MATH 190 REVIEW FOR TEST #4

Instructions:
(1) Scientific calculators are allowed :)
(2) All answers must be fully reduced/simplified!
(3) Each problem is worth 10 points. So show ALL your work for full credit.
(4) Follow the instructions for each problem carefully! If it asks for 1 decimal place, it means 1 decimal place!

1. Given $f(x) = 4 + 2x - x^2$, find and simplify $\dfrac{f(x+h) - f(x)}{h}$ and $\dfrac{f(x+h) - f(x-h)}{h}$.

2. Given $f(x) = -x - 2x^2$, find and simplify $\dfrac{f(x+h) - f(x)}{h}$ and $\dfrac{f(x+h) - f(x-h)}{h}$.

3. Given the function $f(x) = 25 - 10x + x^2$, find and simplify:
   (a) $f(-5)$ (2 points)
   (b) $f(5-a) - f(2a)$ (8 points)

4. Given the function $f(x) = \dfrac{1}{x+1}$, find and simplify:
   (a) $f(4a+2)$ (2 points)
   (b) $f(f(1)) - f(2a)$ (8 points)

5. Let $h(x) = 6 - x^2$ and $g(x) = \sqrt{7-x}$. Find and simplify $h(g(x))$ and $g(h(x))$ (5 points each).

6. Let $h(x) = \sqrt{\dfrac{2x+1}{3}}$ and $g(x) = \dfrac{3x^2 - 1}{2}$. Find and simplify $h(g(x))$ and $g(h(x))$ (5 points each).

7. Find (to the nearest tenth of a degree) the largest angle of a triangle whose sides measure 10, 14, and 8 units.

8. Find (to the nearest tenth of a degree) the largest angle of a triangle whose sides measure 5, 6, and 8.

9. Given that θ is an acute angle (that is, an angle in the first quadrant) and $\sec\theta = 2$, find the exact value of $\cot\theta$. (You may also want to practice finding all the other trig ratios)

10. Given that θ is an acute angle and $\csc\theta = \dfrac{13}{12}$, find the exact value of $\tan\theta$. (You may also want to practice finding all the other trig ratios)

11. Given that θ is an acute angle and $\sin\theta = \dfrac{2}{\sqrt{13}}$, find the exact value of all the remaining trig ratios.

12. In triangle ABC, angle C measures $60°$, the length of side AB is 87, and the length of side AC is 60. Find angle A to the nearest tenth of a degree.

13. In triangle PQR, angle P measures $151°$, side PR measures 410 meters, while the side PQ measures 340 meters. Find the length of side QR, correct to two decimal places.

14. In triangle PQR, angle P measures 16.3°, side PR measures 76.3 meters, while the side PQ measures 42.8 meters. Find the length of side QR, correct to two decimal places.

15. In triangle ABC, angle A measures 105°, angle B measures 45°, and the length of AB is 630 units. Find the length of AC, correct to two decimal places.

16. ABC is a triangle with $C = 90°$. The length of AB is 25 and the length of AC is 7. Find the length of BC.

17. In the triangle above, find the remaining angles, A and B (label them!). (5 points each)

18. ABC is a triangle with $C = 90°$. The length of AB is 13 and the length of AC is 12. Find the length of BC.

19. In the triangle above, find the remaining angles, A and B (label them!). (5 points each)