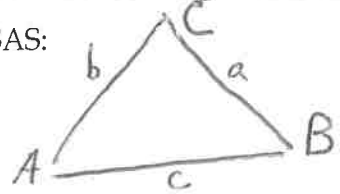
Accel Pre-Calculus

Name _____

Date _____

3.08 Area of Triangles Notes

For SAS:



$\text{Area} = \frac{1}{2}bc\sin A$ $\text{Area} = \frac{1}{2}ab\sin C$

$\text{Area} = \frac{1}{2}ac\sin B$

For SSS:

Heron's Formula s = semiperimeter

$s = \frac{1}{2}(a+b+c)$

$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$

Find the area of each triangle. Round answers to the nearest tenth.

1. $A = 52°,\ b = 12,\ c = 18$

$\text{Area} = \frac{1}{2}bc\sin A$

$A = \frac{1}{2}(12)(18)\sin 52$

$A = 85.11$

2. $a = 13,\ b = 8,\ c = 15$

$s = \frac{1}{2}(13+8+15) = 18$

$A = \sqrt{18(18-13)(18-8)(18-15)}$

$A = \sqrt{2700}$

$A \approx 51.96$

3. $a = 24,\ b = 18,\ c = 21$

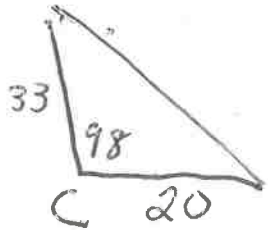
$s = \frac{1}{2}(24+18+21) = 31.5$

$A = \sqrt{31.5(31.5-24)(31.5-18)(31.5-21)}$

$A = \sqrt{31.5(7.5)(13.5)(10.5)}$

$A = 182.99$ units^2

4. $a = 20,\ b = 33,\ C = 98°$



$\text{Area} = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(20)(33)\sin 98$

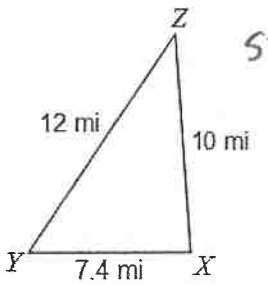
$A = 326.79$ units^2

3.08 Area of a Triangle

Date: _____

Find the area of each triangle.

1)



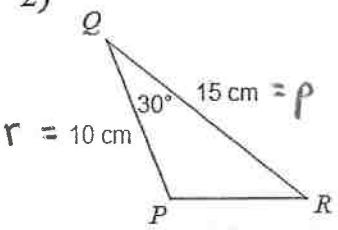
$s = \frac{1}{2}(12+10+7.4)$

$s = 14.7$

$A = \sqrt{14.7(14.7-12)(14.7-7.4)(14.7-10)}$

$A = \sqrt{1361.7639} = \boxed{36.9}\ mi^2$

2)

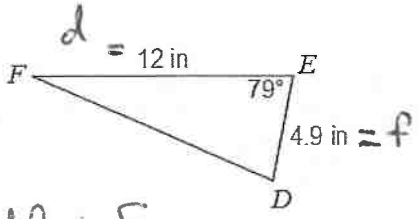


$A = \frac{1}{2} r p \sin Q$

$A = \frac{1}{2}(10)(15)\sin 30$

$A = \frac{75}{2} = 37.5\ cm^2$

3)

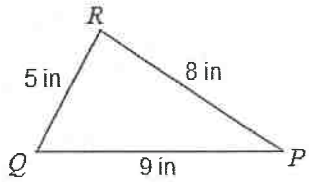


$A = \frac{1}{2} df \sin E$

$A = \frac{1}{2}(12)(4.9)\sin 79$

$A = 28.859\ in^2$

4)

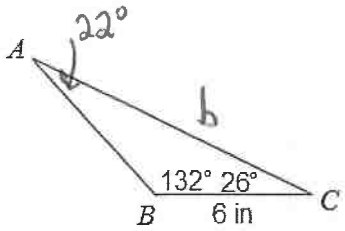


$s = \frac{1}{2}(5+9+8) = 11$

$A = \sqrt{11(11-5)(11-8)(11-9)}$

$A = \sqrt{11(6)(3)(2)} = 6\sqrt{11} \approx 19.899\ in^2$

5)



* find side b first to create SAS triangle (or side c). Use Law of Sine.

$\frac{b}{\sin 132} = \frac{6}{\sin 22}$

$b = \frac{6\sin 132}{\sin 22}$

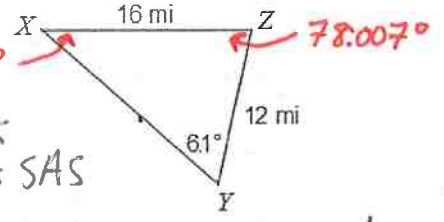
$b = 11.903$

$A = \frac{1}{2} ab \sin C$

$A = \frac{1}{2}(6)(11.903)\sin 26$

$A = 15.654\ in^2$

6)



* work towards SAS

$\frac{\sin X}{12} = \frac{\sin 61}{16}$

$\sin X = \frac{12\sin 61}{16}$

$X = \sin^{-1}(0.6559)$

$X = 40.99°$

$Area = \frac{1}{2} xy \sin Z$

$Area = \frac{1}{2}(16)(12)\sin 78.007$

$Area = 93.905\ mi^2$

7) In $\triangle DEF$, $d = 11$ m, $e = 12$ m, $f = 15.6$ m

$s = \frac{1}{2}(11+12+15.6) = 19.3$

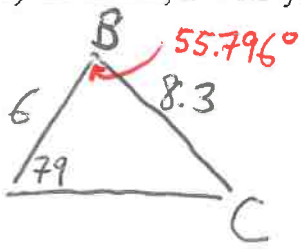
$A = \sqrt{19.3(19.3-11)(19.3-12)(19.3-15.6)}$

$A = \sqrt{4326.7319}$

$A = 65.78$

*work towards SAS

8) In $\triangle ABC$, $a = 8.3$ yd, $c = 6$ yd, $m\angle A = 79°$



$\frac{\sin C}{6} = \frac{\sin 79}{8.3}$

$\sin C = \frac{6\sin 79}{8.3}$

$C = \sin^{-1}(0.7096)$

$C = 45.203°$

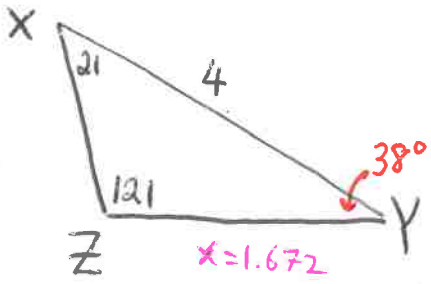
$\angle B = 55.796°$

$A = \frac{1}{2}ac\sin B$

$A = \frac{1}{2}(8.3)(6)\sin 55.796$

Area = 20.593

9) In $\triangle ZXY$, $z = 4$ mi, $m\angle X = 21°$, $m\angle Z = 121°$



*work towards SAS

$\frac{x}{\sin 21} = \frac{4}{\sin 121}$

$x = \frac{4\sin 21}{\sin 121}$

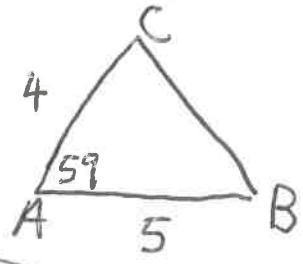
$x = 1.672$

$Area = \frac{1}{2}xz\sin Y$

$Area = \frac{1}{2}(1.672)(4)\sin 38$

$Area = 2.059\ mi^2$

10) In $\triangle ABC$, $c = 5$ cm, $m\angle A = 59°$, $b = 4$ cm



$Area = \frac{1}{2}bc\sin A$

$Area = \frac{1}{2}(4)(5)\sin 59$

$Area = 8.572\ cm^2$