# TEST 4A

1/ $f(x) = 1 + x - 2x^2$

$$\Rightarrow \frac{f(x+h) - f(x)}{h} = \frac{1 + (x+h) - 2(x+h)^2 - (1 + x - 2x^2)}{h}$$

$$= \frac{\cancel{1} + \cancel{x} + h - \cancel{2x^2} - 4xh - 2h^2 - \cancel{1} - \cancel{x} + \cancel{2x^2}}{h}$$

$$= \frac{\cancel{h}(1 - 4x - 2h)}{\cancel{h}}$$

$$= 1 - 4x - 2h$$

2/ $f(x) = 4 - 4x + x^2 = (x-2)^2$

(a) $f(-2) = (-2-2)^2 = 16$

(b) $f(2-a) - f(3a) = a^2 - (3a-2)^2$

$$= a^2 - 9a^2 + 12a - 4$$

$$= -8a^2 + 12a - 4$$

$$= -4(2a-1)(a-1)$$

or difference of two squares

3/ $h(x) = 2 - x^3$, $g(x) = \sqrt[3]{1-x}$

$$\Rightarrow h(g(x)) = 2 - (\sqrt[3]{1-x})^3$$

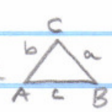
$$= 2 - (1 - x)$$

$$= 1 + x$$

$$g(h(x)) = \sqrt[3]{1 - (2 - x^3)}$$

$$= \sqrt[3]{x^3 - 1}$$

4/ Let A be the largest angle




By the law of cosines:

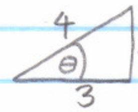
$$A = \cos^{-1}\left(\frac{b^2 + c^2 - a^2}{2bc}\right)$$

$$= \cos^{-1}\left(\frac{4^2 + 6^2 - 7^2}{2(4)(6)}\right)$$

$$\approx 86.4^\circ$$

5/ $\sec\theta = \frac{4}{3} \Rightarrow \cos\theta = \frac{3}{4}$

$\Rightarrow$



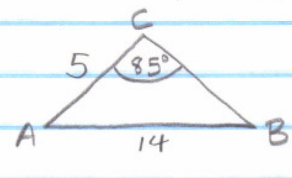

$\leftarrow$ By Pythagoras' Theorem

$$\Rightarrow \sin\theta = \frac{\sqrt{7}}{4}$$

$$\therefore \cot\theta = \frac{\cos\theta}{\sin\theta}$$

$$= \frac{3}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$$

6/




By the law of sines $\left(\frac{\sin B}{b} = \frac{\sin C}{c}\right)$

$$B = \sin^{-1}\left(\frac{b \sin C}{c}\right)$$

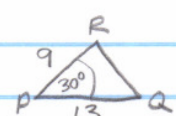
$$= \sin^{-1}\left(\frac{5 \sin 85^\circ}{14}\right)$$

So that $A = 180 - B - C$

$$= 180 - \sin^{-1}\left(\frac{5 \sin 85}{14}\right) - 85$$

$$\approx 74.2^\circ$$

7/



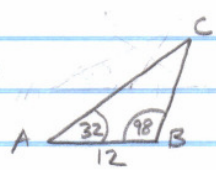

By the law of cosines:

$$QR = +\sqrt{PR^2 + PQ^2 - 2\,PR\,PQ \cos P}$$

$$= \sqrt{9^2 + 13^2 - 2(9)(13)\cos 30}$$

$\approx 6.88$ meters.

8/




Note $C = 180 - 32 - 98 = 50^\circ$

By the law of sines

$$\frac{AC}{\sin B} = \frac{AB}{\sin C}$$

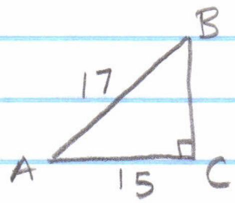
$$\Rightarrow AC = \frac{AB \sin B}{\sin C}$$

$$= \frac{12 \sin 98}{\sin 50}$$

$$\approx 15.51$$

# Test 4A cont'd

9/




By Pythagoras' Theorem

$$AB^2 = AC^2 + BC^2$$

$$\Rightarrow BC = \sqrt{AB^2 - AC^2}$$

$$= \sqrt{17^2 - 15^2}$$

$$= 8$$

10/ SOHCAHTOA!

$$\cos A = \frac{15}{17}$$

$$\Rightarrow A = \cos^{-1}\left(\frac{15}{17}\right)$$

$$\approx 28.07°$$

$$B = 180° - 90° - 28.07°$$

$$= 61.93°$$