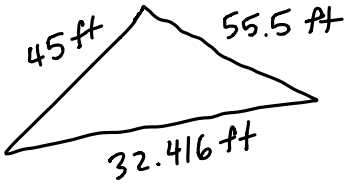
6.3 Worksheet

1. (6.3) A building owner contracts with a local construction company to build a brick patio in a triangular courtyard. The three sides of the courtyard measure $45ft$, $55ft\ 6in$, and $32ft\ 5in$. The construction company charges \$16.20 per square foot for materials and installation. Find the cost of the patio to the nearest hundred dollars



$s = \frac{45+55.5+32.416}{2}$

$= 66.458$

$A = \sqrt{66.458(66.458-45)(66.458-55.5)(66.458-32.416)}$

$= \sqrt{66.458(21.458)(10.958)(34.042)}$

$= \sqrt{531,964.77}$

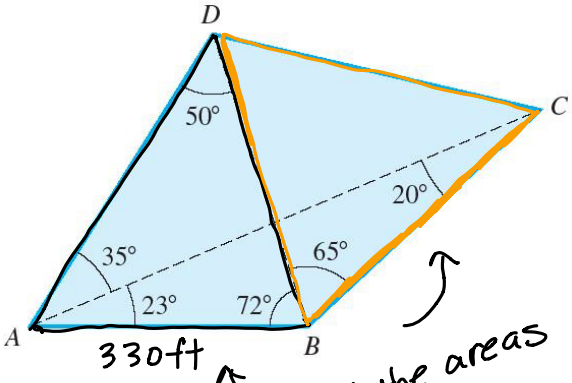
$= 729.3592$

total cost $= (\$16.20)(729.3592)$

$= \$11,815.62$

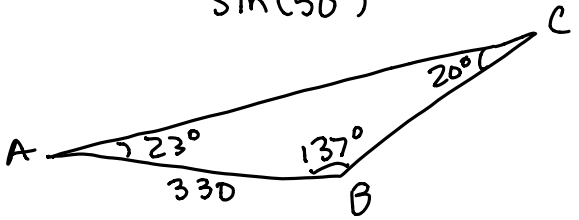
$\approx \boxed{\$11,800}$

2. (6.3) A plot of land has been surveyed, with the resulting information shown in the figure below. If $\overline{AB} = 330ft$ find the area of the plot.



$\frac{\sin(50°)}{330} = \frac{\sin(35°+23°)}{BD}$

$\Rightarrow BD = \frac{330\sin(58°)}{\sin(50°)} = 365.3$



$\frac{\sin(23)}{BC} = \frac{\sin(20°)}{330}$

$\Rightarrow BC = \frac{330\sin(23)}{\sin(20°)} = 377$

$A\triangle DBA$

$= \frac{1}{2}(330)(365.3)(\sin 72°)$

$= 57,324.456$

$A\triangle DBC$

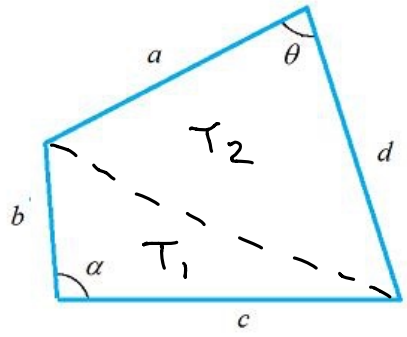
$= \frac{1}{2}(365.3)(377)(\sin 65°)$

$= 62,407.4932$

$\Rightarrow A = 57324.456 + 62,407.4932 = \boxed{119,731.9\ ft^2}$

find the areas of these two big triangles is one strategy

3. (6.3) A four-sided plot of land, shown in the figure, occupies the cul-de-sac in a new development. The land in the rest of the development has sold for \$4.90 per square foot. Suppose $\alpha = 99.3°$, $\theta = 73.2°$, $a = 113ft$, $b = 42.0ft$, $c = 126ft$, and $d = 120ft$. Find the price of this plot to the nearest thousand dollars. (*Hint: Draw a diagonal that divides the plot into two triangles.*)



T_2

$A = \frac{1}{2}(113)(120)\sin(73.2°)$ ← included angle

$= 6490.62619$

T_1

$A = \frac{1}{2}(42)(126)\sin(99.3°)$ ← included angle

$= 2611.22022$

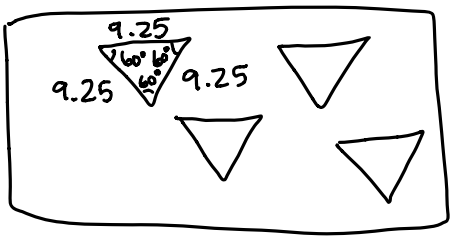
area of figure is area of $T_1 + T_2$

$A = 6490.62619 + 2611.22022$

$= 9101.8464$

$\Rightarrow A \times \$4.90 \approx$ **\$45,000**

4. (6.3) A gardener is building four triangular wildflower beds along one wall of a museum. The triangles will be equilateral with side length $9ft\ 3in$. The wildflower seeds are to be spread at a rate of one packet for each $15sq.ft$. How many packets with the gardener need. (*Round your answer to the nearest integer*)



$A = \frac{1}{2}(9.25)(9.25)\sin(60°)$ ← of 1 triangle

$= 37.0496\ ft^2$

$4A = 4(37.0496)$

$= 148.1986\ ft^2$ ← area of all four wildflower beds

$\frac{148.1986}{15} = 9.88$

$\Rightarrow \approx$ **10 packets needed**