Name **Schlansky**   Date _____
Mr. Schlansky   Algebra I

Common Core Algebra Common Regents Test

10 STU→ x

1. Which trinomial is equivalent to $3(x-2)^2 - 2(x-1)$? 174
1) $3x^2 - 2x - 10$
2) $3x^2 - 2x - 14$
3) $3x^2 - 14x + 10$
④ $3x^2 - 14x + 14$ 174

2. What is the solution of $\dfrac{k+4}{2} = \dfrac{k+9}{3}$?

1) 1   ③ 6
2) 5   4) 14

$\dfrac{6+4}{2} = \dfrac{6+9}{3}$

$5 = 5$

3.29. E14

3. The number of bacteria grown in a lab can be modeled by $P(t) = 300 \cdot 2^{4t}$, where t is the number of hours. Which expression is equivalent to $P(t)$?
1) $300 \cdot 8^t$ 3) $300^t \cdot 2^4$
② $300 \cdot 16^t$ 3.29E14   4) $300^{2t} \cdot 2^{2t}$

4. If $f(n) = (n-1)^2 + 3n$, which statement is true?
1) $f(3) = -2$
② $f(-2) = 3$ $f(-2) = (-2-1)^2 + 3(-2) = 3$
3) $f(-2) = -15$
4) $f(-15) = -2$

5. When solving the equation $12x^2 - 7x = 6 - 2(x^2 - 1)$, Evan wrote $12x^2 - 7x = 6 - 2x^2 + 2$ as his first step. Which property justifies this step?
1) subtraction property of equality   3) associative property of multiplication
2) multiplication property of equality   ④ distributive property of multiplication over subtraction

R-I-I

6. State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

Irrational because rational - irrational is irrational.

7. Which statement is *not* always true?
1) The sum of two rational numbers is rational.
2) The product of two irrational numbers is rational. $I \cdot I = R$ or P
3) The sum of a rational number and an irrational number is irrational.
4) The product of a nonzero rational number and an irrational number is irrational.

(answer 2 is circled)

8. When multiplying polynomials for a math assignment, Pat found the product to be $-4x + 8x^2 - 2x^3 + 5$. He then had to state the leading coefficient of this polynomial. Pat wrote down -4. Do you agree with Pat's answer? Explain your reasoning.

(the $-2x^3$ term is circled)

No, the leading coefficient is -2.

9. Multiply $(2x^2 + 3x - 2)(x - 2)$

$2x^3 - x^2 - 8x + 4$

	$2x^2$	$+3x$	-2
x	$2x^3$	$+3x^2$	$-2x$
-2	$-4x^2$	$-6x$	$+4$

from comes first

10. What is the result when $6x^2 - 13x + 12$ is subtracted from $-3x^2 + 6x + 7$?
1) $3x^2 - 7x + 19$
2) $9x^2 - 19x + 5$
3) $9x^2 - 7x + 19$
4) $-9x^2 + 19x - 5$

(answer 4 is circled)

$(-3x^2 + 6x + 7) - (6x^2 - 13x + 12)$

$-3x^2 + 6x + 7 - 6x^2 + 13x - 12$

$-9x^2 + 19x - 5$

11. Solve the equation below algebraically for the exact value of x.

$3\left[6 - \frac{2}{3}(x+5)\right] = (4x)3$

$18 - 2(x+5) = 12x$

$18 - 2x - 10 = 12x$

$-2x + 8 = 12x$
$+2x \qquad +2x$

$8 = 14x$

$\frac{8}{14} = \frac{14x}{14}$

$\boxed{\frac{4}{7} = x}$

12. Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

$-8x + 7 < 15$
$\quad -7 \quad -7$

$\frac{-8x}{-8} < \frac{8}{-8}$

$x > -1$

$\boxed{0}$

13. The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.

$S = 180n - 360$
$+360 \qquad +360$

$\frac{S + 360 = 180n}{180 \qquad 180}$

$\frac{S + 360}{180} = n$

14. Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each. If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought. Use your equation to determine algebraically how many pens Hannah bought.

pencil: $x + 4$ $6 + 4 = 10$

pen: x $\boxed{6}$

erasers: $x - 2$ $6 - 2 = 4$

$1.25x + .55(x+4) + .75(x-2) = 16$

$1.25x + .55x + 2.2 + .75x - 1.5 = 16$

$2.55x + .7 = 16$
$\qquad -.7 \quad -.7$

$\frac{2.55x}{2.55} = \frac{15.3}{2.55}$

$x = 6$

each
$P/x + 1TF$

15. The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

1) The commercial costs $0 to produce and $110 per airing up to $900.
2) The commercial costs $110 to produce and $900 each time it is aired.
3) The commercial costs $900 to produce and $110 each time it is aired.
4) The commercial costs $1010 to produce and can air an unlimited number of times.

(Answer 3 circled)

16. The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership. State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

slope=50 The gym membership costs $50 per month

y-int=79.50 The gym membership has an initial fee of $79.50

slope x + y-int
per x + ITF

17. At Benny's Cafe, a mixed-greens salad costs $5.75. Additional toppings can be added for $0.75 each. Which function could be used to determine the cost, $c(s)$, in dollars, of a salad with s additional toppings?   *each x + one time fee*

1) $c(s) = 5.75s + 0.75$
2) $c(s) = 0.75s + 5.75$
3) $c(s) = 5.00s + 0.75$
4) $c(s) = 0.75s + 5.00$

18. Solve the following system of equations for x and y:

$2(-3x + 4y = 12)$
$3(2x + y = -8)$

$-6x + 8y = 24$
$+6x + 3y = -24$

$\dfrac{11y}{11} = \dfrac{0}{11}$

$y = 0$

$2x + y = -8$
$2x + 0 = -8$
$\dfrac{2x}{2} = \dfrac{-8}{2}$

$x = -4$

$(-4, 0)$

19. Which system of equations will yield the same solution as the system below?

$2(x - y = 3) = 2x - 2y = 6$
$2x - 3y = -1$

1) $-2x - 2y = -6$
    $2x - 3y = -1$
2) $-2x + 2y = 3$
    $2x - 3y = -1$
3) $2x - 2y = 6$
    $2x - 3y = -1$
4) $3x + 3y = 9$
    $2x - 3y = -1$

20. The Celluloid Cinema sold 150 tickets to a movie. Some of these were child tickets and the rest were adult tickets. A child ticket cost $7.75 and an adult ticket cost $10.25. If the cinema sold $1470 worth of tickets, which system of equations could be used to determine how many adult tickets, a, and how many child tickets, c, were sold?

1) $a + c = 150$
    $10.25a + 7.75c = 1470$
2) $a + c = 1470$
    $10.25a + 7.75c = 150$
3) $a + c = 150$
    $7.75a + 10.25c = 1470$
4) $a + c = 1470$
    $7.75a + 10.25c = 150$

$a+o=108$

21. During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week.

$-5(a+o=108)$
$1(5a+3o=452)$

$\dfrac{2o=44}{}$

$-5a-5o=-540$
$5a+3o=452$
$\dfrac{-2o=-88}{-2}=\dfrac{}{-2}$

$a+o=108$
$a+44=108$
$\dfrac{-44 \quad -44}{a=64}$

22. Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work no more than 15 hours a week, due to school commitments. Edith wants to earn at least \$80 a week, working a combination of both jobs. Write a system of inequalities that can be used to represent the situation. Graph these inequalities on the set of axes below. Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

$\begin{cases} x+y \le 15 \\ -x \quad -x \end{cases}$
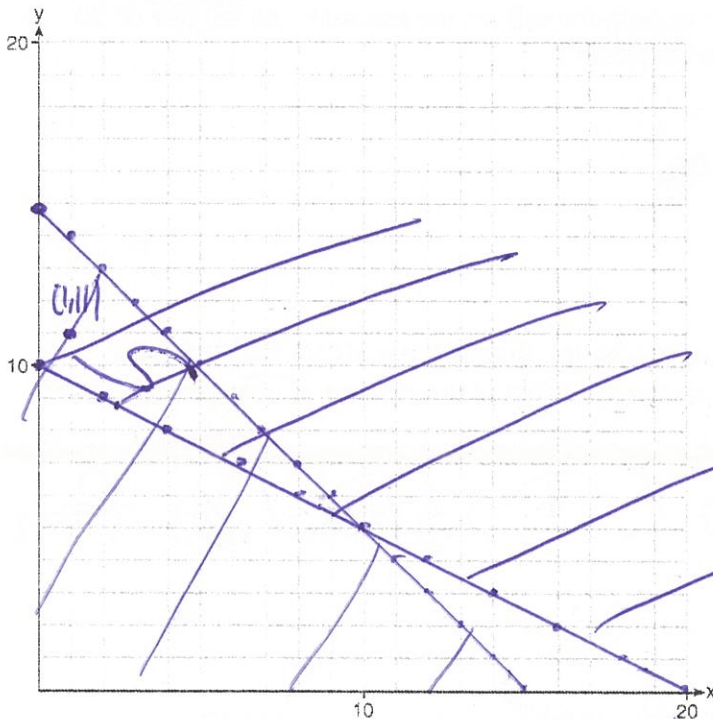
$4x+8y \ge 80$
$-4x \quad -4x$

$y \le -x+15$

$\dfrac{8y}{8} \ge \dfrac{-4x+80}{8}$

$y \ge -\tfrac{1}{2}x+10$

$(1,11)$ 1 hour babysitting and 11 hours at the library

23. Solve the following system of inequalities graphically on the grid below and label the solution S.

Is the point $(3, 7)$ in the solution set? Explain your answer.

$3x + 4y > 20$

$-3x \qquad -3x$

$x < 3y - 18$

$\dfrac{4y}{4} > \dfrac{-3x + 20}{4}$

$y > -\dfrac{3}{4}x + 5$

No, it is on the dashed line —

$x < 3y - 18$

$+18 \qquad +18$

$\dfrac{x + 18}{3} < \dfrac{3y}{3}$

$\dfrac{1}{3}x + 6 < y$

$y > \dfrac{1}{3}x + 6$
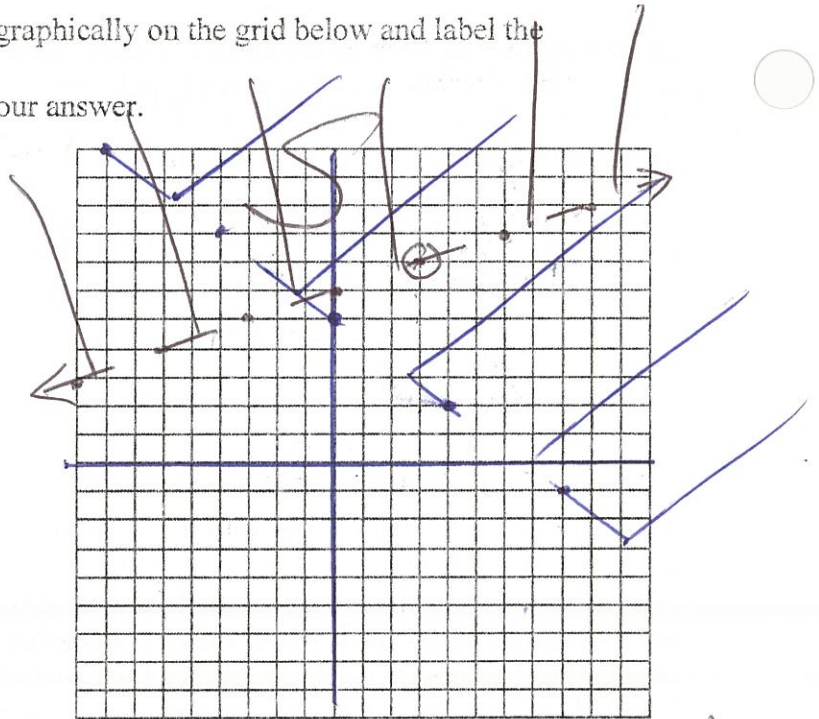
24. Sheba opened a retirement account with $36,500. Her account grew at a rate of 7% per year compounded annually. She made no deposits or withdrawals on the account. At the end of 20 years, what was the account worth, to the *nearest dollar*?

$A = rp(1 \pm r)^t$

$A = A$

$P = 36,500$

$r = .07$

$t = 20$

$A = p(1 \pm r)^t$

$A = 36,500(1 + .07)^{20}$

$A = \$141,243$

25. The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered. What is the percent of change each year? Explain how you arrived at your answer.

Decreasing by 5%. I subtracted .05 from 1 to obtain .95.

26. Which situation is *not* a linear function?

1) A gym charges a membership fee of $10.00 down and $10.00 per month.

2) A cab company charges $2.50 initially and $3.00 per mile.

3) A restaurant employee earns $12.50 per hour.

4) A $12,000 car depreciates 15% per year.

4. is exponential

27. The function, $t(x)$, is shown in the table below. Determine whether $t(x)$ is linear or exponential. Explain your answer.

x	t(x)
−3	10
−1	7.5
1	5
3	2.5
5	0

−2.5
−2.5
−2.5

Linear because it is decreasing by a constant amount.

Factor the following expressions completely

28. $4t^2 - 25$ DoTS

$(2t+5)(2t-5)$

29. $m^2 - 8m + 15$

$(m-5)(m-3)$

1,15
3,5

30. $2x^2 - 50$ GCF

$\dfrac{2x^2}{2} \dfrac{-50}{2}$

$2(x^2-25)$ DoTS
$2(x+5)(x-5)$

31. $2x^2 - 8x - 10$ GCF

$\dfrac{2x^2}{2} \dfrac{-8x}{2} \dfrac{-10}{2}$

$2(x^2-4x-5)$
$2(x-5)(x+1)$

32. $2x^2 + 7x - 4$

−8   1,8
      2,4

$\dfrac{2x^2+8x}{2x} \dfrac{-x}{-1} \dfrac{-4}{-1}$

$2x(x+4) -1(x+4)$
$(2x-1)(x+4)$

33. Solve for x:
$x^2 + 3x = 8x - 4$
$-8x+4 \quad -8x+4$

$x^2-5x+4=0$
$(x-4)(x-1)=0$
$x-4=0 \quad x-1=0$
$+4 \ +4 \quad +1 \ +1$
$x=4 \qquad x=1$

quadratic formula

34. Solve algebraically for x rounding all values to the *nearest tenth.*

$3x^2 + 2x - 4 = 0$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = 3$
$b = 2$
$c = -4$

$x = \dfrac{-2 \pm \sqrt{(2)^2 - 4(3)(-4)}}{2(3)}$

$x = .9 \qquad x = -1.5$

35. Which equation has the same solutions as $x^2 - 8x + 3 = 0$?

(1) $(x-8)^2 = 16$ (3) $(x-4)^2 = 13$
(2) $(x-8)^2 = 13$ (4) $(x-4)^2 = 61$

completing the square

$x^2 - 8x = -3$
$\qquad -3 \quad -3$

$\left(\dfrac{b}{2}\right)^2$

$\left(\dfrac{-8}{2}\right)^2 = 16$

$x^2 - 8x + \boxed{16} = -3 + \boxed{16}$

$(x-4)(x-4) = 13$

$(x-4)^2 = 13$

36. Solve the equation $x^2 - 6x = 15$ by completing the square.

$\left(\dfrac{b}{2}\right)^2$

$\left(\dfrac{-6}{2}\right)^2 = 9$

$x^2 - 6x + \boxed{9} = 15 + \boxed{9}$

$(x-3)(x-3) = 24$

$\sqrt{(x-3)^2} = \sqrt{24}$

$x - 3 = \pm\sqrt{24}$
$\quad +3 \quad +3$

$x = 3 \pm \sqrt{24}$

$\sqrt{4}\sqrt{6}$

$x = 3 \pm 2\sqrt{6}$

37. The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign. Solve this equation algebraically to determine the dimensions of this sign, in inches.

$a = 864/x$

$\dfrac{1}{2}(24) + 6 = 18$

$L = \dfrac{1}{2}x + 6$
$w = x \quad 24$
$A = 432$

$\boxed{6 \times 8}$

$A = lw$

$432 = x\left(\dfrac{1}{2}x + 6\right)$

$432 = \dfrac{1}{2}x^2 + 6x$
$-432 \qquad \qquad -432$
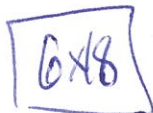
$2(0) = \left(\dfrac{1}{2}x^2 + 6x - 432\right)2$

$0 = x^2 + 12x - 864$

$0 = (x + 36)(x - 24)$

$x + 36 = 0 \quad x - 24 = 0$
$\quad -36 \; -36 \quad \quad +24 \; +24$

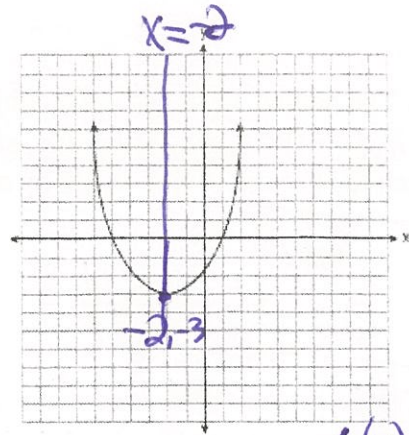$x = -36 \quad x = 24$

Can't have negative

38. The zeros of the function $f(x) = (x+2)^2 - 25$ are

1) -2 and 5
2) -3 and 7
3) -5 and 2
4) -7 and 3

$y =$

the zeros hit the x-axis

39. What are the vertex and the axis of symmetry of the parabola shown in the diagram below?

1) The vertex is $(-2,-3)$, and the axis of symmetry is $x=-2$.
2) The vertex is $(-2,-3)$, and the axis of symmetry is $y=-2$.
3) The vertex is $(-3,-2)$, and the axis of symmetry is $y=-2$.
4) The vertex is $(-3,-2)$, and the axis of symmetry is $x=-2$.

$x=-2$

$-2,-3$

40. Rewrite the following equation in vertex form and state the vertex

$$\frac{f(x)}{2} = \frac{2x^2+12x-6}{2}$$

$$\frac{f(x)}{2} = x^2+6x-3$$
$$+3$$
$$\frac{f(x)}{2}+3 = x^2+6x$$

$\left(\frac{6}{2}\right)^2 = 9$

$$\frac{f(x)}{2}+3+\boxed{9} = x^2+6x+\boxed{9}$$
$$\frac{f(x)}{2}+12 = (x+3)(x+3)$$
$$\frac{f(x)}{2}+12 = (x+3)^2$$
$$-12 \qquad -12$$

$$\frac{f(x)}{2} = (x+3)^2-(12)$$
$$f(x) = 2(x+3)^2-24$$
vertex $(-3,-24)$

41. The expression $-4.9t^2+50t+2$ represents the height, in meters, of a toy rocket t seconds after launch. The initial height of the rocket, in meters, is

y-intercept

1) 0   3) 4.9
2) 2   4) 50

42. Alex launched a ball into the air. The height of the ball can be represented by the equation $h=-8t^2+40t+5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t=0$ to $t=5$ seconds.
State the coordinates of the vertex and explain its meaning in the context of the problem. State the interval of time where the height of the ball is increasing.
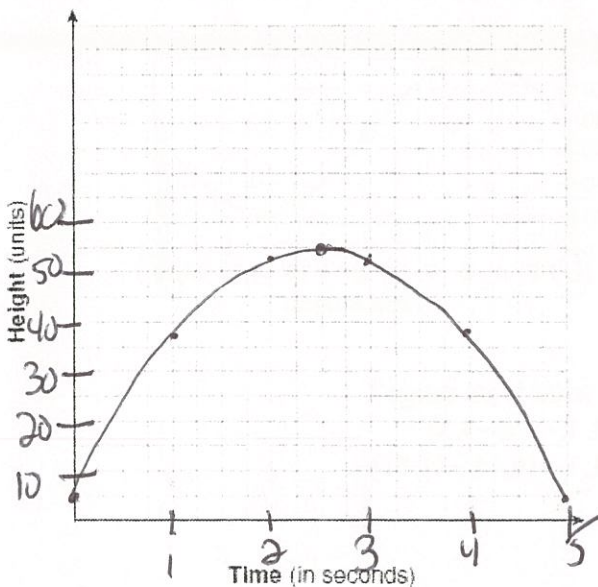
x	y
0	5
1	37
2	53
3	53
4	37
5	5

At 2.5 seconds, the maximum height of the ball is 55 units.

$(2.5, 55)$

2nd Trace, maximum

Height (units) vs Time (in seconds)

43. The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$. Determine, algebraically, how many seconds it will take for the object to reach the ground. What would be an appropriate domain in the context of the problem?

zero

$0 = -16t^2 + 144$

$\frac{}{-16} \quad \frac{}{-16}$

$0 = t^2 - 9$
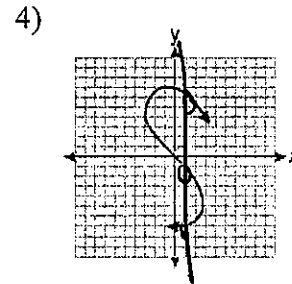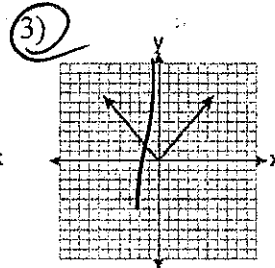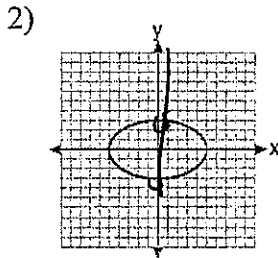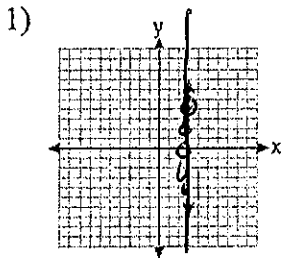
$0 = (t+3)(t-3)$

$t+3=0 \quad t-3=0$

$-3 \quad -3 \quad +3 \quad +3$

$t=3 \quad t=3$

domain
[0,3]

44. Which set of ordered pairs does *not* represent a function?
1) {(3,-2), (-2,3), (4,-1), (-1,4)}
2) {(3,-2), (3,-4), (4,-1), (4,-3)}   X Can't repeat
3) {(3,-2), (4,-3), (5,-4), (6,-5)}
4) {(3,-2), (5,-2), (4,-2), (-1,-2)}

45. Which graph represents a function?
1)   2)   3)   4)

46. A meteorologist drew the accompanying graph to show the changes in relative humidity during a 24-hour period in New York City.

State the domain and range

Domain [0,24]

Range [30,80]
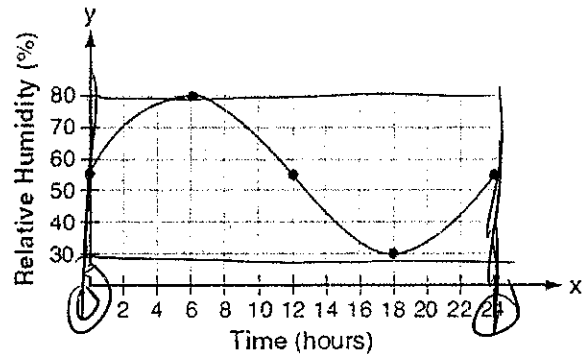
47. If the function $f(x) = x^2$ has the domain {0, 1, 4, 9}, what is its range?
1) {0, 1, 2, 3}   3) {0, -1, 1, -2, 2, -3, 3}
2) {0, 1, 16, 81}   4) {0, -1, 1, -16, 16, -81, 81}

$\frac{x \mid y}{0 \mid 0}$
$1 \mid 1$
$4 \mid 16$
$9 \mid 81$

48. The daily cost of production in a factory is calculated using $c(x) = 200 + 16x$, where x is the number of complete products manufactured. Which set of numbers best defines the domain of $c(x)$?
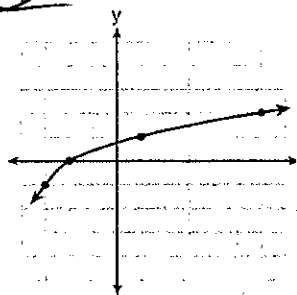
1) integers

3) positive rational numbers

2) positive real numbers

4) whole numbers

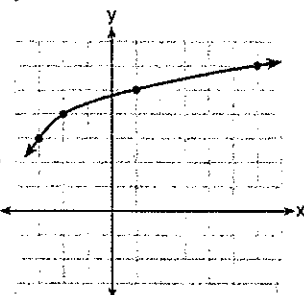49. The graph of $y = f(x)$ is shown below.

left 1 down 2
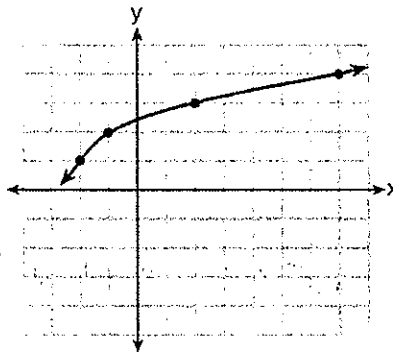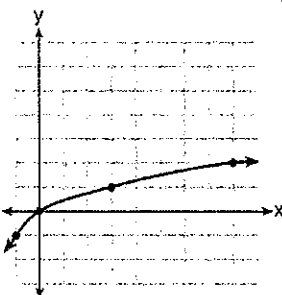
What is the graph of $y = f(x+1) - 2$?
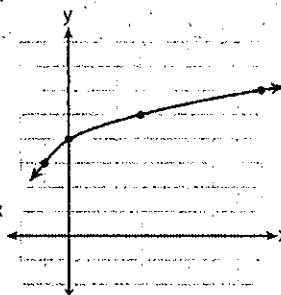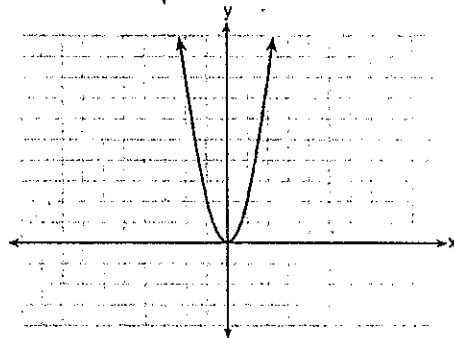
1)　　　　　2)　　　　　3)　　　　　4)

50. The graph of the equation $y = ax^2$ is shown below.

downward   wider

If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

1) wider and opens downward

2) wider and opens upward

3) narrower and opens downward

4) narrower and opens upward

51. An astronaut drops a rock off the edge of a cliff on the Moon. The distance, $d(t)$, in meters, the rock travels after t seconds can be modeled by the function $d(t) = 0.8t^2$. What is the average rate of change, in meters per second, of the rock between 5 and 10 seconds after it was dropped? Explain its meaning in the context of the problem.

$$AROC = \frac{y_2 - y_1}{x_2 - x_1}$$

x	y
5	20
10	80

$$\frac{80 - 20}{10 - 5} = 12$$

On average, from 5 to 10 seconds, the distance the rock travels increases by 12 meters per second.
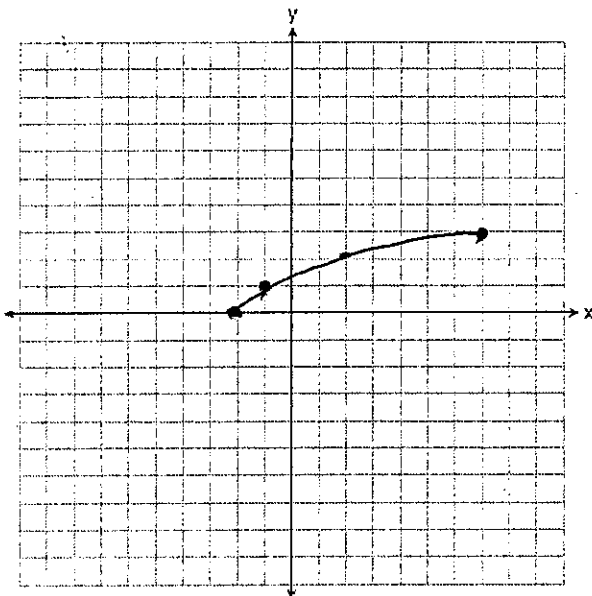
52. The graph below shows the distance in miles, *m*, hiked from a camp in *h* hours. Which hourly interval had the greatest rate of change? Which hourly interval had the least average rate of change?

1) hour 0 to hour 1 *greatest*
2) hour 1 to hour 2
3) hour 2 to hour 3
4) hour 3 to hour 4

4 to 5 least

→*flattest*

→ *steepest slope*
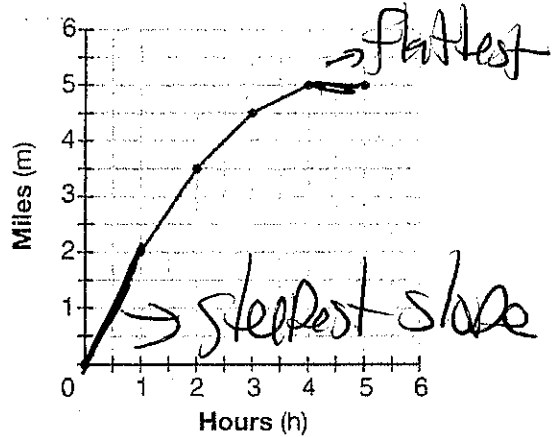
53. Graph $f(x) = \sqrt{x+2}$ over the domain $-2 \le x \le 7$.
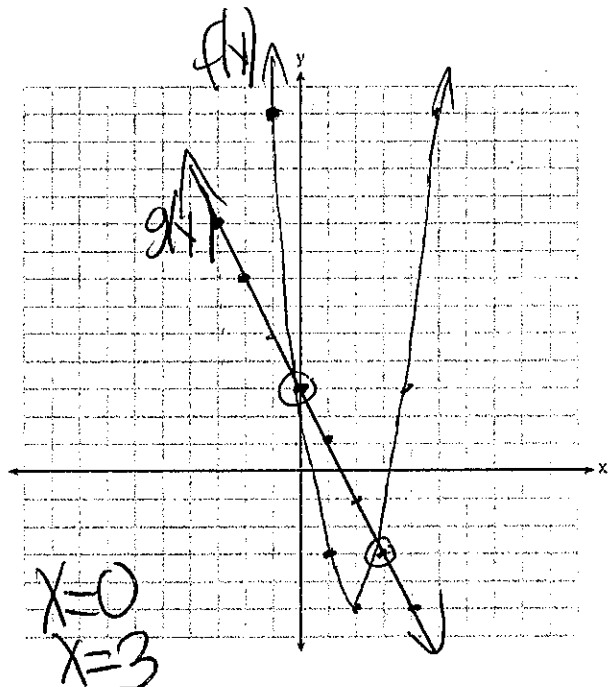

X	Y
-2	0
-1	1
2	2
7	3

54. Graph $y = f(x)$ and $y = g(x)$ on the set of axes below. Determine and state all values of *x* for which $f(x) = g(x)$.

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

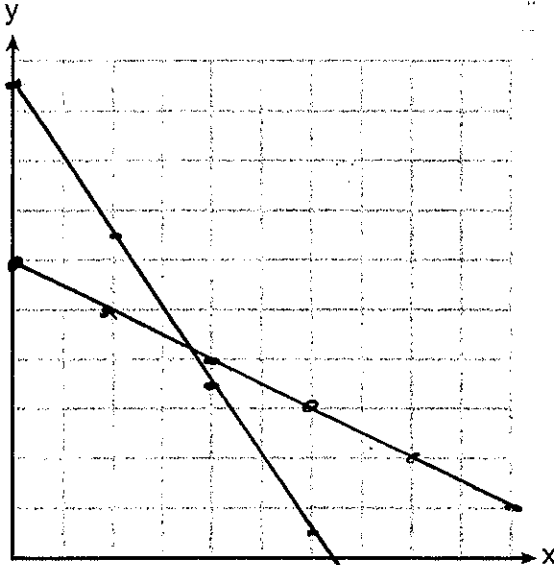*f(x)*

X	Y
-1	13
0	3
1	-3
2	-5
3	-3
4	3
5	13

g(x)

X	Y
-3	9
-2	7
-1	5
0	3
1	1
2	-1
3	-3
4	-5
5	-7

$X = 0$
$X = 3$

55. Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for $19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for $24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies. Write a system of equations that describes the given situation. On the set of axes below, graph the system of equations.

Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution

$$3x + 2y = 19 \qquad 2x + 4y = 24$$
$$-3x \qquad -3x \qquad -2x \qquad -2x$$

$$\frac{2y}{2} = \frac{-3x + 19}{2} \qquad \frac{4y}{4} = \frac{-2x + 24}{4}$$

$$y = -\frac{3}{2}x + 9.5 \qquad y = -\frac{1}{2}x + 6$$

$$-2(3x + 2y = 19) \qquad y = 4.25 \qquad \frac{2x}{2} = \frac{7}{2}$$
$$3(2x + 4y = 24) \qquad 2x + 4y = 24 \qquad x = 3.50$$
$$-6x - 4y = -38 \qquad 2x + 4(4.25) = 24$$
$$6x + 12y = 72 \qquad 2x + 17 = 24$$
$$\frac{8y}{8} = \frac{34}{8}$$

56. On the set of axes below, graph the piecewise function: $f(x) = \begin{cases} -\frac{1}{2}x, & x < 2 \\ x, & x \geq 2 \end{cases}$

$-\frac{1}{2}x$

x	y
2	-1
1	
0	0
-2	1
-4	2

x

x	y
2	2
3	3
4	4
5	5
6	6
7	7
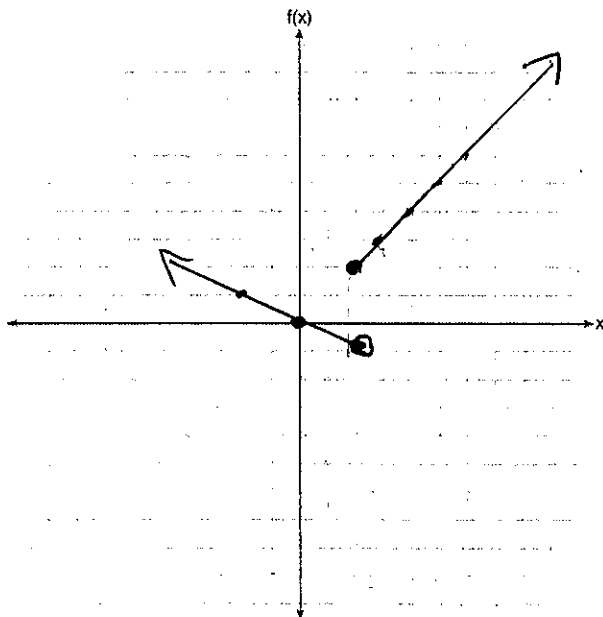
57. A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination. On the set of axes below, draw a graph that models the driver's distance from home.

$2(60) = 120$

X	Y
0	0
2	120
2.5	120
3.5	150

Distance (miles) vs Time (hours)
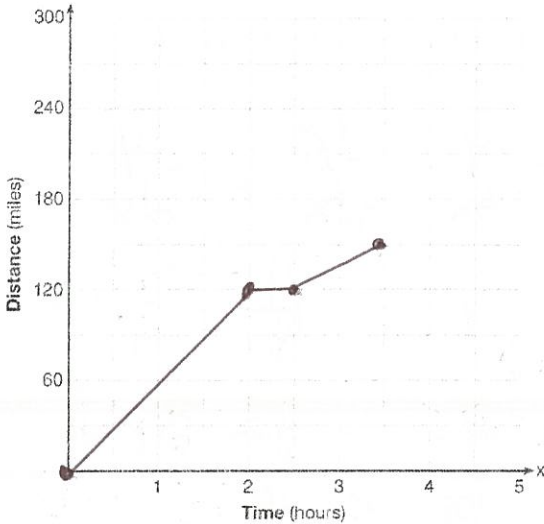
58. The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving. Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning. Explain what might have happened in the interval between B and C. Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

average rate of change
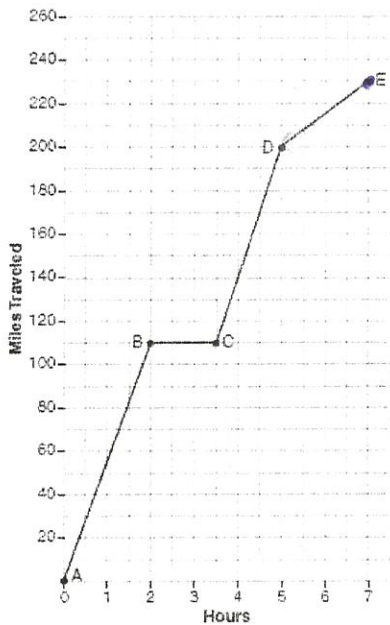
City: D to E because he was moving at a slower pace.

Between B and C, he stopped for lunch.

$AROC = \dfrac{y_2 - y_1}{x_2 - x_1}$

X	Y
0	0
7	230

$\dfrac{230 - 0}{7 - 0} = 32.9 \text{ mph}$

Miles Traveled vs Hours

59. The table below represents the function F.
The equation that represents this function is

x	3	4	6	7	8
F(x)	9	17	65	129	257

1) $F(x) = 3^x$
2) $F(x) = 3x$
3) $F(x) = 2^x + 1$
4) $F(x) = 2x + 3$

Type each equation into Y= and look at the table

60. Wenona sketched the polynomial $P(x)$ as shown on the axes below.
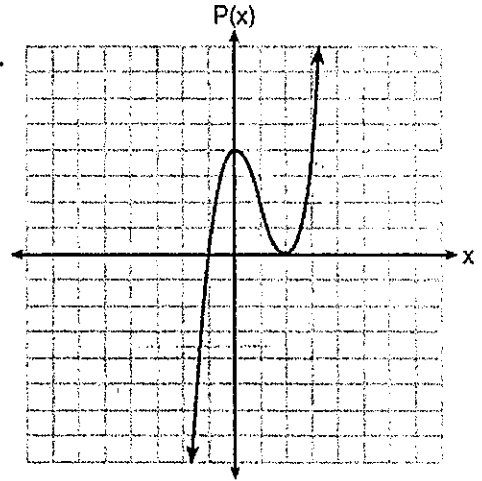
Which equation could represent $P(x)$?

1) $P(x) = (x + 1)(x - 2)^2$
2) $P(x) = (x - 1)(x + 2)^2$
3) $P(x) = (x + 1)(x - 2)$
4) $P(x) = (x - 1)(x + 2)$

Type each equation into Y= and look at the graph

61. Which ordered pair below is *not* a solution to $f(x) = x^2 - 3x + 4$?

1) $(0, 4)$
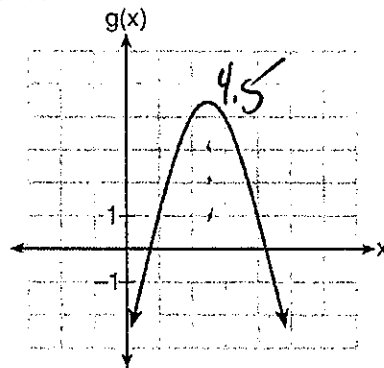2) $(1.5, 1.75)$
3) $(5, 14)$
4) $(-1, 6)$

Type into Y=

62. Which quadratic function has the largest maximum?

1) $h(x) = (3 - x)(2 + x)$ 6.25

3) $k(x) = -5x^2 - 12x + 4$ 11.2

x	f(x)
−1	−3
0	5
1	9
2	9
3	5
4	−3

2)   ≈9.5

g(x)

4)   4.5

Type equations into Y=
2nd Trace (calc)
4: maximum

63. Write an explicit AND recursive equation for the following sequence and find the eighth term.

2, 6, 18, 54, ...

.3.3.3

geometric

$a_1 = 2$
$r = 3$

$a_n = a_1(r)^{n-1}$
$a_n = 2(3)^{n-1}$

recursive
$a_1 = 2$
$a_n = 3a_{n-1}$

$a_8 = 2(3)^{8-1}$
$a_8 = 4374$

64. Write an explicit AND recursive equation for the following sequence and find the 20th term.

63, 57, 51, 45, ...

-6 -6 -6

arithmetic

$a_n = a_1 + (n-1)d$
$a_n = 63 + (n-1)(-6)$
$a_n = 63 - 6n + 6$
$a_n = -6n + 69$

recursive
$a_1 = 63$
$a_n = a_{n-1} - 6$

$a_{20} = -6(20) + 69$
$a_{20} = -51$

65. The first term in a sequence is 5 and the fifth term is 17. What is the common difference?

1) 2.4
2) 12
3) 3
4) 4

Guess and check

$\underset{1}{5} \overset{+3}{\underset{2}{8}} \overset{+3}{\underset{3}{11}} \overset{+3}{\underset{4}{14}} \overset{+3}{\underset{5}{17}}$

66. If $f(1) = 3$ and $f(n) = -2f(n-1) + 1$, then $f(5) =$

plug in term

1) -5
2) 11
3) 21
4) 43

$f(2) = -2(3) + 1$
$f(2) = -5$

$f(3) = -2(-5) + 1$
$f(3) = 11$

$f(4) = -2(11) + 1$
$f(4) = -21$

$f(5) = -2(-21) + 1$
$f(5) = 43$

67. The data given in the table below show some of the results of a study comparing the height of a certain breed of dog, based upon its mass. Write the linear regression equation for these data, where x is the mass and y is the height. Round all values to the *nearest tenth*. State the value of the correlation coefficient to the *nearest tenth*, and explain what it indicates.
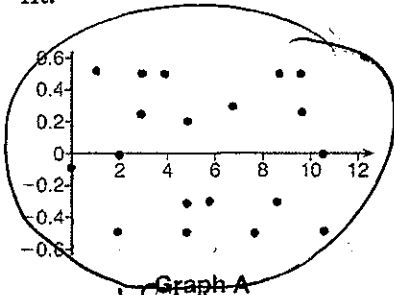
Mass (kg)	4.5	5	4	3.5	5.5	5	5	4	4	6	3.5	5.5
Height (cm)	41	40	35	38	43	44	37	39	42	44	31	30

L1
L2

Lin Reg

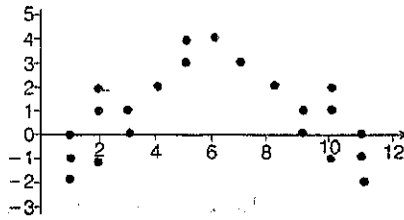LinReg

$r = .3$

$y = 1.9x + 29.8$

There is a weak/positive correlation between mass and height.

68. The residual plots from two different sets of bivariate data are graphed below. Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Graph A

Graph B

good fit because there is no pattern

bad fit because there is a pattern.

69. A survey was given to 12th-grade students of West High School to determine the location for the senior class trip. The results are shown in the table below. To the *nearest percent*, what percent of the girls chose New York City?

|	Niagara Falls	Darien Lake	New York City	
Boys	56	74	103	233
Girls	71	92	88	251
	127	166	191	484

$\frac{88}{251}$

35%

70. The box-and-whisker plot shown below represents the number of magazine subscriptions sold by members of a club.
Which statistical measures do points *B, D,* and *E* represent, respectively?
1) minimum, median, maximum
2) first quartile, median, third quartile
3) first quartile, third quartile, maximum
4) median, third quartile, maximum

Q1   Q3   max

A   B   C   D   E

2   4   6   8   10 12 14 16 18 20
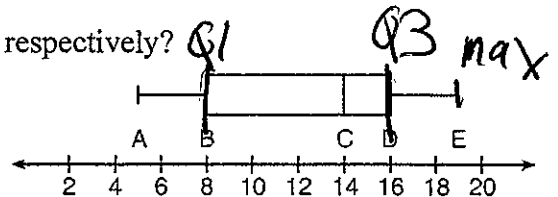
71. Robin collected data on the number of hours she watched television on Sunday through Thursday nights for a period of 3 weeks. The data are shown in the table below.
Using an appropriate scale on the number line below, construct a box plot for the 15 values.

1   2   3   4   5
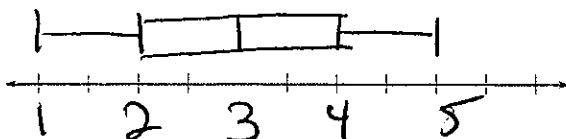
	Sun	Mon	Tues	Wed	Thurs
Week 1	4	3	3.5	2	2
Week 2	4.5	5	2.5	3	1.5
Week 3	4	3	1	1.5	2.5

min :
Q1 :
Med :
Q3 :
Max :

Stat, Edit
Stat Calc 1 var stats
★everything in L1

72. The table below represents the time taken, in minutes, to eat breakfast. For this set of data, find the mean, median, mode, population standard deviation, range, and interquartile range. How many people were involved in this study?

Minutes To Eat Breakfast
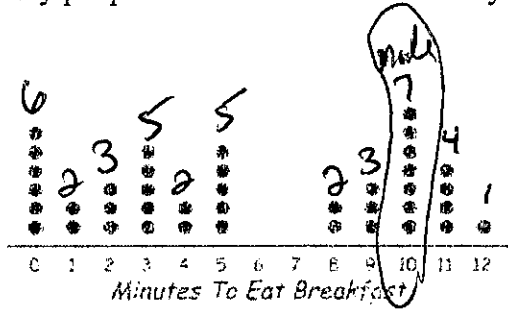
Handwritten:
Stat, Edit
Stat, Calc, 1 Varstats
~~Use~~ Use FreqList is L2
$\bar{x}$ = mean
V_x = standard deviation
mode = # with highest frequency
range = max - min
interquartile range = Q3 - Q1

mean = 5.625
median = 5
mode = ~~9~~ 10
Pop SD = 4.0
range = 12 - 0 = 12
IQR = 10 - 2 = 8

73. Which situation describes a correlation that is *not* a causal relationship?
1) the length of the edge of a cube and the volume of the cube
2) the distance traveled and the time spent driving
③ the age of a child and the number of siblings the child has
4) the number of classes taught in a school and the number of teachers employed

Handwritten: your age does not cause you to have more siblings.

74. Sarah travels on her bicycle at a speed of 22.7 miles per hour. What is Sarah's approximate speed, in kilometers per minute?
1) 0.2   3) 36.5
② 0.6   4) 36.6

Handwritten: $\frac{22.7 \text{ mi}}{1 \text{ hr}} \cdot \frac{1.609 \text{ km}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = .6$
from reference sheet

75. A construction worker needs to move 120 ft³ of dirt by using a wheelbarrow. One wheelbarrow load holds 8 ft³ of dirt and each load takes him 10 minutes to complete. One correct way to figure out the number of hours he would need to complete this job is

1) $\frac{120 \text{ ft}^3}{1} \cdot \frac{10 \text{ min}}{1 \text{ load}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{1 \text{ load}}{8 \text{ ft}^3}$

2) $\frac{120 \text{ ft}^3}{1} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{8 \text{ ft}^3}{10 \text{ min}} \cdot \frac{1}{1 \text{ load}}$

3) $\frac{120 \text{ ft}^3}{1} \cdot \frac{1 \text{ load}}{10 \text{ min}} \cdot \frac{8 \text{ ft}^3}{1 \text{ load}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$

④ $\frac{120 \text{ ft}^3}{1} \cdot \frac{1 \text{ load}}{8 \text{ ft}^3} \cdot \frac{10 \text{ min}}{1 \text{ load}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$