Review Questions for Chapter 1 – 4

1. Simplify. State any restrictions.

a) $\frac{2t+4}{t^2+6t+8}$ b) $\frac{2x^2-2x+1}{3x^2-2x-1}$ c) $\frac{t^2+6t+9}{t^2-6t+9}\times\frac{3t-9}{2t+6}$

d) $\frac{2x^2+5x+2}{2x^2-3x-9}\div\frac{2x^2+3x-2}{2x^2+x-3}$ e) $\frac{4}{3y+1}+\frac{5}{1-3y}$ f) $\frac{4}{2m^2-m-1}-\frac{2}{m^2+2m-3}$

2. Simplify.

a) $\frac{\sqrt{18}}{\sqrt{24}}$ b) $\frac{\sqrt{xy}}{\sqrt{x^5y^3}}$ c) $4\sqrt{3}-2\sqrt{18}+3\sqrt{27}-5\sqrt{32}$ d) $-3(4i)^2$ e) $6i(-3i)$

3. Simplify.

a) $2\sqrt{3}(4\sqrt{64}-7\sqrt{25})$ b) $2\sqrt{xy}(4\sqrt{27xy^3}-\sqrt{12x^3y})$ c) $2\sqrt{m}(4\sqrt{2m}+6\sqrt{12m})$

d) (5-2i)-(6+i) e) $\frac{6i}{12-4i}$ f) (4 – 2i)(-1 + 3i)(3 – i) g) $(3-2i)^2-(4+3i)^2$

4. State whether each set of ordered pairs is a function. How about its inverse?

a) {(2, 4), (3, 5), (7, 9), (2, -5), (3,-7)}
b) {(5, 4), (4, 3), (3, 2), (2, 1), (1, 0)}
c) {(-1, 6), (0, -6), (1, -6), (1, -6), (2, -6)}

5. if $f(x)=2x-3x^2+1$, and g(x) = 9x – 4, find

a) f(4) b) f (-5) c) f (3a) d) $f(a^2-3)$ e) g(f(x)) f) f(g(x+1))

6. Describe how the graph of each of the following functions in **function notation** can be obtained from the graph of $y=f(x)$.

a) $y=2f(x)+4$ b) $y=-2f(2x+2)+1$

7. If the **parent function** f(x) = $\sqrt{x}$ for 6(a), and f(x) = $\frac{1}{x}$ for 6(b), express both functions in **function formula**.

8. Find the inverse of each function. Is the inverse a function? Explain.
If the inverse is not a function, restrict the domain of f(x) to make the inverse a function.

a) $f(x)=7x-5$ b) $f(x)=2x^2-1$ c) $g(x)=\sqrt{2x+3}$ d) $h(x)=\frac{1}{1-3x^2}$

9. Solve ΔABC, where $\angle B = 40^\circ$, c= 25 m, and b = 20 m.

10. Find the principal angle, then find the related acute angle. Lastly, write the following using a positive acute angle.

a) cos 190° b) cot 290° c) $\sin(-225^0)$ d) $\cos 330^0$ e) $\csc(-210^0)$ f) $\tan 3920^0$

11. Determine the exact value of each trigonometric expression. Express your answers in simplified radical form.

a) $(\sin 45^o)(\cos 45^o) + (\sin 30^o)(\cos 60^o)$

b) $(1 - \tan 45^o)(\sin 30^o)(\cos\frac{\pi}{6})(\tan 60^o)$

c) $\cot 30^o + 2(\csc 45^o)(\sec 60^o)$

12. For each coordinate, state the primary trigonometric ratios associated with angle θ. Express your answers in simplified radical form. Then find the principal angle θ.

a) P(-2, 5) b) P(3, -3) c) P(-4, -5)

13. Find θ if $\sin\theta = -0.8480$ $(0° < \theta < 360°)$

14. Find the exact value of each trigonometric ratio.

a) $\tan\frac{5}{4}\pi$ b) $\sin 300^o$ c) $\csc 315^o$ d) $\sec\frac{8}{3}\pi$

15. If $0 \le \theta \le 360^0$, find the possible measures of $\angle\theta$.

a) $\sin\theta = -\frac{1}{\sqrt{2}}$ b) $\tan\theta = -1$

16. Three sides of a triangle measure 20m, 30m, and 40m. Find the largest angle of the triangle to the *nearest degree.*

17. Two spotlights, one blue and the other white, are placed 6.0 m apart on a track on the ceiling of a ballroom. A stationary observer standing on the ballroom floor notices that the angle of elevation is 45^o to the blue spotlight and 70^o to the white one. How high, to the nearest tenth of a metre, is the ceiling of the ballroom?

18. To determine the height of a pole across a road, Justin takes two measurements. He stands at point *A* directly across from the base of the pole and determines that the angle of elevation to the top of the pole is 15.3^o. He then walks 30 m parallel to the freeway to point *C*, where he sees that the base of the pole and point *A* are 57.5^o apart. From point *A*, the base of the pole and point *C* are 90^o apart. Calculate the height of the pole to the nearest metre.

19. (a) Convert from degree to radian in terms of π.: i) 540° ii) –290°

(b) Convert from radian to degree measure: i) $\frac{5\pi}{3}$ ii) $-\frac{8\pi}{15}$