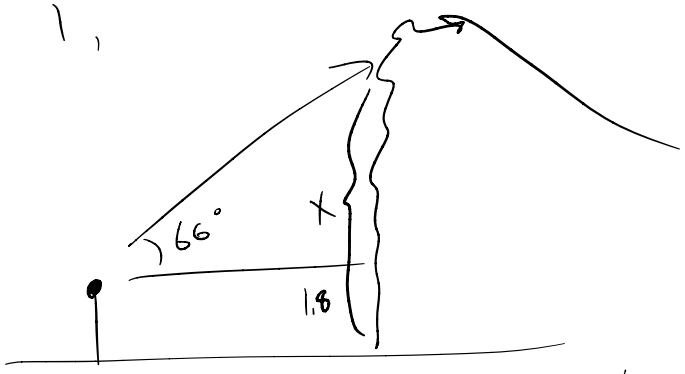
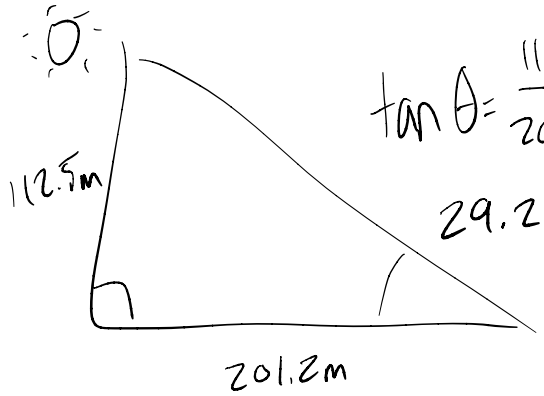
1.



$\tan(66°) = \frac{x}{14}$

$31.44 + 1.8 = 33.2\text{m}$

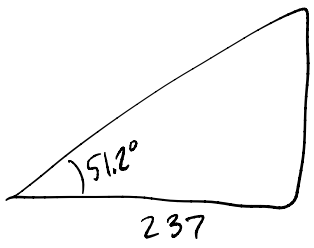
2.



$\tan\theta = \frac{112.5}{201.2}$

$29.21°$

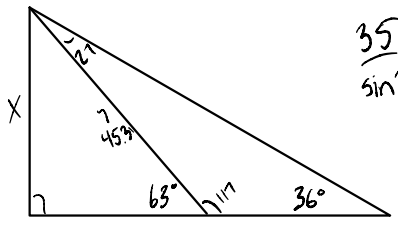
3.



$= 296\text{ ft}$

$\tan 51.2° = \frac{x}{237}$

4.

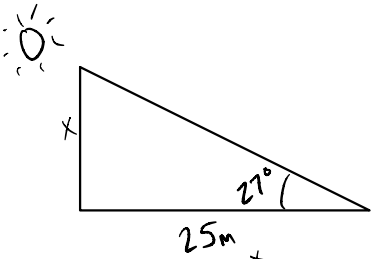


$\frac{35}{\sin 27} = \frac{y}{\sin 36}$

$y = 45.3$

$\sin 63 = \frac{x}{45.31}$ 35 ft flagpole $= 40.38$ ft.

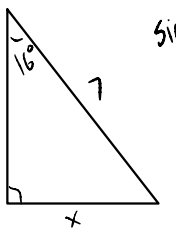
5.



$\tan 27° = \frac{x}{25}$

$x = 12.74\text{m}$

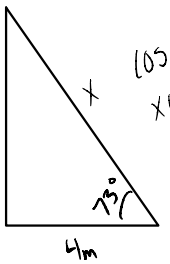
6.



$\sin 16° = \frac{x}{7}$

$x = 1.93\text{m}$

7.



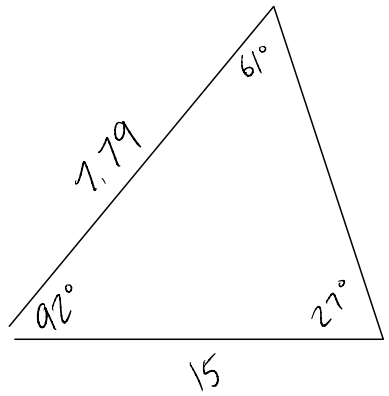
$\cos 73° = \frac{4}{x}$

$x \cos 73° = 4$

$\frac{4}{\cos 73°} = x$

$x = 13.68\text{m}$

8.



$\frac{15}{\sin 61} = \frac{x}{\sin 27}$

7.79

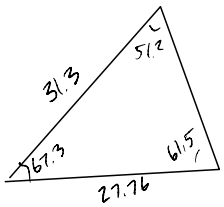
$\text{area} = \frac{1}{2}(7.79)(15)\sin 92$

$58.4 \rightarrow 60 \text{ units}^2$

12. $\sqrt{38.5(38.5-22)(38.5-25)(38.5-30)}$

$269.99 \Rightarrow 270 \text{ units}^2$

14.



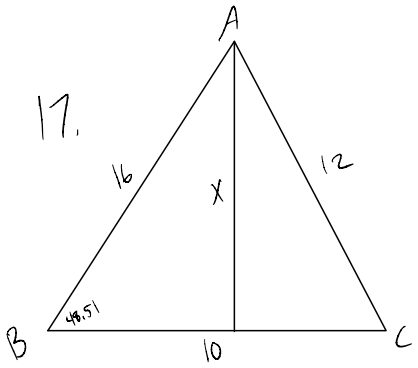
$\frac{31.3}{\sin(61.5)} = \frac{r}{\sin 51.2}$

$r = 27.76$

$\text{area} = \frac{1}{2}(27.76)(31.3)\sin 67.3$

$\text{area} = 400.79 \Rightarrow 401 \text{ units}^2$

17.



$12^2 = 16^2 + 10^2 - 2(10)(16)\cos B$

$-212 = -2(10)(16)$

$0.6625 = \cos B$

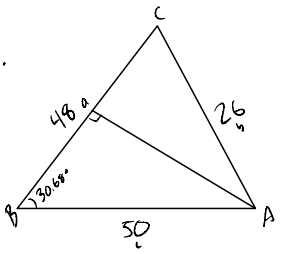
$B = 48.51$

$\sin 48.51 = \frac{x}{16}$

$x = 11.99$

$x = 12$

18.



$26^2 = 50^2 + 48^2 - 2(50)(48)\cos B$

$-4129 = -2(50)(48)\cos B$

$\frac{-4800}{-4800}$

$0.86 = \cos B$

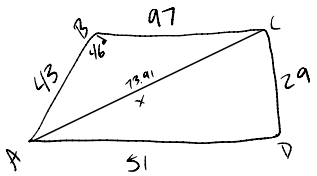
$\angle B = 30.68$

$\sin 30.68 = \frac{x}{50}$

$x = 25.5$

$x = 26$

20.



$x^2 = 43^2 + 97^2 - 2(43)(97)\cos 46°$

$x = 73.91$

$\text{Area} = 106.955(106.955 - 73.91)(\ldots)$

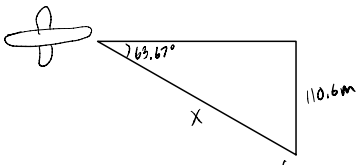
$\text{Area} = 1500.07$

$\text{Area} = 540.06$

$\text{Area} = 2046.13$

$\text{Area} = 2000 \text{ units}^2$

23.



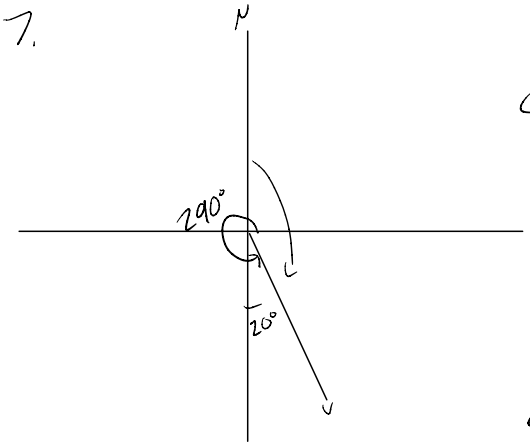
$\sin 63.67 = \frac{110.6}{x}$

$x \sin 63.67 = 110.6$

$x = 123.4\text{m}$

Applications of Vectors WS

7.



$\langle 350\cos 290 + 350\sin 290 \rangle$

$\langle 119.71, -328.89 \rangle$

$\langle 20\cos 180, 20\sin 180 \rangle$

$\langle -20, 0 \rangle$

$\langle 99.71, -328.89 \rangle$

$\sqrt{99.71^2 + (-328.89)^2}$

343.67 mph

$\tan\alpha = \frac{-328.89}{99.71}$

$\alpha = -73.13° \Rightarrow 163.13$ bearing

$\tan 20 = \frac{t}{300}$

Unit 4 Formulas

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

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

$$|v| = \sqrt{a_1^2 + b_1^2}$$

$$v = |v|(\cos a\, i + \sin a\, j)$$

$$v \cdot w = a_1 a_2 + b_1 b_2$$

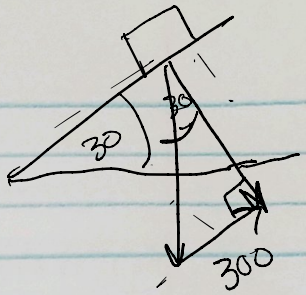
$$\cos\theta = \frac{u \cdot v}{|u||v|}$$

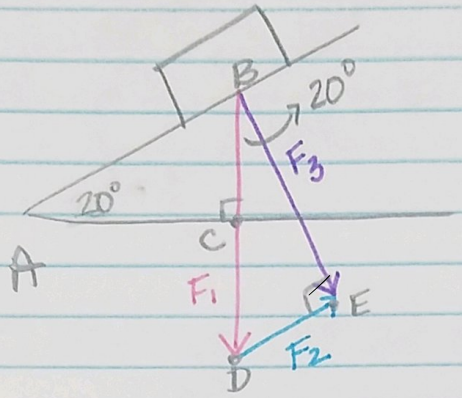
$$W = F \cdot D$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

Finding the weight of a Piano





3 forces:

F_1 → force of gravity aka weight

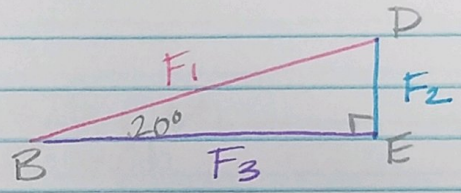
F_2 → force to move piano = 300

F_3 → force of piano against ramp

$\triangle ABC$ is similar to $\triangle BDE \Rightarrow \measuredangle EBD = 20°$

* both are right $\triangle$s *

Using $\triangle BDE$



$$\sin 20° = \frac{||F_2||}{||F_1||}$$

$$\sin 20° = \frac{300}{||F_1||}$$

$$||F_1|| = \frac{300}{\sin 20°}$$

$$||F_1|| = 877 \text{ lbs}$$

↳ weight of piano