

NAME:

Unit 4 Test (Lessons 31–36)

Answer all parts of the open response problem.

1) $f(x) = x - 3$ $g(x) = x^2 - 9$

A) The product of g and f form the new function $h(x)$. Find $h(x)$. Show your work.

B) Name the degree and end behavior for $h(x)$.

C) Sketch the graph of $h(x)$. Label the roots and turning points.

D) Name the interval(s) where $h(x)$ is increasing.

←—————→ x

Multiple Choice

_____ 2) Name the excluded domain values for: $f(x) = \frac{1}{\frac{3}{x} + 1}$

A) $x \neq -3$

B) $x \neq -3, 0$

C) $x \neq 0$

D) $x \neq -1, 0$

_____ 3) Name the possible degree n and end behavior.

A) $n = 3$

$x \rightarrow -\infty, f(x) \rightarrow +\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$

B) $n = 3$

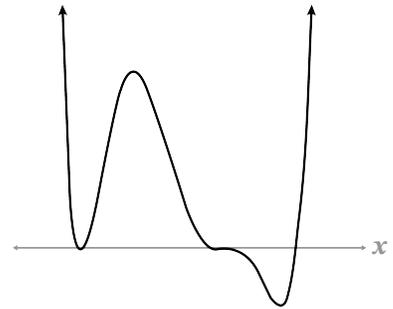
$x \rightarrow -\infty, f(x) \rightarrow -\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$

C) $n = 6$

$x \rightarrow -\infty, f(x) \rightarrow +\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$

D) $n = 6$

$x \rightarrow -\infty, f(x) \rightarrow -\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$



_____ 4) Determine all possible rational roots for $n(x) = 3x^4 - 2x^3 + x^2 - 12$.

A) $\pm 1, \pm 3$

B) $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

C) $\pm \frac{1}{3}, \pm \frac{2}{3}, \pm 1, \pm \frac{4}{3}, \pm 2, \pm 4$

D) $\pm \frac{1}{3}, \pm \frac{2}{3}, \pm 1, \pm \frac{4}{3}, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

_____ 5) Select the equation.

y varies directly as x -squared, and inversely as the product of w and z -cubed.

A) $y = \frac{x^2}{wz^3}$

B) $y = \frac{kx^2}{wz^3}$

C) $y = \frac{kwx^2}{z^3}$

D) $y = \frac{k wz^3}{x^2}$

___ 6) Determine the inverse of $p(x) = \frac{1}{\sqrt[3]{x+6}}$.

A) $p^{-1}(x) = \frac{1}{x^3} - 6$

B) $p^{-1}(x) = \frac{1}{x^3 - 6}$

C) $p^{-1}(x) = x^3 - 6$

D) inverse not shown

___ 7) Determine the restrictions on the function: $h(x) = \frac{x-5}{x^3 - 5x^2 - 4x + 20}$

A) $x \neq \pm 2$

B) $x \neq \pm 2, -5$

C) $x \neq \pm 2, 5$

D) $x \neq \pm \sqrt{2}, 5$

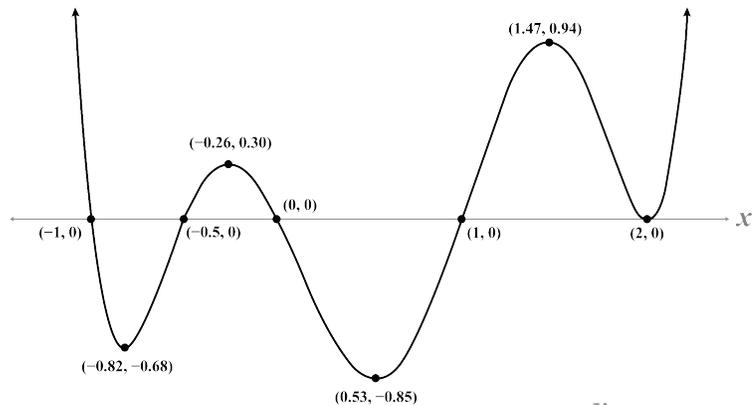
___ 8) Name the relative minimum over the interval $[0, 3]$.

A) $(-0.82, -0.68)$

B) $(1.47, 0.94)$

C) $(0.53, -0.85)$

D) $(2, 0)$



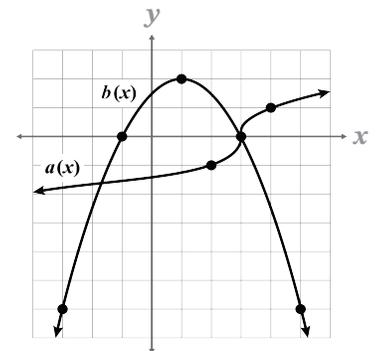
___ 9) Evaluate $[b \circ a](2)$.

A) -1

B) 0

C) 2

D) 3



___ 10) The graphs of polynomial functions are ___ smooth, continuous and ___ contain sharp turns or holes.

A) sometimes, never

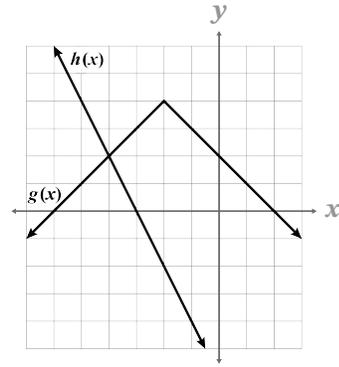
B) always, always

C) never, sometimes

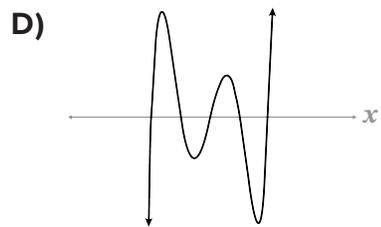
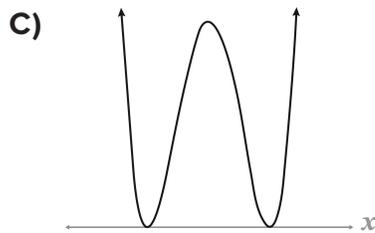
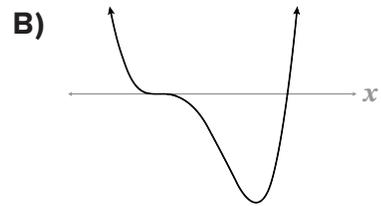
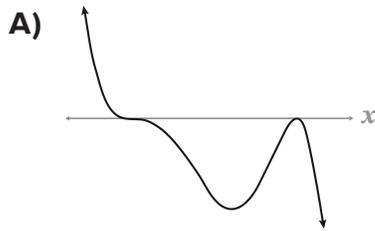
D) always, never

_____ 11) Determine $(g - h)(-2)$.

- A) 6
- B) 4
- C) 2
- D) -6



_____ 12) Select the graph that contains a multiplicity of two and a multiplicity of three.

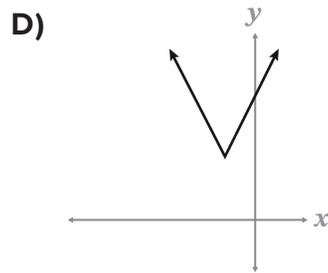
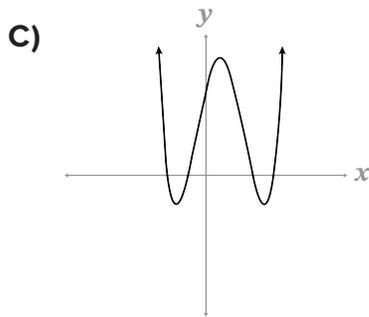
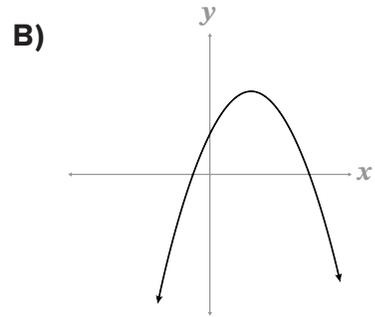
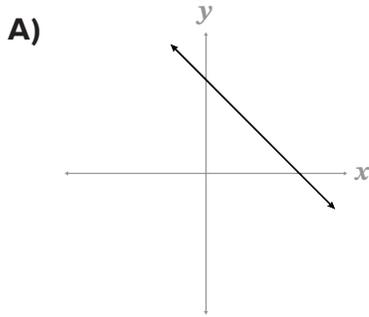


_____ 13) p varies jointly as the square of y , and the cube of x .

If $p = -8$, $y = 3$ and $x = -2$, find p when $y = 1$ and $x = 2$.

- | | |
|------------------|------------------|
| A) $\frac{1}{9}$ | B) $\frac{4}{9}$ |
| C) $\frac{2}{9}$ | D) $\frac{8}{9}$ |

_____ 14) Select the graph that does not represent a polynomial function.



_____ 15) Find the exact roots of $f(x) = x^4 - 2x^3 + x^2 - 8x - 12$.

A) $-3, 1$

B) $\pm 2i, -1, 3$

C) $-1, 3$

D) $\pm 2, -1, 3$

_____ 16) Find the quotient of g and f given: $f(x) = 5 - \frac{1}{x}$ $g(x) = \frac{1}{x}$

A) $5x - 1$

B) $\frac{1}{5x - 1}$

C) $\frac{5}{x} - \frac{1}{x^2}$

D) $\frac{2}{x} - 5$

_____ 17) Name the end behavior for the polynomial function.

$k(x) = -3x(x - 6)^2(x + 8)$

A) $x \rightarrow -\infty, f(x) \rightarrow +\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$

B) $x \rightarrow -\infty, f(x) \rightarrow -\infty$, and $x \rightarrow +\infty, f(x) \rightarrow -\infty$

C) $x \rightarrow -\infty, f(x) \rightarrow -\infty$, and $x \rightarrow +\infty, f(x) \rightarrow +\infty$

D) $x \rightarrow -\infty, f(x) \rightarrow +\infty$, and $x \rightarrow +\infty, f(x) \rightarrow -\infty$

