Summer Assignments for Calculus Honors

Chapter P

1. Find all intercepts of the graph of \( y = \frac{x^2}{x-3} \).

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<tbody>
<tr>
<td>(a) (-2, 0)</td>
<td>(b) (-2, 0), (3, 0)</td>
<td>(c) ( 0, \frac{2}{3} ), (3, 0)</td>
</tr>
<tr>
<td>(d) (-2, 0), (0, -\frac{2}{3})</td>
<td>(e) None of these</td>
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2. Determine if the graph of \( y = \frac{x}{x^2-4} \) is symmetrical with respect to the x-axis, the y-axis, or the origin.

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<tbody>
<tr>
<td>(a) About the x-axis</td>
<td>(b) About the y-axis</td>
<td>(c) About the origin</td>
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<tr>
<td>(d) All of these</td>
<td>(e) None of these</td>
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3. Find all points of intersection of the graphs of \( x^2 - 2x - y = 6 \) and \( x - y = -4 \).

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<tbody>
<tr>
<td>(a) (0, -6), (0, 4)</td>
<td>(b) (10, 14), (13, 17)</td>
<td>(c) (5, 9), (-2, 2)</td>
</tr>
<tr>
<td>(d) (-5, -1), (2, 6)</td>
<td>(e) None of these</td>
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4. Which of the following is a sketch of the graph of the function \( y = x^3 + 1 \)?

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<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
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<tr>
<td>(c)</td>
<td>(d)</td>
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<tr>
<td>(e) None of these</td>
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5. Find an equation for the line passing through the point (4, -1) and perpendicular to the line $2x - 3y = 3$.

(a) $y = \frac{2}{3} x - 1$  
(b) $3x + 2y + 2 = 0$  
(c) $2x + 3y = 10$

(d) $3x + 2y = 10$

(e) None of these

6. Find the domain of $f(x) = \frac{1}{\sqrt{3-2x}}$

(a) $(-\infty, \frac{3}{2})$

(b) $[\frac{3}{2}, \infty)$

(c) $(-\infty, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$

(d) None of these

7. Find $f(x + \Delta x)$ for $f(x) = x^3 + 1$.

(a) $x^3 + 1 + \Delta x$

(b) $x^3 + 3x^2(\Delta x) + 3x(\Delta x)^2 + (\Delta x)^3 + 1$

(c) $x^3 + (\Delta x)^3 + 1$

(d) $\Delta^2 x^6 + 1$

(e) None of these

8. If $f(x) = \frac{1}{\sqrt{x}}$ and $g(x) = 1 - x^2$, find $f(g(x))$.

(a) $1 - x^2$

(b) $\frac{1}{\sqrt{1 - x^2}}$

(c) $1 - \frac{1}{x}$

(d) $\frac{1}{\sqrt{x}} + 1 - x^2$

(e) None of these

9. If the point $(3, \frac{1}{2})$ lies on the graph of the equation $2x + ky = -11$, find the value of $k$.

(a) $\frac{5}{2}$

(b) $-34$

(c) $\frac{17}{2}$

(d) $-10$

(e) None of these

10. Which of the following equations expresses $y$ as a function of $x$?

(a) $3y + 2x - 9 = 17$

(b) $2x^2y + x = 4y$

(c) Both a and b

(d) Neither a nor b

(e) $3y^2 - x^2 = 5$

11. Given $f(x) = x^2 - 3x + 4$, find $f(x + 2) - f(2)$.

(a) $x^2 - 3x + 4$

(b) $x^2 + 2$

(c) $x^2 + x - 8$

(d) $x^2 - 3x - 4$

(e) None of these
12. Determine which function is neither even nor odd.

<table>
<thead>
<tr>
<th>(a)</th>
<th>f(x) = tan x</th>
<th>(b)</th>
<th>f(x) = 3x^5 + 5x^3 + 1</th>
<th>(c)</th>
<th>f(x) = \frac{3}{x^2}</th>
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<tbody>
<tr>
<td>(d)</td>
<td>f(x) = \sqrt{x^2 + 1}</td>
<td>(e)</td>
<td>Both a and b</td>
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13. Find the point that lies on the line determined by the points (1, -2) and (-3, 1).

<table>
<thead>
<tr>
<th>(a)</th>
<th>(0, 0)</th>
<th>(b)</th>
<th>(5, 1)</th>
<th>(c)</th>
<th>(4, -6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d)</td>
<td>(5, -5)</td>
<td>(e)</td>
<td>(-2, 0)</td>
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14. Determine the slope of the line given by the equation 9x – 5y = 11.

<table>
<thead>
<tr>
<th>(a)</th>
<th>\frac{5}{9}</th>
<th>(b)</th>
<th>-\frac{5}{9}</th>
<th>(c)</th>
<th>\frac{9}{5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d)</td>
<td>-\frac{9}{5}</td>
<td>(e)</td>
<td>-9</td>
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15. Describe the transformation needed to sketch the graph of \( y = \frac{1}{x-2} \) using the graph of \( f(x) = \frac{1}{x} \).

(a) Shift f(x) two units to the right.
(b) Shift f(x) two units to the left.
(c) Shift f(x) two units upward.
(d) Shift f(x) two units downward.
(e) Reflect f(x) about the x-axis.

16. Use the vertical line test to determine which of the following graphs represent \( y \) as a function of \( x \).

(a) 
(b) 
(c) 
(d) 
(e) None of these
17. Let \( f(x) = \begin{cases} \frac{1}{x} & x < 0 \\ 2x + 1, & x \geq 0 \end{cases} \). Find \( f(3) \).

(a) \( \frac{1}{3} \)  
(b) 1  
(c) 7

(d) Undefined  
(e) \( \frac{22}{3} \)

18. The dollar value of a product in 1998 is $1430. The value of the product is expected to increase $83 per year for the next 5 years. Write a linear equation that gives the dollar value \( V \) of the product in terms of the year \( t \). (Let \( t = 8 \) represent 1998.)

(a) \( V = 1430 + 83(t - 8) \)  
(b) \( V = 83 + 1430t \)  
(c) \( V = 1430 + 83t \)

(d) \( V = 83 + 1430(t + 8) \)  
(e) \( V = 1430 + 83(t + 8) \)

19. During the first and second quarters of the year, a business had sales of $150,000 and $185,000, respectively. If the growth of sales follows a linear pattern, what will sales be during the fourth quarter?

(a) $220,000  
(b) $235,000  
(c) $335,000

(d) $255,000  
(e) None of these

20. In order for a company to realize a profit in the manufacture and sale of a certain item, the revenue, \( R \), for selling \( x \) items must be greater than the cost, \( C \), of producing \( x \) items. If \( R = 79.99x \) and \( C = 61x + 1050 \), for what values of \( x \) will this product return a profit?

(a) \( x \geq 55 \)  
(b) \( x \geq 8 \)  
(c) \( x \geq 18 \)

(d) \( x \geq 56 \)  
(e) None of these