

Precalculus Summer Packet 2018

Work must be shown to support each answer and should be done neatly. Please circle the answers. The first assessment for the quarter will be based on the problems in this summer packet.

I. Find the equation of a line in slope-intercept form given the following information:

| | |
|--|--|
| 1. through $(5, -1)$ and $(0, 4)$ | 2. slope of $\frac{3}{2}$ and passes through $(2, 4)$ |
| 3. through $(-1, -1)$ and parallel to $y = -x - 5$ | 4. through $(5, -3)$ and perpendicular to $y = \frac{5}{2}x$ |
| 5. $f(-2) = 1$ and $f(-1) = 3$ | 6. through $(2, -4)$ and parallel to $x = 5$ |

II. Factor completely.

| | |
|--------------------|----------------------|
| 1. $3x^4 + 9x^2$ | 2. $x^2 + 5x - 6$ |
| 3. $3x^2 - 8x + 4$ | 4. $4x^2 - 20x + 25$ |

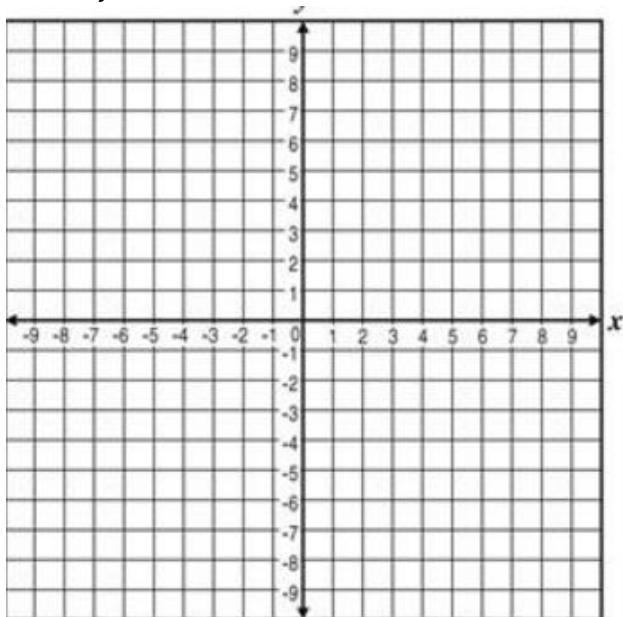
| | |
|-------------------------------|-----------------------|
| 5. $x^3 - 8$ | 6. $16x^4 - 81$ |
| 7. $x^2 - 9$ | 8. $2x^2 - 4x - 30$ |
| 9. $r^3 + 3r^2 - 54r$ | 10. $6n^2 - 11n - 2$ |
| 11. $6v^3 - 16v^2 + 21v - 56$ | 12. $2b^2 + 17b + 21$ |

III. Solve the inequality.

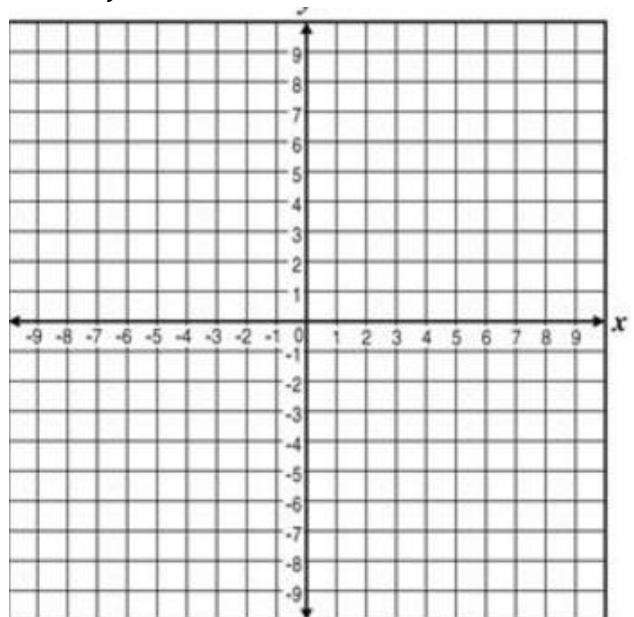
| | |
|-----------------------|-----------------------------|
| 1. $4 - 2x > -18$ | 2. $3 - 6x \leq 9(2x - 12)$ |
| 3. $-3(4x - 1) < -12$ | 4. $-2x + 4 \geq 15$ |

IV. Solve and graph linear systems and compound inequalities

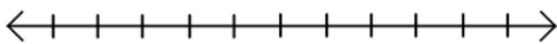
1. $3x + 5y \leq 15$
 $4x + y > 8$



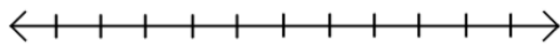
2. $2x - 3y \leq -8$
 $9x + 3y \geq -3$



4. $5 < 4 - 3x \leq 2$

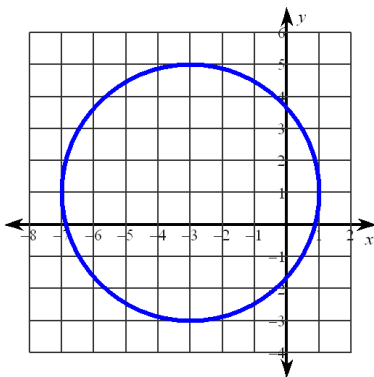


5. $3(x - 2 < 9 \text{ or } 3(x - 3) \geq 15)$



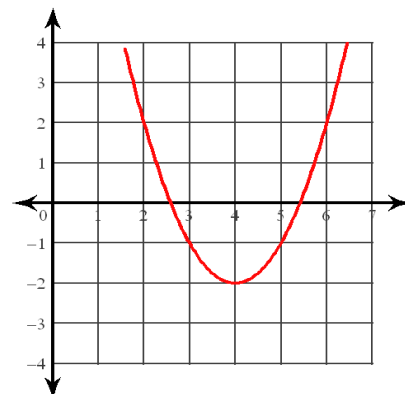
V. State the domain and range of the following relations:

1.



Domain: _____ Range: _____

2.



Domain: _____ Range: _____

3. $\{(-2,3), (-1,0), (-4,5), (1,5), (2,7)\}$

D_x : _____ R_y : _____

4. $x = -2$

D_x : _____ R_y : _____

VI. Use the graph below to find the following:

| | | |
|----------------------------|----------------------------|--|
| a) Domain: | b) Range: | |
| c) $f(-2)$: | d) $f(0)$: | |
| e) $f(2)$: | f) Interval(s) increasing: | |
| g) Interval(s) decreasing: | h) Interval(s) constant: | |
| i) x-intercept(s): | j) y-intercept: | |

VII. Evaluate each function.

1. If $f(a) = a^2 - 3a + 6$, find :

a. $f(-3)$

b. $f(x + 2)$

c. $f(2\sqrt{3})$

2. If $g(n) = -3n - 4$ and $h(n) = n^2 - n$, find $g(h(6))$

3. If $f(x) = 4x + 3$ and $g(x) = x^2 + 2x + 3$, find:

| | |
|----------------------|------------------|
| a. $f(x) + g(x)$ | b. $f(x) - g(x)$ |
| c. $f(x) \cdot g(x)$ | d. $g(f(x))$ |

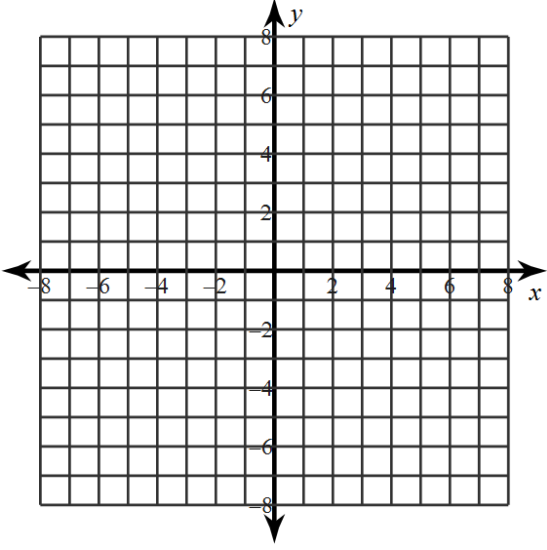
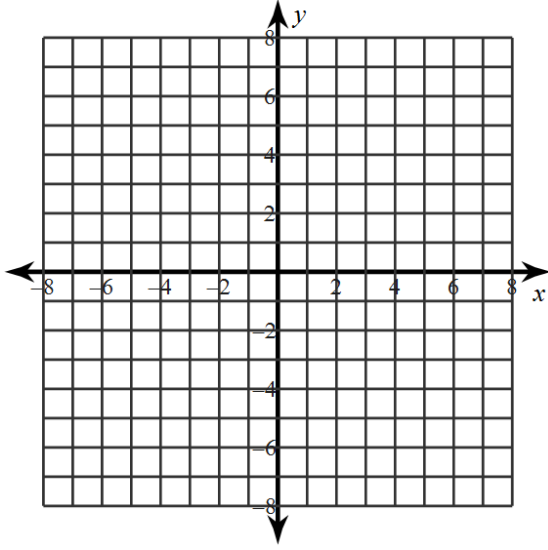
VIII. Find the domain algebraically. Write your answer in interval notation.

| | |
|-------------------------------|-----------------------------------|
| 1) $y = \sqrt{x^2 - 16}$ | 2) $y = \frac{4x}{x^2 + 2x - 15}$ |
| 3) $y = \frac{3}{\sqrt{x-5}}$ | 4) $\sqrt{x^2 + 3}$ |

IX. Find the zeroes of the following by solving for x when $y = 0$.

| | |
|------------------------------------|-------------------------------|
| 1) $y = 3x - 7$ | 2) $y = x^2 - 14x + 45$ |
| 3) $y = x(x + 1)(2x - 5)(x - 3)^2$ | 4) $y = x^2 - 12$ |
| 5) $y = x^4 - 7x^2 + 12$ | 6) $y = x^3 + 4x^2 - 3x - 12$ |
| 7) $y = 2x^3 + 5x^2 - 6x - 15$ | 8) $y = \frac{1}{x}$ |

X. Sketch the graph of the function using transformations.

| | |
|---|---|
| 1) $f(x) = 3x - 8$  | 2) $f(x) = -2(x + 1)^2 - 3$  |
|---|---|

XI. Given the equation $(x) = (x + 2)^2 - 1$, find:

1. Vertex: _____
2. Axis of Symmetry: _____
3. Direction: _____
4. Max or Min Value: _____
5. x intercept: _____
6. y- intercept: _____

XII. The height of a ball thrown vertically upward from ground level is $h(t) = -32t^2 + 64t$, where t is the time in seconds and h is the height.

1. Find the height when $t = .5$
2. Find the time when the ball reaches its maximum height. (Hint: Find the vertex)
3. What is the maximum height?
4. After what time does the ball hit the ground? (Hint: Find t when $h(t) = 0$)