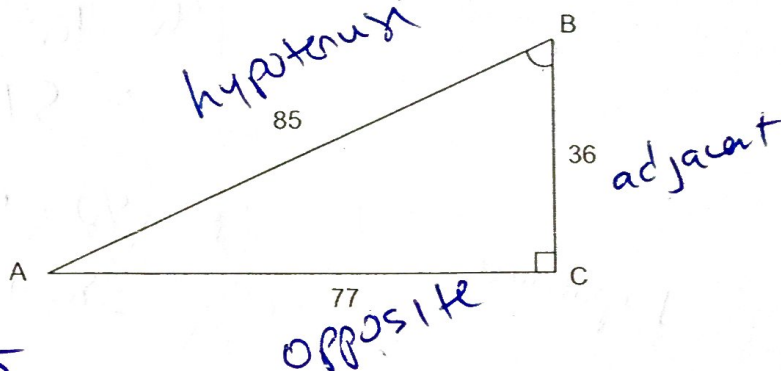


Test 1: Trigonometry Version A

Name: _____

Key

1. (3 points) Given the right-angle triangle below, determine the following trig ratios



(a) $\sin B = 77/85$

(b) $\cos B = 36/85$

(c) $\tan B = 77/36$

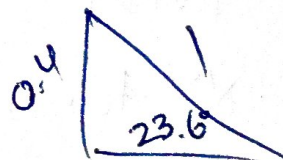
2. (2 points) In your own words, explain what the two symbolic statements mean

$\sin(32^\circ)$ and $\sin^{-1}(0.4)$

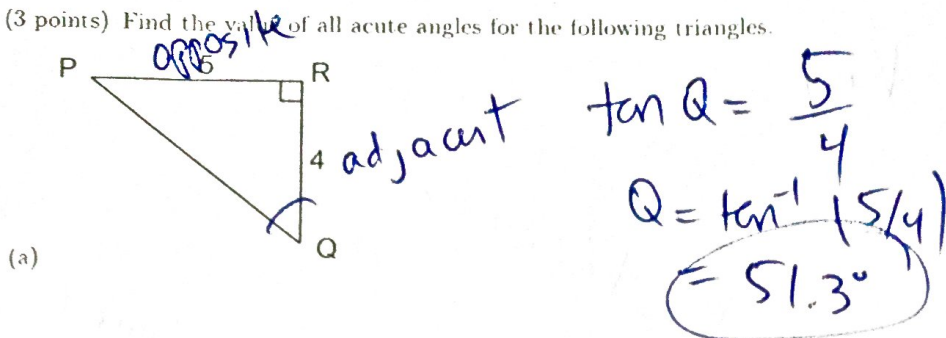
$\sin 32 = 0.53$
 ↑ angle ↑ $\frac{o}{h}$ ratio



$\sin^{-1}(0.4) = 23.6^\circ$
 ↑ $\frac{o}{h}$ ratio ↑ angle

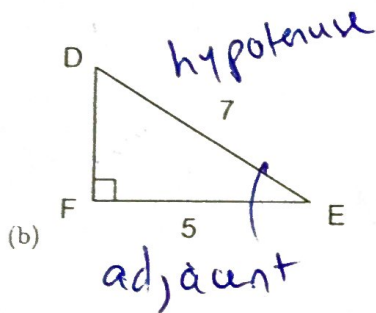


3. (3 points) Find the value of all acute angles for the following triangles.



$$P = 90 - 51.3$$

$$= 38.7^\circ$$



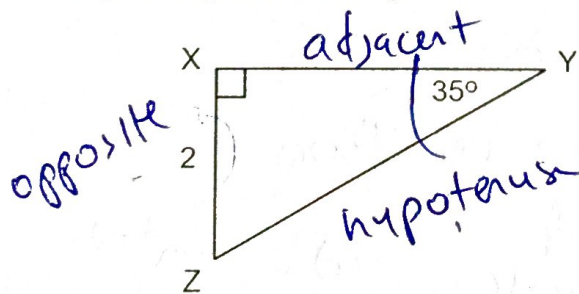
$$\cos E = 5/7$$

$$E = \cos^{-1}(5/7)$$

$$= 44.4^\circ$$

$$D = 90 - 44.4 = 45.6^\circ$$

4. (2 points) Find the missing side lengths of the triangle.



$$\tan 35^\circ = \frac{2}{XY}$$

$$XY \tan 35^\circ = 2$$

$$XY = \frac{2}{\tan 35^\circ}$$

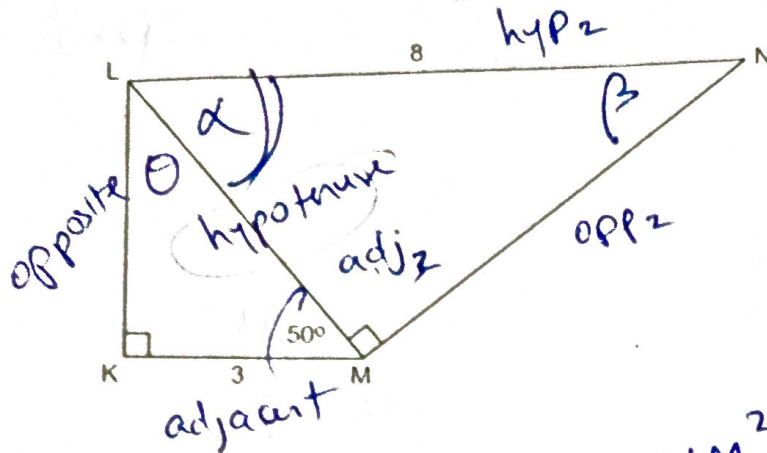
$$= 2.86$$

$$\sin 35^\circ = \frac{2}{ZY}$$

$$ZY = \frac{2}{\sin 35^\circ}$$

$$= 3.49$$

5. (5 points) Find all missing side lengths and acute angles



$$\tan 50^\circ = \frac{LK}{3}$$

$$LK = 3 \tan 50 = 3.58$$

$$\cos 50 = \frac{3}{LM}$$

$$LM = \frac{3}{\cos 50} = 4.67$$

$$\theta = 90 - 50 = 40^\circ$$

$$\cos \alpha = \frac{4.67}{8}$$

$$\alpha = \cos^{-1}\left(\frac{4.67}{8}\right) = 54.3^\circ$$

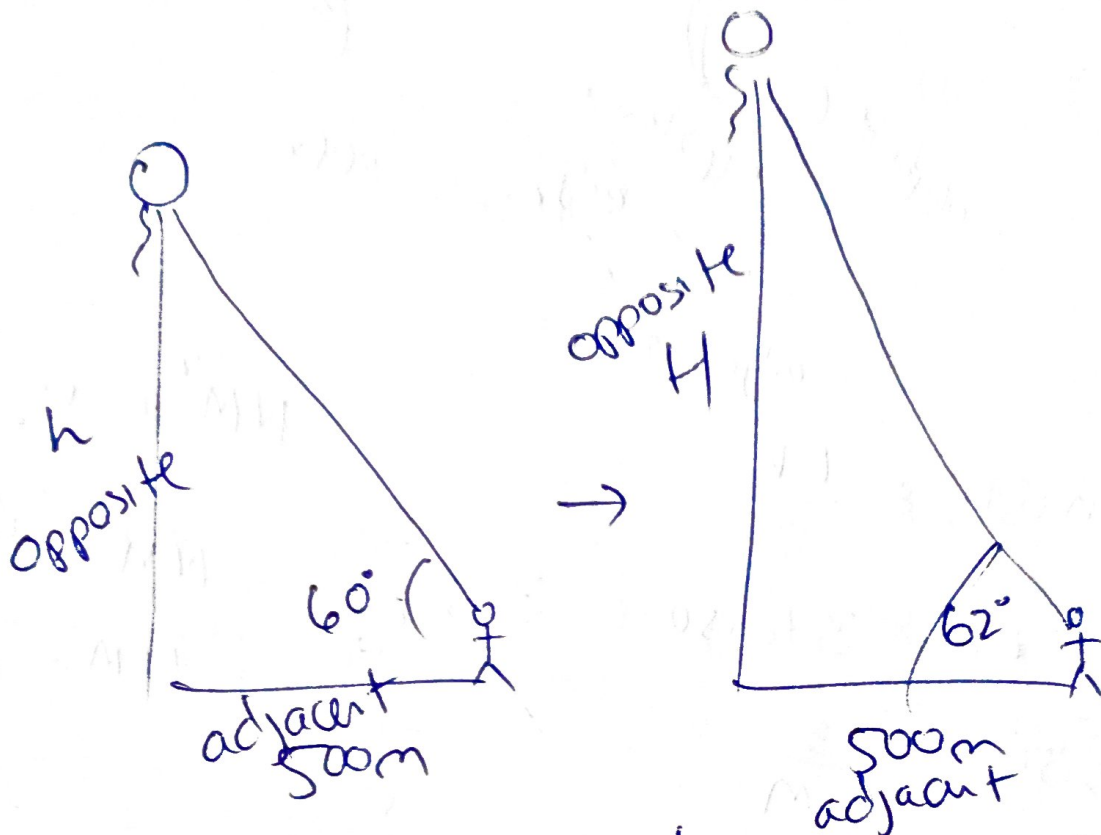
$$\beta = 90 - 54.3 = 35.7^\circ$$

$$NM^2 + 4.67^2 = 8^2$$

$$NM^2 = 42.19$$

$$NM = 6.50$$

6. (3 points) You stand 500m away from where a hot air balloon launched from the ground. Currently the angle of elevation between you and the balloon is 60° , but in 5 minutes the angle of elevation will be 62° . Assuming the balloon is rising straight up, how far will it have travelled in those 5 minutes?



$$H-h \Rightarrow \tan 60^\circ = \frac{h}{500}$$

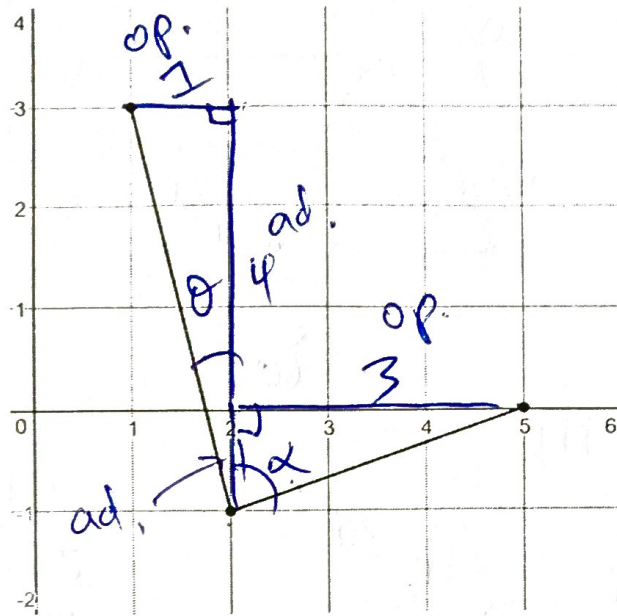
$$h = 500 \tan 60 \\ = 866$$

$$\tan 62^\circ = \frac{H}{500}$$

$$H = 500 \tan 62 \\ = 940$$

$$H-h = 940 - 866 = \underline{\underline{74 \text{ m}}} \text{ in 5 min}$$

7. (3 points) Determine the angle, $\angle ABC$, that is made when the points $A(1, 3)$, $B(2, -1)$, and $C(5, 0)$ are connected with straight lines.



$$\tan \theta = \frac{1}{4}$$

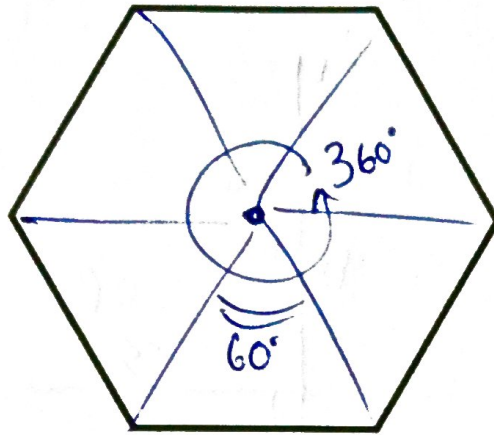
$$\tan \alpha = \frac{3}{1}$$

$$\theta = \tan^{-1}\left(\frac{1}{4}\right) = 14^\circ$$

$$\alpha = \tan^{-1}(3) = 71.6^\circ$$

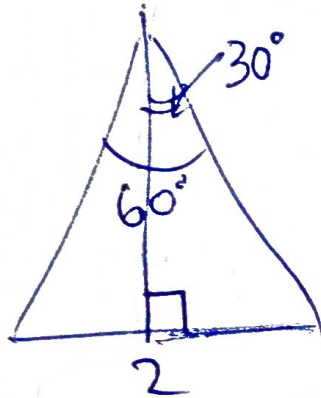
$$\angle ABC = \theta + \alpha = 85.6^\circ$$

8. (4 points) Determine the area of a regular hexagon where the length of each side is 2cm. [Area of a triangle is $\frac{1}{2}(\text{base} \times \text{height})$]



$$\frac{360^\circ}{6} = 60^\circ$$

$$\text{Area} = 6 \times$$



$$\tan 30^\circ = \frac{1}{h}$$

$$h = \frac{1}{\tan 30^\circ} = 1.73$$

$$= 6 \times \left[\frac{2 \times 1.73}{2} \right]$$

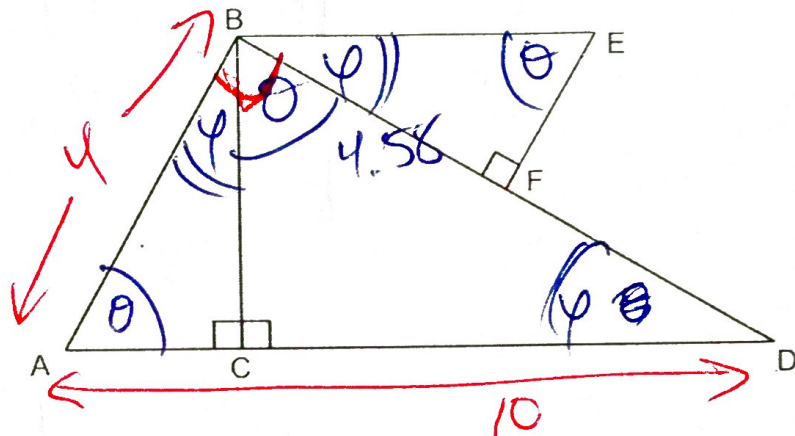
$$= 10.39 \text{ cm}^2$$

9. (4+1 points) Given that:

- (i) $\triangle ABC$, $\triangle BCD$, and $\triangle BEF$ are similar (all their angles are the same)
- (ii) the point F bisects BD (divides it in two equal halves).
- (iii) $AD = 10$

What is the minimum information you need from $\triangle ABC$ to determine the length EF in the fewest steps? Justify your answer by making up any necessary numbers (estimate reasonably) and solve for EF .

Note this question is out of 4, but possible to earn 5.



$$\theta + \varphi = 90^\circ$$

If AB was given (OR θ was given)

$$\text{The } BD^2 + 4^2 = 10^2$$

$$BD^2 = 100 - 16$$

$$= 84$$

$$EF = \frac{1}{2} BD = 4.58$$

$$\cos \theta = \frac{4}{10} \quad \theta = \cos^{-1}\left(\frac{4}{10}\right) = 66.4^\circ$$

$$EF = 4.58 \cos 66.4^\circ = \underline{\underline{1.53}}$$