MATH1P97 - 2016/2017 - Assignment #1 - Solutions - Total Marks: 30

1. [1 point for completion]

2. [2 points] We need to find when both terms are opposite signs. $2x-2 \leq 0$ when $x \leq 1$, and $3x+6 \leq 0$ when $x \leq -2$ [1 point]. Then both terms are opposite signs and satisfy the inequality in the interval $[-2,1]$ [1 point]. *Note: 1 point for graphical interpretation and 1 point for solution interval*

3. [2 points] Slope: $m = \frac{6-2}{3-2} = 4$ [1 point]. Point-Slope formula: $y = 4(x-2)+2 = 4x-6$ [1 point].

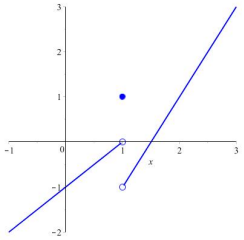
4. [1 point for completion]

5. [1 point for completion]

6. [3 points] The numerator gives $x \geqslant -2$ [1 point]. The factored denomiator is $2(x+2)(x+5)$, then $x \neq -2$ and $x \neq -5$ [1 point]. Then the domain is $(-2,\infty)$ [1 point].

7. [1 point] The domain of an odd-powered root is $(-\infty,\infty)$.

8. [4 points] Since $f(x)$ is defined for all x and all y, both domain and range are $(-\infty,\infty)$ [1 point]. Sketched graph [3 points] *Note: 1 point for each correct part of the graph*



9. [2 points] $f \circ g = f(g(x)) = \frac{1}{(\sqrt{x^3})^2} = \frac{1}{x^3}$ [1 point] $g \circ f = g(f(x)) = \sqrt{\left(\frac{1}{x^2}\right)^3} = \sqrt{\frac{1}{x^6}}$ [1 point].

10. [1 point] $h(x) = g \circ f = g(f(x)) = 3x^2 - 2$, then $h(2) = 10$.

11. [1 point for completion]

12. [4 points] *Note: 1 point for each correct line*

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> restart:
> r:=3*t^3+1/3*t^2+20/3*t+3;

> P:=4/51*r^2+1/2*r+4;

> expand(P);

> subs(t=11,P);
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$$r := 3t^3 + \frac{1}{3}t^2 + \frac{20}{3}t + 3$$

$$P := \frac{4}{51}\left(3t^3 + \frac{1}{3}t^2 + \frac{20}{3}t + 3\right)^2 + \frac{3}{2}t^3 + \frac{1}{6}t^2 + \frac{10}{3}t + \frac{11}{2}$$

$$\frac{12}{17}t^6 + \frac{8}{51}t^5 + \frac{1444}{459}t^4 + \frac{2993}{918}t^3 + \frac{3497}{918}t^2 + \frac{110}{17}t + \frac{211}{34}$$

$$\frac{1217923937}{918}$$

13. [1 point for completion]

14. [1 point for completion]

15(b). [1 point] \$4500

15(c). [1 point] The lowest value is \$2221.875 and occurs at $x = \frac{135}{16} = 8.4375$ years.

15(d). [1 point] \$6500

15(e). [2 points] *Note: 1 point for graph, 1 point for left axis labels all the same 4 decimals*