Part A: Completion

Answers must be placed in the space provided. It is not necessary to show work. Each question is worth one mark.

1. If $f(x) = 2x - 7$, find $f(-3) + 1$. 1. _____

2. State the domain for the following function: $y = \frac{2}{(x-4)}$. 2. _____

3. Write the following in set notation: 3. _____

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4. For $p(t) = 5t + 4$, determine $p^{-1}(-2)$. 4. _____

5. Given the point $(1,-3)$ on $y = f(x)$, what would be the image of the point under the following transformation: $y = f(\frac{1}{2}x)$ 5. _____

6. How many zeroes does the following function have? $y = -3(x-2)^2 - 4$ 6. _____

7. Simplify the following expression: $\frac{m^2 + m - 12}{m^2 + 5m + 4}$. 7. _____

8. Simplify: $4x[3(2x-8) + 11x]$. 8. _____

9. Express $\sqrt{80}$ as a mixed radical. 9. _____

10. Simplify: $\sqrt{32} - \sqrt{8}$. 10. _____

11. Evaluate: $32^{\frac{-2}{5}}$ (No decimals) 11. _____

12. Solve: $4^{3x-5} = 64$. 12. _____

13. What is the horizontal asymptote of the function $y = 2^x - 1$? 13. _____

14. What is the y-intercept of the function $y = -2(3)^x + 1$? 14. _____

15. Find the next two terms of the sequence: 3, 5, 8, 13, 21, ___, ___. 15. _____

16. Identify the type of sequence represented by: $\frac{3}{7}, \frac{2}{7}, \frac{12}{63}, \frac{24}{189}, \ldots$ 16. _____

17. Write the recursive sequence for $2, 10, 50, 250, \ldots$ 17. _____

18. What is the interest rate per period of an investment at 4.4%/a, compounded semi-annually? 18. _____

19. What is the principal angle of -127° ? 19. _____

20. What is the related acute angle for -327° ? 20. _____

21. State the period of the function $y = 2\sin 4\theta - 5$ in degrees. 21. _____

22. Solve for θ to the nearest degree: $\cos\theta = 0.2218$, $0° \leq \theta \leq 360°$. 22. _____

23. What is the range of the function $y = -4\sin x + 3$ 23. _____

24. What is the equation of the axis for $y = 2\cos(\theta - 30°) - 4$ 24. _____

25. What is the exact value of $\sec 330°$? 25. _____

Part B: Full Solutions

Answer the following questions in the space provided. Complete solutions are required and all answers should be expressed in their simplest form.

1. For the geometric sequence with terms $t_8 = 210$ and $t_9 = 630$, find *a* and *r*.

[3]

2. Determine the number of terms in the following arithmetic sequence:
$-109, -95, -81, -67, ..., 101.$ (Show appropriate work)

[4]

3. Determine the sum of the series $5 - 10 + 20 - 40 + ... + 1280$ by using the appropriate formulas.

[4]

4. Barry purchases a new truck worth $45000. It depreciates in value by 12% each year. How much is the truck worth after 7 years?

[2]

5. A 200 gram sample of radioactive plutonium has a half-life of 138 days. The mass of plutonium, in grams, that remains after t days can be modeled by $M = 200\left(\frac{1}{2}\right)^{\frac{t}{138}}$.

a) Determine the mass that remains after 5 years. [2]

b) How long does it take for this 200 gram sample to decay to 110 grams? [3]

6. Determine the equation of the quadratic function in standard form that has roots $\left(3+\sqrt{5}\right)$ and $\left(3-\sqrt{5}\right)$ and passes through the point $(4,2)$.

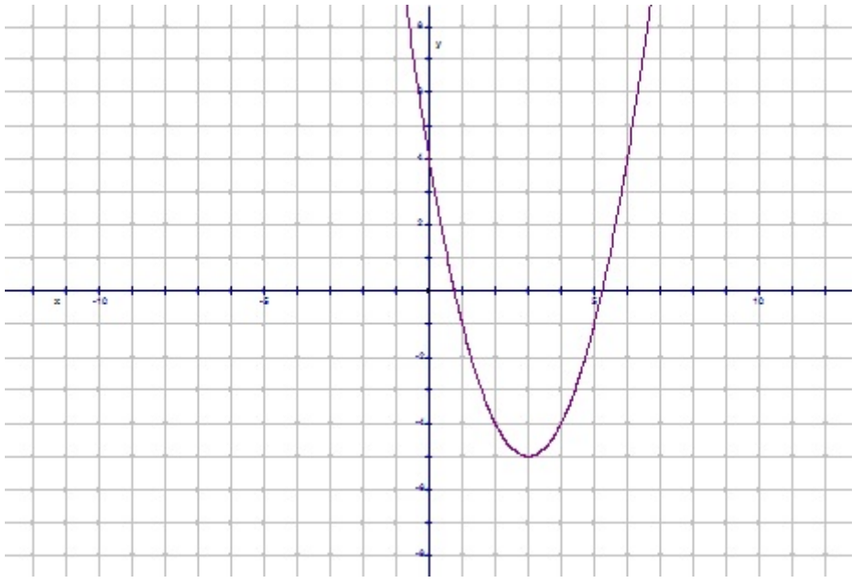
[4]

7. Determine the coordinates of the vertex of the following parabola by completing the square.

$f(x) = -3x^2 + 5x - 7$ Use fractions.

[3]

8. The graph of $y = (x-3)^2 - 5$ is given below.



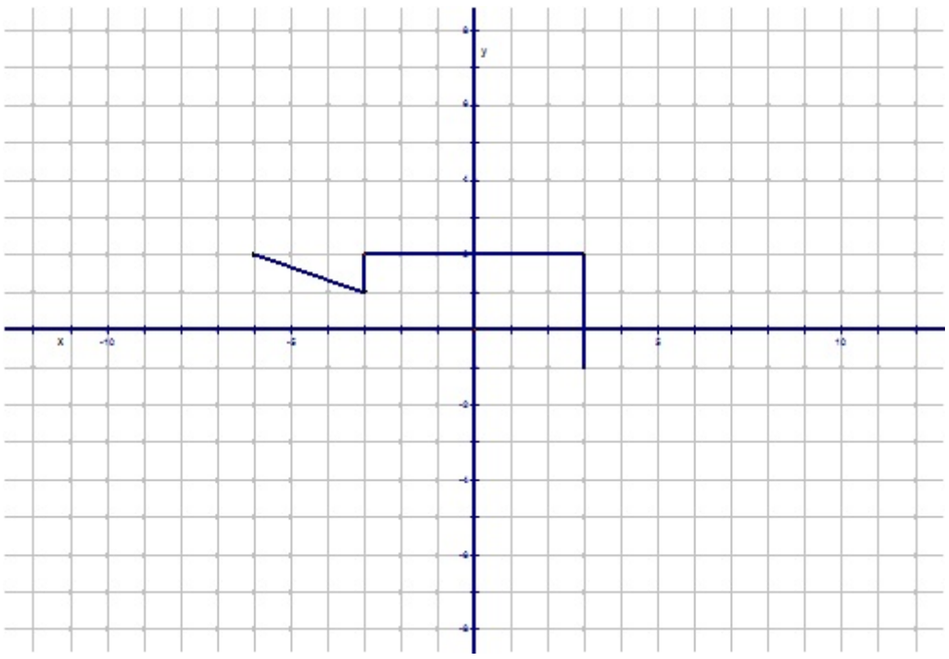
a) On the same set of axes, draw the inverse of the above graph. [1]

b) What is the equation of the inverse? [3]

c) State a restriction on the original function, so that the inverse is also a function. [1]

9. Expand and simplify the first <u>three</u> terms of $(3x + 5y)^6$ [4]

10. Given the graph $y = f(x)$, sketch $y = -3f2(x+1)$. State all of the transformations. [4]



11. Simplify the following: $\dfrac{x^2+x-12}{6x^2+7x-5} \div \dfrac{x^2-x-20}{9x^2+30x+25} \times \dfrac{1}{x-3}$

[3]

12. The average monthly temperature, T, in degree Celsius for Ottawa can be modelled by the function $T(t) = -20\cos(30t)° + 10$, where *t* represents the number of months. January is represented by *t=0*, February by *t = 1* and so on.

a) What is the period? Explain the period in relation to this problem.

[1]

b) What is the minimum temperature?

[1]

c) In what months does the temperature reach 7°C ? Show this algebraically.

[4]

13. Find the intersection of $x^2 + y^2 = 10$ and $y - 2x = 7$ algebraically.

[4]

14. Prove the following trigonometric identity:

a) $\cos\theta(1+\sec\theta)(\cos\theta-1) = -\sin^2\theta$

[3]

15. A river flows at 4 km/h. Kelly takes 3 hours to row 15 km up the river and 15 km back. How fast can Kelly row in still water?

[6]

16. Peter has a part time job at McDonald's and is saving money for a school trip to France in two years. He needs $3200 for the trip. He wants to deposit equal amounts at the end of every month for two years in a savings account that pays 3.6%/a, compounded monthly. How much money does Peter need to deposit at the end of every month in order to save the $3200?

[3]

17. On a particular par 3 hole, Mike Weir's first shot was 156 yards but sliced 13° to the right. He estimated that he was still 38 yards from the pin. Find the straight line distance from the tee to the pin. (There are two possible answers)

[6]