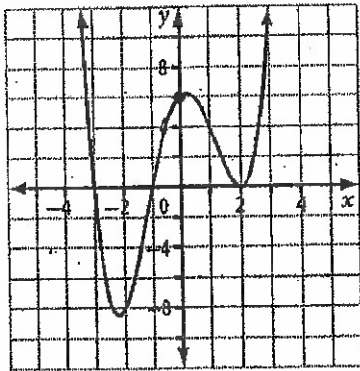


2022

Pre-Calculus 30 Additional Final Review Questions

- A pendulum of a clock with a length of 85 cm swings through an angle of 15° . What is the arc length through which the pendulum swings?
- A person is seated on a ferris wheel and is located 5 m from the centre of the wheel. The ferris wheel seat moves through an angle of $\frac{\pi}{7}$ radians. What is the arc length that the person sitting in the seat has travelled?
- Solve the following:
 - $2\sin x - \sqrt{3} = 0, \quad 0 \leq x \leq 2\pi$
 - $4\sec x - 5 = 0 \quad 0^\circ \leq x \leq 360^\circ$
- Solve $2\cos^2 x + \cos x - 1 = 0$ over the interval $0 \leq x \leq 2\pi$
- Solve the following equations:
 - $7^{x+2} = 441$
 - $2^{2x-5} = 6^{x+2}$
 - $\log_2(4x + 10) - \log_2 x = 3$
 - $\log_5(4x - 6) - 3 = \log_5(2x - 3)$
 - $3 \log_6 x = \log_6 9 + \log_6 24$
- Graph the following for one cycle:
 - $y = 3\cos 2\left(x + \frac{\pi}{3}\right) + 1$
 - $y = -4\sin(2x - \pi) - 3$
- Prove the following identities
 - $\frac{\cos x}{1 - \sin x} + \frac{\cos x}{1 + \sin x} = \frac{2}{\cos x}$
 - $\frac{\sin x + \sin^2 x}{\cos x + \sin x \cos x} = \tan x$
- The half-life of a particular substance is 15 years. How long will it take 27 grams of this substance to decay to 10 grams?
- Mary invests \$4000 into an account that pays 6% compounded semi-annually. How long will it take for the investment to grow to \$5500?
- The base function $y = x^2$ is vertically stretched by a factor of 3, reflected in the x axis, horizontally stretched by a factor of 4, translated 3 units left and 4 units up. Write the equation of the transformed function.
 - The base function $y = \log_3 x$ is reflected in the y axis, horizontal stretched by a factor of $\frac{1}{2}$, translated 5 units right and 6 down. Write the equation of the transformed function.

11. Sketch the graph $y = |x|$ and then sketch the transformed graph $y = 2|-(x - 1)| + 4$ on the same graph.
12. Find the equation of the following polynomial function.



13. The World Series champion Boston Red Sox, have 5 different team jerseys they can wear, 3 pairs of pants, 2 different pairs of socks and 3 different hats. How many different uniforms can they possible wear?
14. Factor fully $x^3 - 4x^2 + x + 6$.
15. Sketch the function $y = (x + 3)^3(x - 4)(x - 2)^2$
16. Given the function $y = \frac{x-3}{x^2-x-6}$
- a) Determine the following:
- Domain and range
 - Intercepts
 - Equations of asymptotes
 - Points of Discontinuity
- b) Sketch the function.
17. The revenue function for selling n tickets to a rock concert is given by $R(n) = 25n$. The total cost for producing the concert based on the number of tickets sold is $C(x) = 15n + 2000$. How many tickets must be sold to make a profit of \$5000?
18. Given that $\sin\theta = \frac{-3}{5}$ in quadrant three and $\cos\beta = \frac{12}{13}$ in quadrant four, find the following:
- a) $\sin(\theta - \beta)$ b) $\tan(\theta + \beta)$ c) $\cos 2\theta$
19. Find the exact value of $\sin 75^\circ$.

20. In how many ways can the advisor of the debating club select a team from 7 grade 11 students and 8 grade 12 students if the team has:
- a) four members?
 - b) four members, only one of whom is grade 11?
 - c) four members, at least two of whom are grade 12?
21. How many different arrangements can be used using all of the letters from the word MISSISSIPPI?
22. A teacher wants to place 5 Pre-Calc 30 texts and 6 Pre-Calc 20 texts and 7 Physics texts on a book shelf. How many ways can she place all of the textbooks on the shelf?
23. Expand the following:
- a) $(x + 3y)^5$
 - b) $(2x - 5y)^4$
24. Find the fifth term in the expansion of $(2x - 7y)^7$