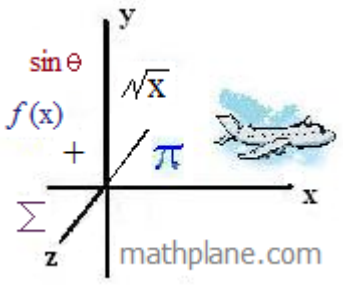
Algebra I

Review Test 007

(and solutions)

24 questions include exponents, graphs, linear systems, Venn Diagram, inequalities, absolute value, factoring, and more…



Math 007 Review Practice

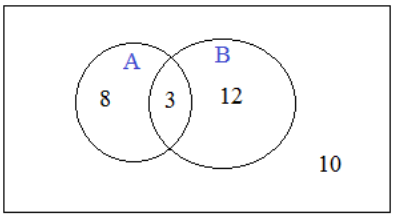
1) a) Evaluate the expression $x^3 + 3x - 4y$ if $x = -1$ and $y = 2$

b) Simplify $7n - [3(2n - 4) + 5]$

2) Simplify; (do not use negative exponents in your final answers)

a) $\dfrac{15xy^4}{-5x^3y^2}$ b) $(7a^3b^{-2})(2a^5b)$ c) $(8m^6)^{\frac{2}{3}}$ d) $\dfrac{-(2x^2y)^2}{3x^5y}$

3) Answer for the following Venn Diagram



a) A =

b) A U B =

c) A ∩ B =

d) $\overline{B}$ =

4) For the given graph, find each of the following:

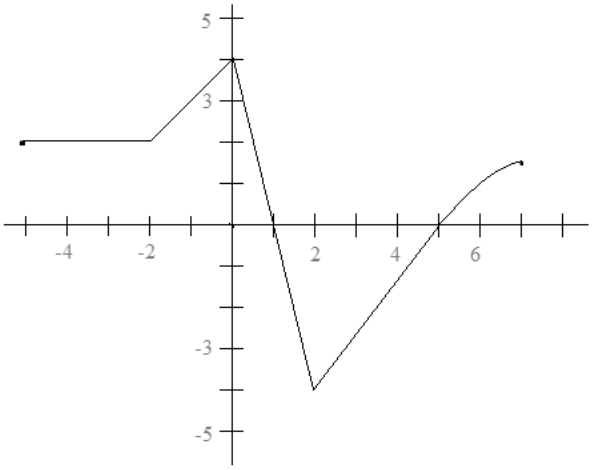
a) $f(-3)$

b) the domain of f

c) all x where $f(x) = 0$

d) the (approximate) range of f

e) all x where $f(x) = 2$



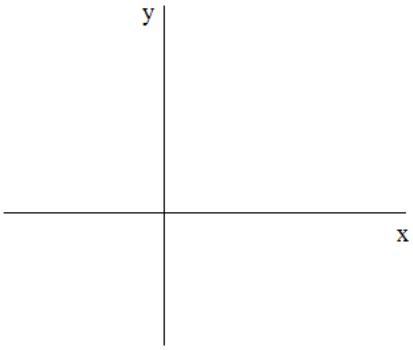
5) After the 20% discount, a jacket cost $57. What was the original price of the jacket?

Math 007 Review Practice

6) Write the equation of a line containing the points $(2, -3)$ and $(5, 6)$. What is the x-intercept? What is the y-intercept?

7) Solve the following system:
$$2x + 5y = -10$$
$$6x + 4y = 14$$

8) Sketch the following system:
$$x < 6$$
$$y \geq 2x - 3$$



9) The difference between two integers is 43. If you double the smaller integer and triple the larger integer, their sum is 189. Identify the two integers.

10) Solve for each:

a) $|x + 4| = 14$

b) $|y + 2| + 5 = 8$

c) $|3n - 2| + 9 = 8$

d) $3|x + 4| = 6$

Math 007 Review Practice

11) Solve $(x + 2) - 16 < 4(x - 3)$. Write the solution using interval notation.

12) Factor

a) $x^2 - 8x + 7$ b) $9 - 4z^2$ c) $2y^2 + 10y - 28$

13) Solve

a) $x^2 + 6x = 7$ b) $x^3 - 9x = 0$ c) $x^2 + 5x - 8 = 0$

14) Expand the given polynomial: $(x^2 - 2)(x^2 + 2x + 1)$

a) What is the degree of the polynomial?

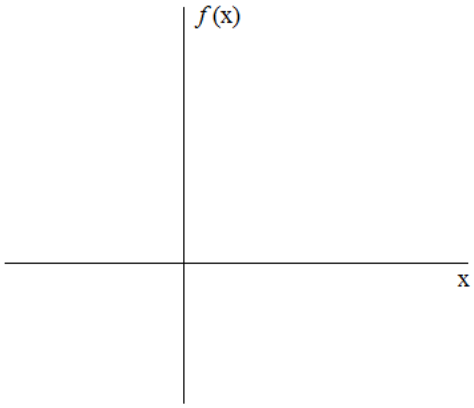
b) Arrange the terms in descending order.

c) What is the leading coefficient?

d) Evaluate the polynomial at $x = 1$

15) Graph the following function $f(x) = 2x^2 - 13x + 15$

Identify the y-intercept, zeros, and vertex.



Math 007 Review Practice

16) Rationalize each denominator.

a) $\frac{6}{\sqrt{7}}$ b) $\frac{-2}{3+\sqrt{5}}$

17) Solve $\frac{x}{x+3} + \frac{5}{x-1} = \frac{x+25}{x^2+2x-3}$

18) Answer (leaving answers in $a + bi$ form)

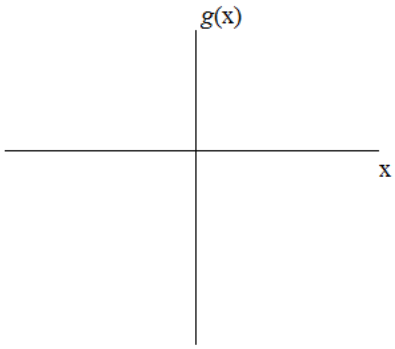
a) $4 + i - (2 - 3i)$ b) $(3 - i)(2 + 5i)$ c) $(4 + 7i)^2$

19) The *diagonal* of a rectangle is 15 feet. If one of the sides is 9 feet, what is the area of the rectangle?

20) Solve $\sqrt{4x + 41} = x + 5$ (Identify any extraneous solutions)

Math 007 Review Practice

21) Sketch a graph of the following: $g(x) = 2(x + 1)^2 - 8$



Identify:

a) the vertex

b) y-intercept

c) x-intercepts

22) Simplify

a) $\sqrt{32}$ b) $\sqrt{27} - \sqrt{12}$ c) $(3 + 2\sqrt{5})(1 + \sqrt{5})$

23) Tom can paint 3 fences in 8 hours. And, Jerry can paint 3 fences in 5 hours. Working together, how long would it take Tom and Jerry to paint 3 fences?

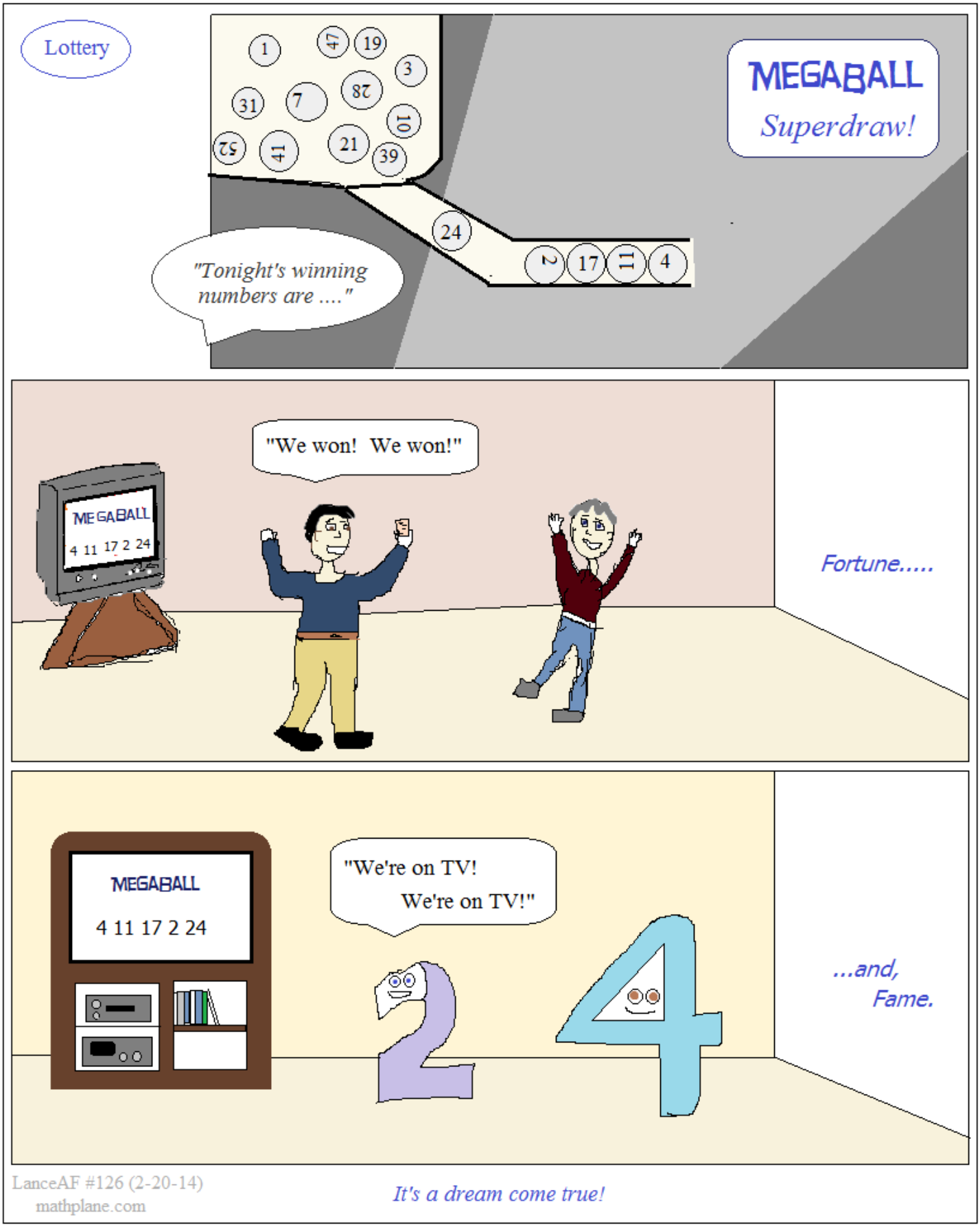
24) Let $f(x) = 2x^2 - 10x + 8$

a) Find $f(-2)$

b) Find $f(n)$

c) What is the vertex of the graph $y = f(x)$?

d) Is the vertex is a minimum or a maximum?


Lottery
1
47
19
3
31
7
28
10
52
41
21
39
24
2
17
11
4
MEGABALL
Superdraw!
"Tonight's winning numbers are ...."
MEGABALL
4 11 17 2 24
"We won! We won!"
Fortune.....
MEGABALL
4 11 17 2 24
"We're on TV!
We're on TV!"
...and,
Fame.
LanceAF #126 (2-20-14)
mathplane.com
It's a dream come true!

Math 007 Review Practice

SOLUTIONS

1) a) Evaluate the expression $x^3 + 3x - 4y$ if $x = -1$ and $y = 2$ $(-1)^3 + 3(-1) - 4(2) = -1 - 3 - 8 = \boxed{-12}$

b) Simplify $7n - [3(2n - 4) + 5]$ $7n - [6n - 12 + 5] = 7n - 6n + 12 - 5 = \boxed{n + 7}$

2) Simplify; (do not use negative exponents in your final answers)

a) $\dfrac{15xy^4}{-5x^3y^2}$

$\boxed{\dfrac{-3y^2}{x^2}}$

b) $(7a^3b^{-2})(2a^5b)$

$14a^8b^{-1} = \boxed{\dfrac{14a^8}{b}}$

c) $(8m^6)^{\frac{2}{3}}$

$8^{\frac{2}{3}} = 4$

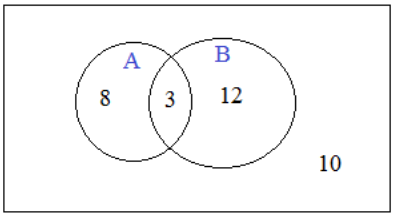
$\left(m^6\right)^{\frac{2}{3}} = m^{\frac{12}{3}}$

$\boxed{4m^4}$

d) $\dfrac{-(2x^2y)^2}{3x^5y} = \dfrac{-(4x^4y^2)}{3x^5y}$

$\boxed{\dfrac{-4y}{3x}}$

3) Answer for the following Venn Diagram



a) A = 11

b) A ∪ B = 23

c) A ∩ B = 3

d) $\overline{B}$ = 18 $\overline{B}$ = All terms that are not in B

4) For the given graph, find each of the following:

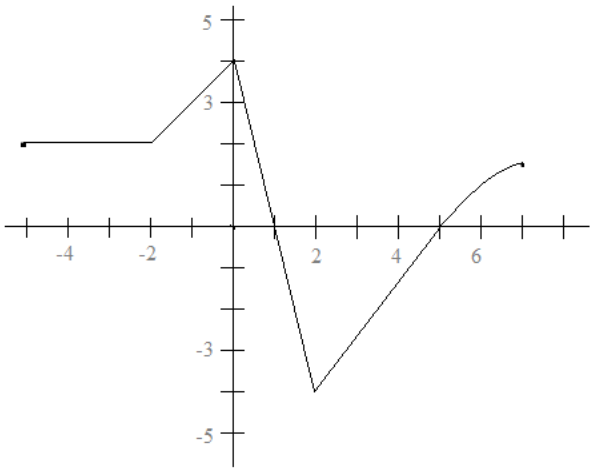
a) $f(-3) = 2$

b) the domain of f [-5, 7]

c) all x where $f(x) = 0$ the zeros are x = 1, 5

d) the (approximate) range of f [-4, 4]

e) all x where $f(x) = 2$ in the interval [-5, -2]



5) After the 20% discount, a jacket cost $57. What was the original price of the jacket?

J = original cost of the Jacket

.20J = amount of discount

J − .20J = $57

.80J = $57

J = $71.25

Math 007 Review Practice

SOLUTIONS

6) Write the equation of a line containing the points $(2, -3)$ and $(5, 6)$. What is the x-intercept? What is the y-intercept?

slope $= \frac{y1 - y2}{x1 - x2} = \frac{-3 - 6}{2 - 5} = 3$

equation of line (pt. slope form) = $y - 6 = 3(x - 5)$

y-intercept: (0, ?) plug in 0 for x --- $y - 6 = 3(0 - 5)$, $y = -9$ → (0, -9)

x-intercept: (?, 0) plug in 0 for y --- $0 - 6 = 3(x - 5)$, $-6 = 3x - 15$, $x = 3$ → (3, 0)

slope intercept form: $y = 3x - 9$

7) Solve the following system: $2x + 5y = -10$, $6x + 4y = 14$

$2x + 5y = -10$ x (-3) → $-6x - 15y = 30$

$6x + 4y = 14$ → $6x + 4y = 14$

$-11y = 44$

$y = -4$

$2x + 5(-4) = -10$

$2x = 10$

$x = 5$

(5, -4)

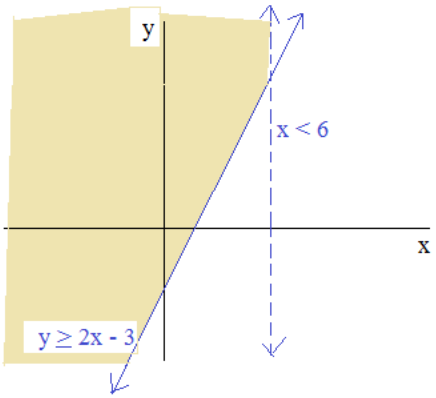
check: plug (5, -4) into 2nd equation

$6(5) + 4(-4) = 14$

$30 + -16 = 14$

$14 = 14$ ✓

8) Sketch the following system: $x < 6$, $y \geq 2x - 3$



9) The difference between two integers is 43. If you double the smaller integer and triple the larger integer, their sum is 189. Identify the two integers.

let s = small integer, l = large integer

$l - s = 43$

$2s + 3l = 189$

(solve using substitution)

$l = s + 43$

$2s + 3l = 189$

$2s + 3(s + 43) = 189$

$2s + 3s + 129 = 189$

$5s = 60$

$s = 12$

$l = s + 43$

$l = (12) + 43$

$l = 55$

10) Solve for each:

a) $|x + 4| = 14$

$x + 4 = 14$, $x = 10$

$x + 4 = -14$, $x = -18$

10, -18

b) $|y + 2| + 5 = 8$

(isolate the absolute value)

$|y + 2| = 3$

$y + 2 = 3$, $y = 1$

$y + 2 = -3$, $y = -5$

-5, 1

c) $|3n - 2| + 9 = 8$

$|3n - 2| = -1$

NO SOLUTION

absolute value $\not< 0$

d) $3|x + 4| = 6$

$|x + 4| = 2$

$x + 4 = 2$, $x = -2$

$x + 4 = -2$, $x = -6$

-6, -2

Math 007 Review Practice

SOLUTIONS

11) Solve $(x + 2) - 16 < 4(x - 3)$. Write the solution using interval notation.

$x - 14 < 4x - 12$

$-2 < 3x$

$x > -2/3$

$(-2/3, \infty)$

12) Factor

a) $x^2 - 8x + 7$

$(x - 1)(x - 7)$

b) $9 - 4z^2$

(difference of squares)

$(3 + 2z)(3 - 2z)$

c) $2y^2 + 10y - 28$

(greatest common factor is 2)

$2(y^2 + 5y - 14)$

$2(y + 7)(y - 2)$

13) Solve

a) $x^2 + 6x = 7$

$x^2 + 6x - 7 = 0$

$(x + 7)(x - 1) = 0$

$x = -7, 1$

b) $x^3 - 9x = 0$

$x(x^2 - 9) = 0$

$x(x + 3)(x - 3) = 0$

$x = -3, 0, 3$

c) $x^2 + 5x - 8 = 0$

Use quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(-8)}}{2(1)}$$

$$= \frac{-5 + \sqrt{57}}{2} \text{ and } \frac{-5 - \sqrt{57}}{2}$$

14) Expand the given polynomial: $(x^2 - 2)(x^2 + 2x + 1)$

a) What is the degree of the polynomial? 4

b) Arrange the terms in descending order. $x^4 + 2x^3 - x^2 - 4x - 2$

c) What is the leading coefficient? 1

d) Evaluate the polynomial at $x = 1$ -4

$x^4 + 2x^3 + x^2$

$-2x^2 - 4x - 2$

$x^4 + 2x^3 - x^2 - 4x - 2$

15) Graph the following function $f(x) = 2x^2 - 13x + 15$

Identify the y-intercept, zeros, and vertex.

y-intercept: $f(0) = 0 - 0 + 15$ $(0, 15)$

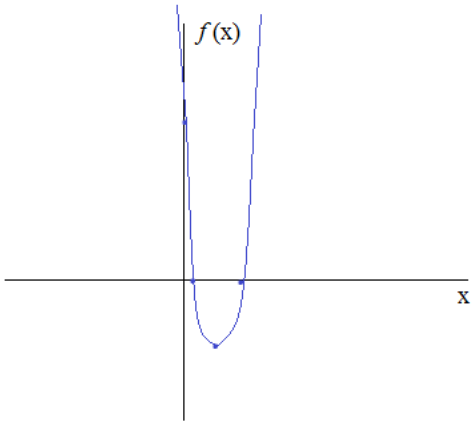
x-intercepts: x values where $f(x) = 0$ (zeros)

$0 = 2x^2 - 13x + 15$

$0 = (2x - 3)(x - 5)$

$x = 5, 3/2$

vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ $(13/4, -49/8)$



Math 007 Review Practice

SOLUTIONS

16) Rationalize each denominator.

a) $\frac{6}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$

$= \frac{6\sqrt{7}}{7}$

b) $\frac{-2}{3+\sqrt{5}} \cdot \frac{(3-\sqrt{5})}{(3-\sqrt{5})}$

$= \frac{-6+2\sqrt{5}}{4} = \frac{-3+\sqrt{5}}{2}$

17) Solve $\frac{x}{x+3} + \frac{5}{x-1} = \frac{x+25}{x^2+2x-3}$

$\frac{x(x-1)}{(x+3)(x-1)} + \frac{5(x+3)}{(x-1)(x+3)} = \frac{x+25}{(x-1)(x+3)}$

$\frac{x^2-x+5x+15}{(x+3)(x-1)} = \frac{x+25}{(x-1)(x+3)}$

$x^2+4x+15 = x+25$

$x^2+3x-10 = 0$

$(x+5)(x-2) = 0$

$x = -5, 2$

check -5 : $\frac{-5}{-2} + \frac{5}{-6} = \frac{20}{12}$

$\frac{30}{12} + \frac{-10}{12} = \frac{20}{12}$

check 2: $\frac{2}{5} + \frac{5}{1} = \frac{27}{5}$

$\frac{2}{5} + \frac{25}{5} = \frac{27}{5}$

18) Answer (leaving answers in $a + bi$ form)

a) $4 + i - (2 - 3i)$

$4 + i - 2 + 3i$

$2 + 4i$

b) $(3 - i)(2 + 5i)$

$6 + 15i - 2i - 5i^2$

$6 + 13i - 5(-1)$

$11 + 13i$

c) $(4 + 7i)^2$

$(4 + 7i)(4 + 7i)$

$16 + 28i + 28i + 49i^2$

$-33 + 56i$

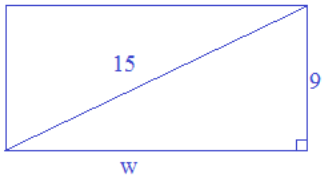
19) The *diagonal* of a rectangle is 15 feet. If one of the sides is 9 feet, what is the area of the rectangle?

(using pythagorean theorem)

$9^2 + w^2 = (15)^2$

$w^2 = 225 - 81$

$w = 12$



area of rectangle = l x w

9 x 12

= 108 sq. feet

20) Solve $\sqrt{4x+41} = x + 5$ (Identify any extraneous solutions)

(square both sides)

$4x + 41 = (x + 5)(x + 5)$

$4x + 41 = x^2 + 10x + 25$

$x^2 + 6x - 16 = 0$

$(x + 8)(x - 2) = 0$

$x = -8, 2$

check solutions:

$\sqrt{4(-8)+41} = -8 + 5$

$\sqrt{9} = -3$

extraneous!!

$\sqrt{4(2)+41} = (2) + 5$

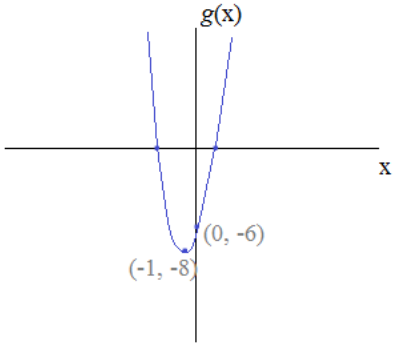
$\sqrt{49} = 7$

$7 = 7$

Math 007 Review Practice

SOLUTIONS

21) Sketch a graph of the following: $g(x) = 2(x + 1)^2 - 8$



Identify: $y = a(x - h)^2 + k$

a) the vertex $(h, k) =$ (-1, -8)

b) y-intercept $g(0) = 2(0 + 1)^2 - 8$

(0, -6)

c) x-intercepts

$g(x) = 0$

$2(x + 1)^2 - 8 = 0$

$2x^2 + 4x + 2 - 8 = 0$

$2x^2 + 4x - 6 = 0$

$2(x^2 + 2x - 3) = 0$

$2(x + 3)(x - 1) = 0$

$x = -3, 1$

22) Simplify

a) $\sqrt{32}$

$\sqrt{16 \cdot 2}$

$= 4\sqrt{2}$

b) $\sqrt{27} - \sqrt{12}$

$3\sqrt{3} - 2\sqrt{3}$

$= \sqrt{3}$

c) $(3 + 2\sqrt{5})(1 + \sqrt{5})$

(FOIL)

$3 + 3\sqrt{5} + 2\sqrt{5} + 10 = 13 + 5\sqrt{5}$

approx 24.18

23) Tom can paint 3 fences in 8 hours. And, Jerry can paint 3 fences in 5 hours. Working together, how long would it take Tom and Jerry to paint 3 fences?

Tom's rate: $\frac{3 \text{ fences}}{8 \text{ hours}}$

Jerry's rate: $\frac{3 \text{ fences}}{5 \text{ hours}}$

together: they'll paint for t hours

(tom) (jerry)

$\frac{3 \text{ fences}}{8 \text{ hours}} t + \frac{3 \text{ fences}}{5 \text{ hours}} t = 3 \text{ fences}$

(multiply by 40 hours)

$\frac{120 \text{ hours(fences)}t}{8 \text{ hours}} + \frac{120 \text{ hours(fences)}t}{5 \text{ hours}} = 120 \text{ hours(fences)}$

15 fences(t) + 24 fences(t) = 120 hours(fences)

39t = 120 hours

t = 40/13 hours

or 3 hours 5 minutes

Check: Tom:

40/13 hours (3 fences/8 hours) = 1.15 fences

Jerry:

40/13 hours (3 fences/5 hours) = 1.85 fences

24) Let $f(x) = 2x^2 - 10x + 8$

a) Find $f(-2)$ $2(-2)^2 - 10(-2) + 8 =$ 36

b) Find $f(n)$ $2n^2 - 10n + 8$

c) What is the vertex of the graph $y = f(x)$?

$\frac{-b}{2a} = \frac{-(-10)}{2(2)} = \frac{5}{2}$ $f(5/2) = 50/4 - 50/2 + 8 = -18/4 = -9/2$

$\left(\frac{5}{2}, \frac{-9}{2}\right)$

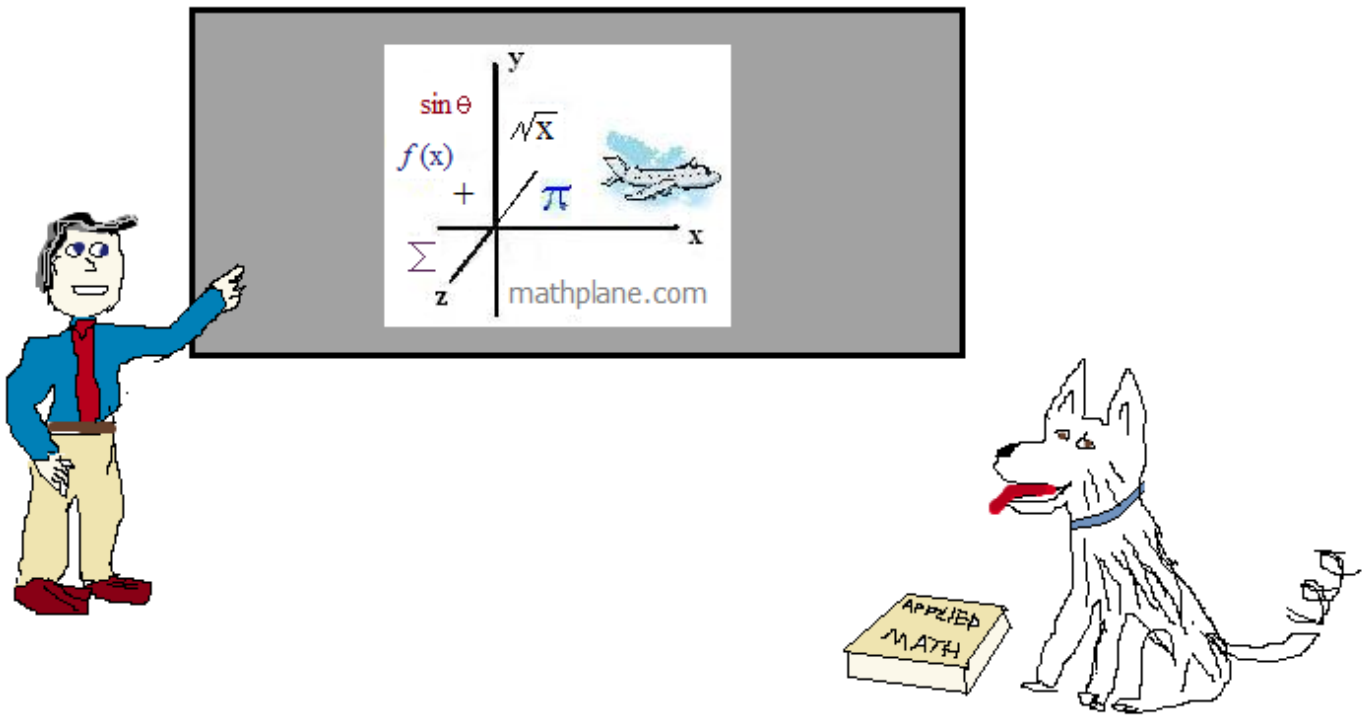
d) Is the vertex is a minimum or a maximum?

minimum (since coefficient of lead term is 2 (> 0), the graph faces up....)

Thanks for visiting. (Hope it helped!)

If you have questions, suggestions, or requests, let us know.

Enjoy



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