Math–0362
Final Exam Review

Name_____

MULTIPLE CHOICE. Choose the one alternative that best answers the question.

Factor out the greatest common factor.

1) $30x^4 - 48x^2 + 15x$ 1) _____

A) $15x(2x^3 - 3x + 1)$ B) $x(30x^3 - 48x + 15)$
C) $3x(10x^3 - 16x + 5)$ D) $30x^4(1 - 18x^2 + 15x^3)$

Factor completely.

2) $y^2 - 12y + 20$ 2) _____

A) $(y - 10)(y + 2)$ B) Prime
C) $(y + 10)(y - 2)$ D) $(y - 10)(y - 2)$

Factor by grouping.

3) $12p^2 - 3p - 8p + 2$ 3) _____

A) $(3p - 2)(4p + 1)$ B) $(3p + 2)(4p + 1)$
C) $(3p + 2)(4p - 1)$ D) $(3p - 2)(4p - 1)$

Factor completely.

4) $2a^2 - 15a + 18$ 4) _____

A) $(2a - 6)(a - 3)$ B) $(2a - 3)(a - 6)$
C) $(a - 6)(2a + 3)$ D) Prime

Factor completely.

5) $4p^2 - 9$ 5) _____

A) $(2p - 3)^2$ B) Prime
C) $(4p + 3)(p - 3)$ D) $(2p + 3)(2p - 3)$

Solve the equation.

6) $4y(y + 10) = 0$ 6) _____

A) {−10, 4} B) {−10} C) {−10, 0} D) {10}

7) $w^2 - 13w + 42 = 0$ 7) _____

A) {-7, -6} B) {6, 7} C) {-6, 7} D) {-7, 6}

Determine the value(s) of the variable for which the expression is undefined.

8) $\frac{m - 6}{m + 3}$ 8) _____

A) 3 B) -3 C) -6 D) 6

Multiply and simplify.

9) $\frac{5x^6}{7y^7} \cdot \frac{8y^5}{11x^4}$ 9) _____

A) $\frac{13x^2}{18y^2}$ B) $\frac{40x^2}{77y^2}$ C) $\frac{13x^{10}}{18y^{12}}$ D) $\frac{40x^6y^5}{77x^4y^7}$

Divide and simplify.

10) $\frac{25x^9}{(4x - 1)^8} \div \frac{5x^3}{(4x - 1)^6}$ 10) _____

A) $\frac{5x^6}{(4x - 1)^2}$ B) $\frac{(4x - 1)^2}{5x^6}$ C) $\frac{(4x - 1)^{14}}{125x^{12}}$ D) $\frac{5x^9(4x - 1)^6}{x^3(4x - 1)^8}$

Add and simplify.

11) $\frac{16x}{9x+4} + \frac{7}{9x+4}$ 11) _____

A) $\frac{112x}{9x+4}$ B) $\frac{23x}{9x+4}$ C) $\frac{16x+7}{2(9x+4)}$ D) $\frac{16x+7}{9x+4}$

12) $\frac{5}{2x-10} + \frac{4x-1}{x^2-8x+15}$ 12) _____

A) $\frac{13x^2-82x+85}{2(x-5)^2(x-3)}$ B) $\frac{13x-17}{2(x-5)(x-3)}$

C) $\frac{4x^2-13x+13}{x-5}$ D) $\frac{4x+4}{x^2+6x+5}$

Subtract and simplify.

13) $\frac{18}{t-5} - \frac{16}{5-t}$ 13) _____

A) $\frac{2}{t^2-25}$ B) $\frac{34}{t-5}$ C) $\frac{2}{t-5}$ D) $\frac{-34t+10}{(t-5)(5-t)}$

Simplify completely.

14) $\frac{\frac{8x^8y^6}{77}}{\frac{18x^3y^8}{11}}$ 14) _____

A) $\frac{144x^{11}y^{14}}{847}$ B) $\frac{88x^8y^6}{1386x^3y^8}$ C) $\frac{4x^5}{63y^2}$ D) $\frac{4x^5y^2}{7623}$

Solve the equation.

15) $\frac{7m}{14} + \frac{3}{7} = \frac{2}{21}$ 15) _____

A) $\left\{-\frac{1}{7}\right\}$ B) ∅ C) $\left\{\frac{4}{9}\right\}$ D) $\left\{-\frac{2}{3}\right\}$

16) $\frac{3}{x} + \frac{3}{x - 7} = \frac{3x - 18}{x - 7}$ 16) _____

A) ∅ B) {7, 1} C) $\left\{-\frac{5}{2}, \frac{1}{3}\right\}$ D) {1}

Solve the problem.

17) Write an equation and solve. 17) _____

With a current flowing at 6 mph, a boat can travel 27 miles upstream in the same amount of time it can travel 63 miles downstream. Find the speed of the boat in still water.

A) 21 mph B) 15 mph C) $\frac{12}{5}$ mph D) 9 mph

18) The cost, in dollars, of filling your gas tank is directly proportional to the amount purchased. If 8 gallons of gas costs $10.40, how much would 11 gallons cost? 18) _____

A) $6.15 B) $13.40 C) $14.30 D) $15.40

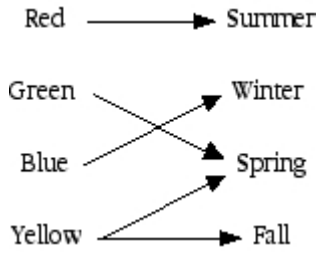
Identify the domain and range of the relation, and determine whether the relation is a function.

19) {(-7, -13), (-1, 7), (4, 15), (6, 16)} 19) _____

A) Domain: {-7, -1, 4, 6}; Range: {-13, 7, 15, 16}; Not a function
B) Domain: {-13, 7, 15, 16}; Range: {-7, -1, 4, 6}; Not a function
C) Domain: {-13, 7, 15, 16}; Range: {-7, -1, 4, 6}; Function
D) Domain: {-7, -1, 4, 6}; Range: {-13, 7, 15, 16}; Function

Determine whether the relation defines y as a function of x.

20) x y 20) _____



A) False B) True

Evaluate as indicated.

21) If $z(t) = 2t^2 + 7t - 4$, find $z(-7)$ and $z(4)$. 21) _____

A) $z(-7) = 45$; $z(4) = 56$ B) $z(-7) = 143$; $z(4) = 88$
C) $z(-7) = -151$; $z(4) = 56$ D) $z(-7) = 101$; $z(4) = 35$

Solve the system by substitution.

22) $y = 7 - 8x$ 22) _____
$6x + 7y = -51$

A) (-2, 2) B) (-9, 2) C) (2, -9) D) (-9, -1)

Solve the system using the elimination method.

23) $7x + 3y = 25$ 23) _____
$4x - y = 17$

A) (0, -17)
B) (4, -1)
C) ∅
D) Infinite number of solutions of the form $\{(x, y) \mid 7x + 3y = 25\}$

Solve the equation.

24) $|3c + 2| = 3$ 24) _____

A) $\left\{-\frac{1}{3}, \frac{1}{3}\right\}$ B) $\left\{\frac{1}{3}\right\}$ C) $\left\{-\frac{5}{3}, \frac{1}{3}\right\}$ D) ∅

Solve the inequality. Write the solution set in interval notation.

25) $|x + 10| \leq 13$ 25) _____

A) (-3, 23)
B) (-3, 3)
C) $[-\infty, -23] \cup [3, \infty]$
D) [-23, 3]

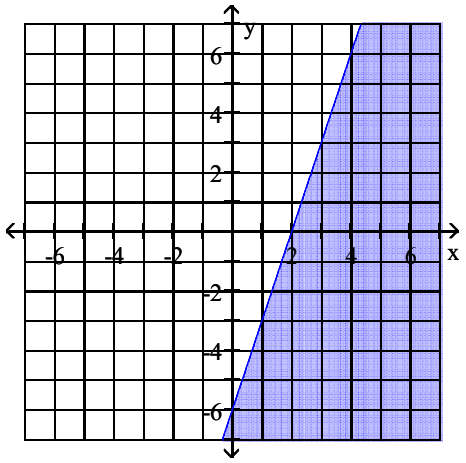
26) $|4w - 7| \geq 5$ 26) _____

A) $\left[\frac{1}{2}, 3\right]$
B) $\left(-\infty, \frac{1}{2}\right] \cup [3, \infty)$
C) $(-\infty, -3] \cup \left[-\frac{1}{2}, \infty\right)$
D) $\left[-3, -\frac{1}{2}\right]$

Graph the inequality.

27) $y \geq 3x - 6$ 27) _____

A)



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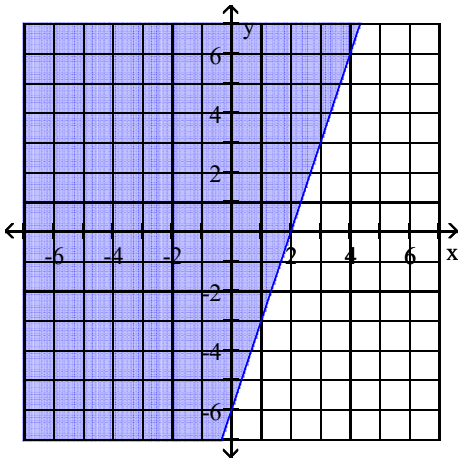

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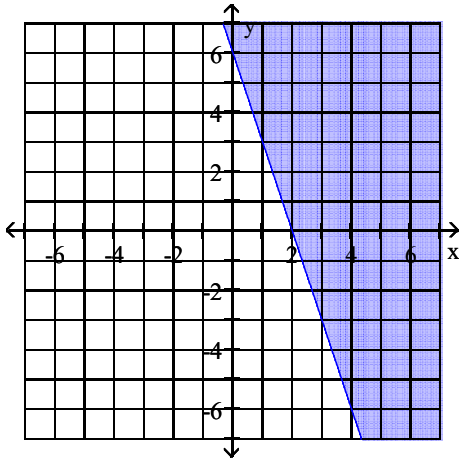

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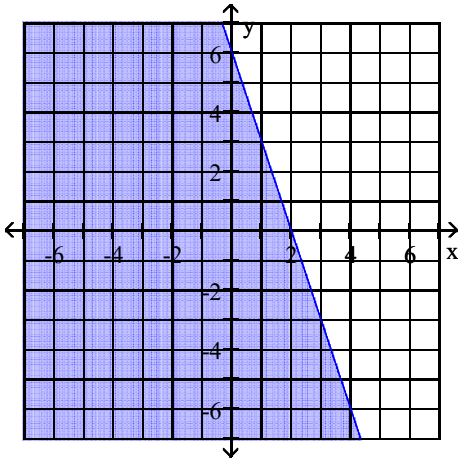
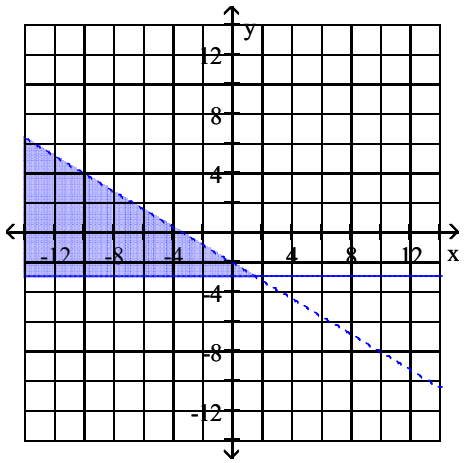


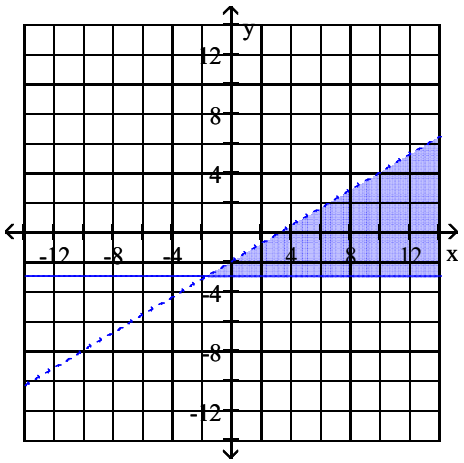
Graph the compound inequality.

28) $y < \frac{3}{5}x - 2$ and $y \geq -3$ 28) _____

A)



B)



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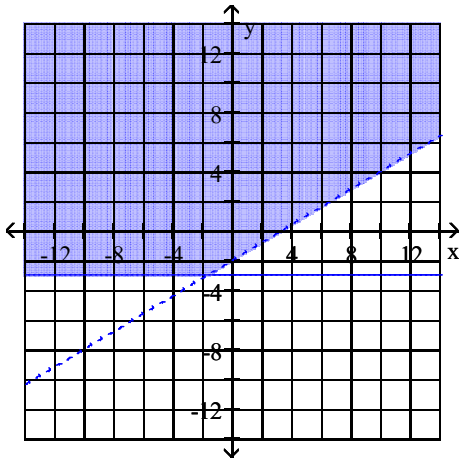
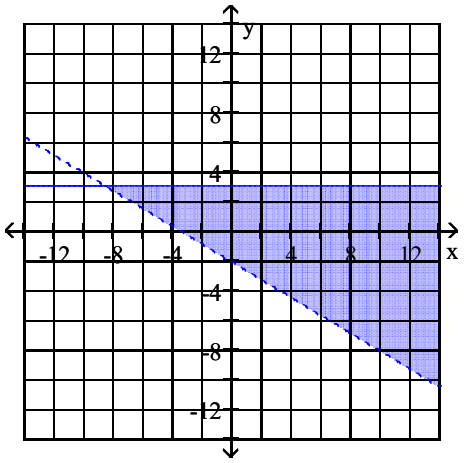
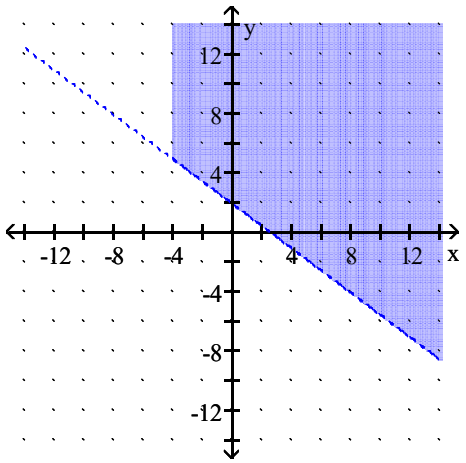


D)



29) $y < \frac{3}{4}x + 2$ or $x > -4$ 29) _____

A)



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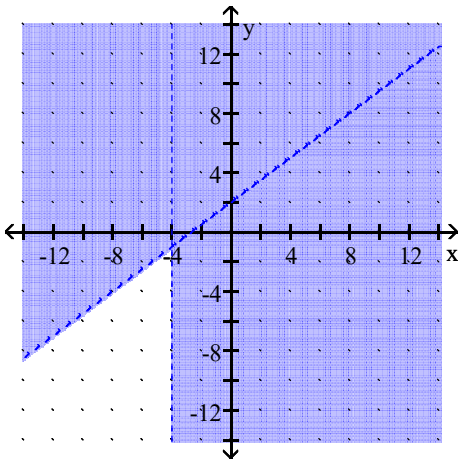
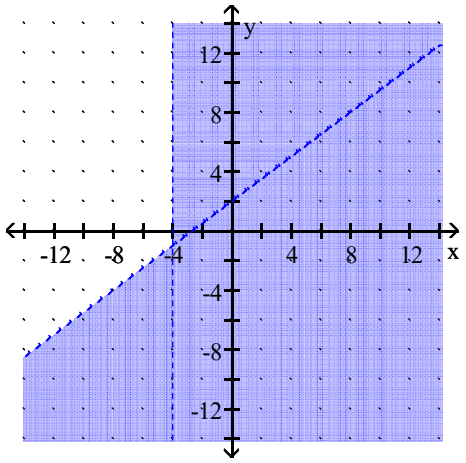
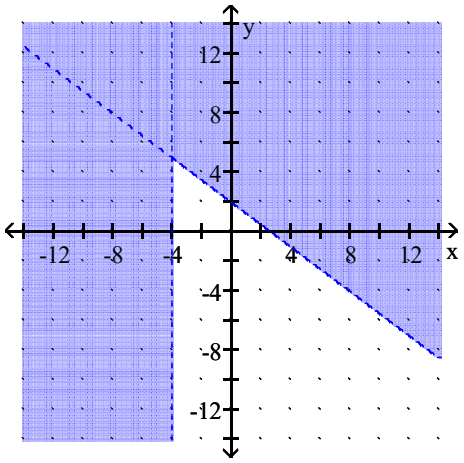


C)



D)



Find the root, if possible.

30) $\sqrt{256}$ 30) _____

A) 65,536 B) ±16 C) 16 D) 256

31) $\sqrt[3]{-125}$ 31) _____

A) -5 B) Not real C) 5 D) -375

Convert the expression to radical form and simplify.

32) $512^{2/3}$ 32) _____

A) Not a real number B) -64

C) $\frac{1024}{3}$ D) 64

Multiply and simplify.

33) $\sqrt{2} \cdot \sqrt{y}$ 33) _____

A) $2y$ B) $\sqrt{2y}$ C) $2\sqrt{y}$ D) $y\sqrt{2}$

Simplify completely. Assume the variable represents a positive real number.

34) $\sqrt{12x^{11}}$ 34) _____

A) $4x^{10}\sqrt{3x}$ B) $2x\sqrt{3x^9}$ C) $2\sqrt{3x^{11}}$ D) $2x^5\sqrt{3x}$

Multiply.

35) $\sqrt[4]{5} \cdot \sqrt[4]{10}$ 35) _____

A) $\sqrt[16]{50}$ B) $5\sqrt[4]{2}$ C) $5\sqrt[16]{2}$ D) $\sqrt[4]{50}$

Simplify completely. Assume the variable represents a positive real number.

36) $\sqrt[3]{64a^9b^{15}}$ 36) _____

A) $8a^3b^5$ B) $4a^3b^5$ C) $61a^6b^{12}$ D) $2a^3b^3$

Perform the operations, and simplify.

37) $6\sqrt{10} + 2\sqrt{10}$ 37) _____

A) $8\sqrt{20}$ B) $12\sqrt{10}$

C) $8\sqrt{10}$ D) Cannot be simplified further

38) $\sqrt{27} - \sqrt{12} + \sqrt{108}$ 38) _____

A) $\sqrt{123}$ B) $3(\sqrt{3} - \sqrt{2} + \sqrt{6})$

C) $7\sqrt{3}$ D) Cannot be combined

39) $(15 - \sqrt{2})(15 + \sqrt{2})$ 39) _____

A) 227 B) 221 C) $225 - \sqrt{2}$ D) 223

Rationalize the denominator and simplify.

40) $\frac{6}{\sqrt{10}}$ 40) _____

A) Already rationalized B) $\frac{5\sqrt{10}}{3}$

C) $\frac{36}{10}$ D) $\frac{3\sqrt{10}}{5}$

41) $\frac{3}{9 - \sqrt{5}}$ 41) _____

A) $\frac{27 + 3\sqrt{5}}{76}$ B) $\frac{3\sqrt{5}}{4}$ C) $\frac{3}{9 + \sqrt{5}}$ D) $\frac{27 + 3\sqrt{5}}{56}$

Solve.

42) $\sqrt{p - 10} - 6 = 3$ 42) _____

A) ∅ B) {55} C) {19} D) {91}

Simplify the expression in terms of *i*.

43) $\sqrt{-49}$ 43) _____

A) $-7i$ B) $7i$ C) $i\sqrt{7}$ D) $49i$

Perform the indicated operations. Write the answer in the form $a + bi$.

44) $(-4 + 7i) - (11 - 19i)$ 44) _____

A) $-15 - 12i$ B) -41 C) $-15 + 26i$ D) $3 - 30i$

45) $(2 - 2i)(-6 + 4i)$ 45) _____

A) $-20 + 20i$ B) $-12 + 20i + 8i^2$

C) $-4 + 20i$ D) $-12 + 20i - 8i^2$

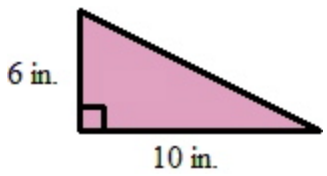
Simplify the complex number. Write the answer in the form $a + bi$.

46) $\frac{6}{4 - 3i}$ 46) _____

A) $\frac{24}{25} + \frac{18}{25}i$ B) $24 - 18i$ C) $24 + 18i$ D) $\frac{24}{25} - \frac{18}{25}i$

Solve the problem.

47) Find the length of the third side of the triangle. Write your answer as a simplified radica 47) _____



A) $4\sqrt{34}$ inches B) $6\sqrt{16}$ inches C) $2\sqrt{34}$ inches D) $3\sqrt{24}$ inches

Solve using the quadratic formula.

48) $m^2 + 5m - 3 = 0$ 48) _____

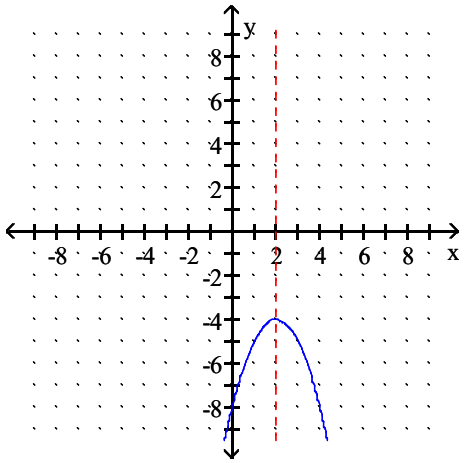
A) $\left\{-\frac{5}{2} - i\frac{\sqrt{13}}{2}, -\frac{5}{2} + i\frac{\sqrt{13}}{2}\right\}$ B) $\left\{\frac{-5 - \sqrt{37}}{2}, \frac{-5 + \sqrt{37}}{2}\right\}$

C) $\left\{\frac{-5 - \sqrt{13}}{2}, \frac{-5 + \sqrt{13}}{2}\right\}$ D) $\left\{-5 - \frac{\sqrt{37}}{2}, -5 + \frac{\sqrt{37}}{2}\right\}$

Graph the parabola and the axis of symmetry. Label the coordinates of the vertex, and write the equation of the axis of symmetry.

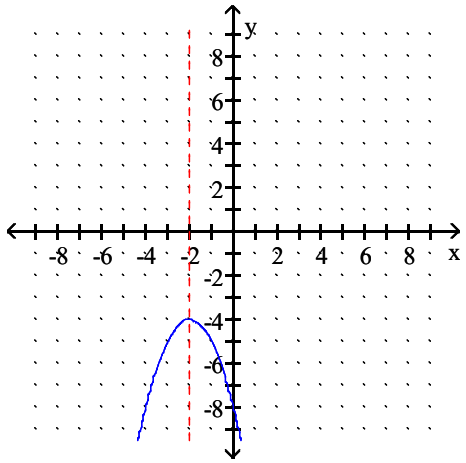
49) $y = -(x + 2)^2 - 4$ 49) _____

A)



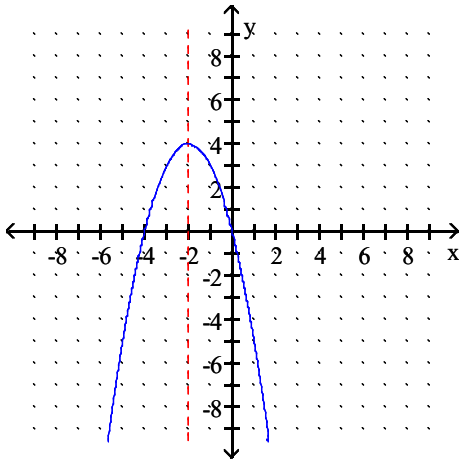
Vertex (2, -4)
axis of symmetry: $x = 2$

B)



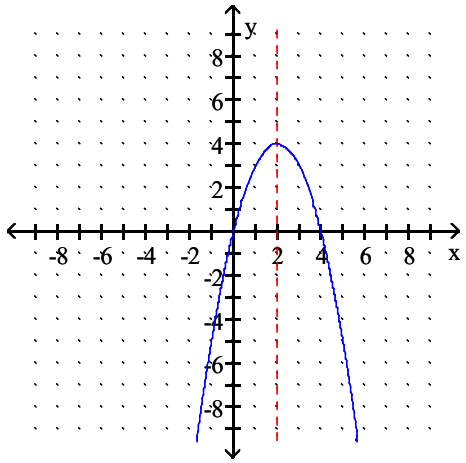
Vertex (-2, -4)
axis of symmetry: $x = -2$

C)



Vertex (-2, 4)
axis of symmetry: $x = -2$

D)



Vertex (2, 4)
axis of symmetry: $x = 2$

Identify the vertex, axis of symmetry, and intercepts for the graph of the function.

50) $y = x^2 + 2x - 2$ 50) _____

A) Vertex at (1, 1); axis: $y = 1$; x-intercepts: $(-1 - \sqrt{3}, 0)$ and $(-1 + \sqrt{3}, 0)$; y-intercept: (0, -2)

B) Vertex at (-1, -3); axis: $y = -3$; x-intercepts: none; y-intercept: $(-1 - \sqrt{3}, 0)$

C) Vertex at (1, 1); axis: $x = 1$; x-intercepts: none; y-intercept: $(-1 + \sqrt{3}, 0)$

D) Vertex at (-1, -3); axis: $x = -1$; x-intercepts: $(-1 - \sqrt{3}, 0)$ and $(-1 + \sqrt{3}, 0)$; y-intercept: (0, -2)

1) C
2) D
3) D
4) B
5) D
6) C
7) B
8) B
9) B
10) A
11) D
12) B
13) B
14) C
15) D
16) D
17) B
18) C
19) D
20) A
21) A
22) C
23) B
24) C
25) D
26) B
27) B
28) B
29) C
30) C
31) A
32) D
33) B
34) D
35) D
36) B
37) C
38) C
39) D
40) D
41) A
42) D

43) B
44) C
45) C
46) A
47) C
48) B
49) B
50) D