# 1 When \( p(x) = x^4 - 2x^3 - 3x^2 + 8x - 4 \) is divided by which factor is the remainder the greatest?

a. \((x - 1)\)  
b. \((x + 1)\)  
c. \((x - 2)\)  
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ANSWER:
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# 3 As a cannonball travels through the air, its height in meters above the ground at t seconds is \( h(t) = -9.8(t - 10)^2 + 980 \).

For what time does this equation have physical meaning? Express answer in interval notation.
# 4 Find \( f''(-4) \) if
\[ f(x) = x^4 - 3x^3 + 2x - 7 \]
# 5 Find the limit, if it exists.
\[
\lim_{x \to \infty} \frac{x^2 - 36}{x^2 + x - 30}
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# 6 A point is moving along the graph of \( y = \frac{1}{1 + x^2} \) so that \( \frac{dx}{dt} = 2 \) cm/min. Find \( \frac{dy}{dt} \) when \( x = -2 \).
# 7 How many terms are in the sequence
3, 7, 11, … , 39?

CODE:
ANSWER:
# 8 Solve for $x$:
\[
\left(2^{8x^2}\right)\left(2^{4x}\right)\left(2^{-2}\right) = \left(2^{2x^2}\right)\left(2^{5x}\right)
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# 9 Solve for x:
\[
\begin{vmatrix}
4 & x^2 & x \\
3 & 1 & 0 \\
-1 & -2 & 3 \\
\end{vmatrix} = 8
\]

CODE:

ANSWER:
# 10 Find \[ \lim_{x \to \infty} \left( \frac{1}{x} + \frac{1}{x^2} + 1 \right) \]
# 11 Find $f'(x)$ if
\[ f(x) = 3 \cos^2 5x \]
# 12 If the coefficient of the 5th and 6th terms in the expansion of \((x - y)^n\) are equal, find the 3rd term.
# 13  Find the dot product given
\[ \vec{v} = -3i + 4j - 7k \quad \text{and} \quad \vec{w} = 3i - 6j - 3k. \]
# 14 Simplify:

\[
\frac{q!(q-3)!}{(q-5)!(q+2)!}
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# 15 Find the mean of the first \textit{500,000} odd numbers.

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The height, \( h \) in meters, of a projectile launched from under water is given by the portion of the curve of \( h(t) = -t^5 - 2t^4 + 10t^3 + 20t^2 - 9t - 18 \) where \( t \geq 0 \), \( t \) is in seconds. At what time does the projectile leave the water?

\[
54 + 3t + 2t^2 - 0t - 221 + 0t - t = 0
\]

\[
8 - 8t = 0
\]
# 17 Solve and express the answer in interval notation:

\[(x + 4)^2 (x - 1)^2 (x + 7)^2 > 0\]
# 18 If
\[ f'(x) = -8(x-1)^3(x+2)(x-3)^7(x+1)^4 \]
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# 19 Which of the functions are even?
I. \( y = 3x^2 \)
II. \( y = 5x^4 - 4 \)
III. \( y = 4x^2 + 8x + 4 \)
IV. \( y = x^4 + 3x^2 + 7 \)
V. \( y = \cos 5x \)
State the domain for $f(x)$ in interval form if $f(x) = \sqrt{4 - x^2}$
# 21 What test would be used to prove convergence of the series \( \sum_{n=1}^{\infty} \frac{1}{n^5} \)
# 22 A particle is moving along a horizontal line according to the equation 
\[ s(t) = 2t^3 - 4t^2 + 2t - 1. \] Find the velocity at the instant \( t = 3 \) seconds.

**CODE:**

**ANSWER:**
# 23 Find $\int \sin \frac{1}{3} x \, dx$

CODE: 

ANSWER:
# 24 Solve for $x$: $\ln x + \ln (x - 2) = 3 \ln 2$

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