NAME: _____

Mathematics Summer Packet

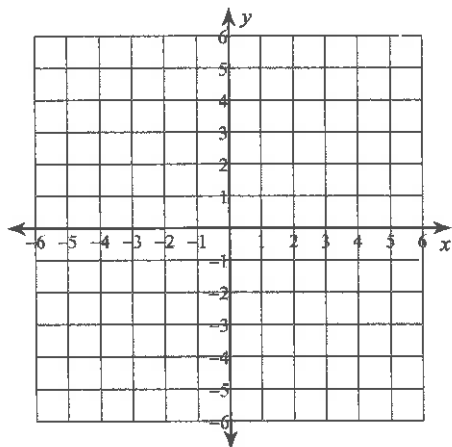For incoming seniors taking the following course in September:

Precalculus

- Completed packets will be collected on the first Monday of Academic week in September.
- Calculators may be used, but you must show your work to get full credit.
- This packet will count as a quiz grade for the first term of the upcoming school year.
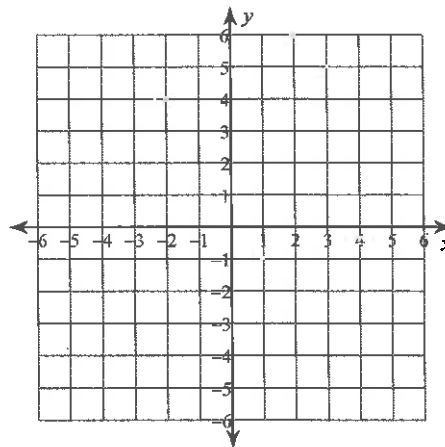
Equations and Inequalities   **Sketch the graph of each linear inequality.**

1) $y < -3x + 3$ 2) $2x - y \geq 1$
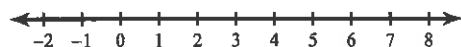
Solve each equation.

3) $176 = 4(4 - 5n)$

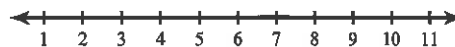4) $\dfrac{121}{12} = \dfrac{4}{3}x + 6x$

5) $13 - 4x = 1 - 2x$

6) $4(3m - 5) = 6(m - 8) - m$

Solve each inequality and graph its solution.

7) $28 + 7x > 7(2x - 2)$

$$\xleftarrow{\quad}\underset{-2\;\;-1\;\;\;0\;\;\;1\;\;\;2\;\;\;3\;\;\;4\;\;\;5\;\;\;6\;\;\;7\;\;\;8}{\rule{8cm}{0.4pt}}\xrightarrow{\quad}$$

8) $-8x - 2(2x + 4) < -92$

$$\xleftarrow{\quad}\underset{1\;\;\;2\;\;\;3\;\;\;4\;\;\;5\;\;\;6\;\;\;7\;\;\;8\;\;\;9\;\;10\;\;11}{\rule{8cm}{0.4pt}}\xrightarrow{\quad}$$
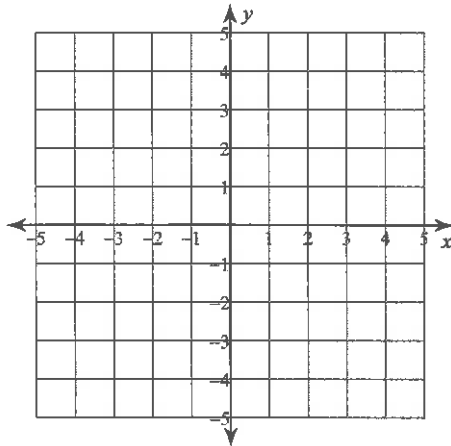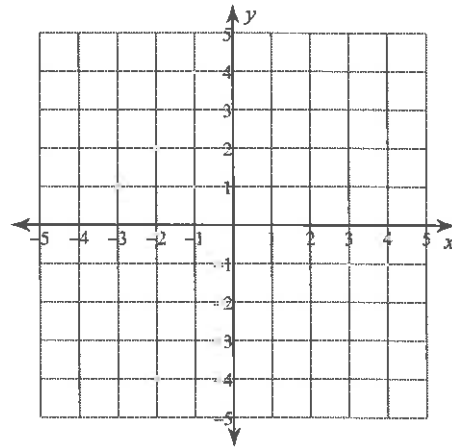
Solving Systems of Equations

Solve each system by graphing.

9) $y = \dfrac{3}{4}x - 4$

$y = -\dfrac{3}{4}x + 2$

10) $x + 2y = -8$

$5x - 2y = -4$

Solve each system of equations.

11) $9x + 9y = 27$

$-x - 2y = 3$

12) $-3x + 8y = -17$

$8x - 10y = 0$

13) $-8x + y = -5$

$-2x + 4y = 10$

14) $x + 5y = 1$

$5x - 7y = 5$

15) Adam and Brenda are selling pies for a school fundraiser. Customers can buy blueberry pies and lemon meringue pies. Adam sold 10 blueberry pies and 6 lemon meringue pies for a total of $172. Brenda sold 9 blueberry pies and 12 lemon meringue pies for a total of $267. Find the cost each of one blueberry pie and one lemon meringue pie.

Factoring and Solving Quadratics

Factor each completely.

16) $r^2 - 12r + 35$

17) $b^2 - 18b + 81$

18) $5x^2 + 3x - 8$

19) $2x^2 + x - 28$

20) $16r^2 - 9$

21) $x^2 + 10xy + 25y^2$

Solve each equation by factoring.
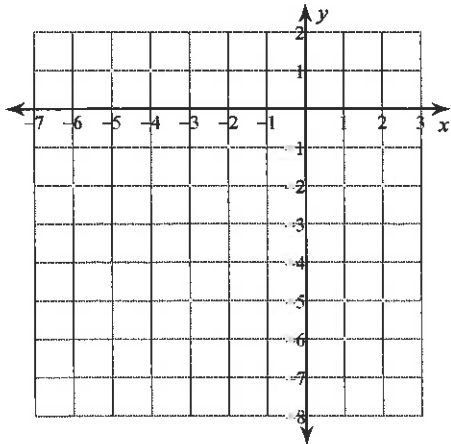
22) $k^2 - 35 = 2k$

23) $5x^2 + 42 = 41x$

Solve each equation with the quadratic formula.
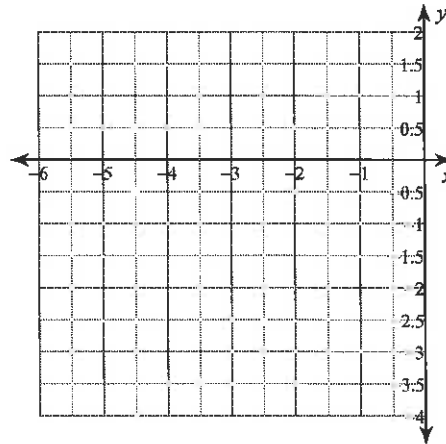
24) $3n^2 - 2n - 5 = 0$

25) $8x^2 - 4x - 4 = 2$

Sketch the graph of each function.

26) $y = -2x^2 - 4x - 1$

27) $y = x^2 + 6x + 6$

Applying Exponent Properties

Simplify. Your answer should contain only positive exponents.

28) $yx^3 \cdot 2x^4$

29) $\left(3uv^2\right)^2$

30) $\dfrac{u^3 v^3 \cdot uv^4}{\left(2v^3\right)^2}$

31) $\dfrac{3x^3 y^4 z^2}{4x^2 z^3}$

32) $\left(3a^{-1}b^3\right)^{-2}$

33) $\dfrac{\left(2v^2\right)^{-3}}{\left(-2u^2 v^{-4}\right)^4}$

Function Operations

Evaluate each function.

34) $g(t) = t^2 + 5t$; Find $g(3)$

35) $w(t) = t^2 - t$; Find $w(z - 3)$

Perform the indicated operation.

36) $g(x) = 3x + 2$
$h(x) = x^2 - 2x$
Find $(g - h)(x)$

37) $f(n) = 2n + 3$
$g(n) = n^2 - 2n$
Find $(f \cdot g)(n)$

38) $f(n) = 4n - 2$
$g(n) = -n^3 - 4n$
Find $(f \circ g)(n)$

39) $g(x) = x - 2$
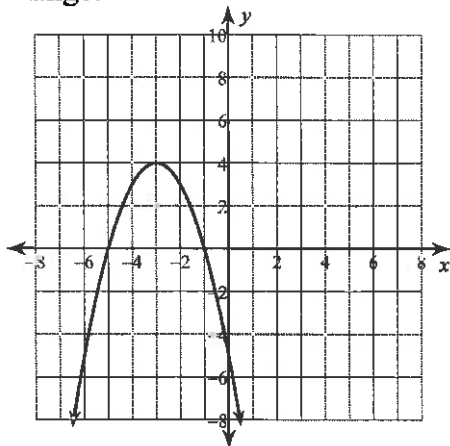$f(x) = 3x - 5$
Find $(g \circ f)(x)$

40) $f(a) = 4a - 2$
$g(a) = a^3 + 4a$
Find $\left(\dfrac{f}{g}\right)(4)$

41) $g(n) = n + 4$
$h(n) = n^2 - 4n$
Find $(g \circ h)(-5)$

42) Find the domain and range of the graph below.
Domain:

Range:

43) Find the domain and range of the graph below.
Domain:

Range: