = 127.7°$, $d = 1.6$ km

3) In $\triangle ZXY$, $x = 18$ in, $z = 20$ in, $y = 44$ in

No triangle formed

4) In $\triangle FDE$, $m\angle D = 16°$, $m\angle E = 9°$, $d = 30$ mi

$m\angle F = 155°$, $e = 17$ mi, $f = 46$ mi

5) In $\triangle DEF$, $e = 21$ in, $f = 13$ in, $d = 11$ in

$m\angle D = 26.4°$, $m\angle E = 121.9°$, $m\angle F = 31.7°$

6) Two straight roads diverge at an angle of 53°. Two cars leave the intersection at 4:15 P.M., one traveling at 34 mi/hr and the other at 58 mi/hr. To the nearest tenth of a mile, how far apart are the cars at 6:45 P.M.?

115.8 mi

7) Elisa, facing east and standing at milepost 26 sights a plane in the sky at an angle of elevation of 35°. Michelle, facing west is standing at milepost 231 and sights the plane at an angle of elevation of 67°. (i) What is the distance of the plane from Elisa? (ii) What is the plane's elevation?

(i) 192.9 miles
(ii) 110.64 miles