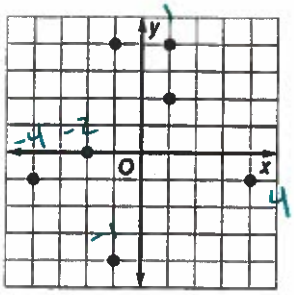
NAME Key

Algebra I Midterm Review

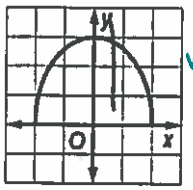
1. What is the domain of the relation shown on the graph?

F {– 4, –1, 0, 2, 4}
G {– 4, –2, –1, 1, 4}
H {– 4, –2, –1, 0, 1, 2, 4}
J {–1, 1}



2. Determine which relation is *not* a function.

F



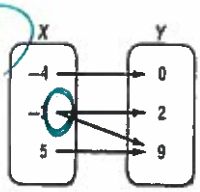
vert line test

G

x	y
–2	0
0	0
1	2
3	1

no repeats

H

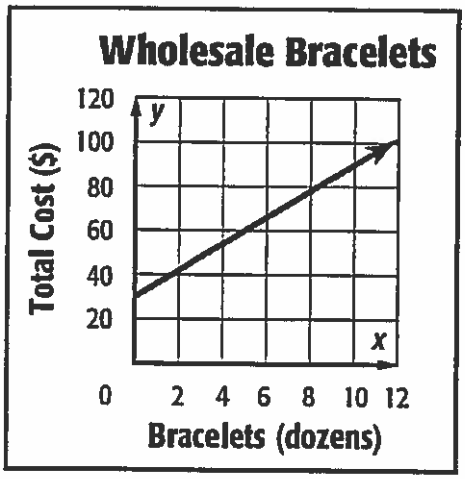


J

x	y
–4	0
–3	9
5	2
6	9

no repeats

For Questions 3 and 4, use the graph.



3. Interpret the *y*-intercept of the graph.

A 0 bracelets cost about $30.
B 1 dozen bracelets cost about $30.
C 28 dozen bracelets cost $0.
D Each dozen bracelets costs about $5.

4. Interpret the end behavior of the function.

F The total cost decreases.
G The cost per dozen decreases.
H The total cost increases. (y-value)
J The cost per dozen increases.

reciprocal

5. Solve $-\frac{3}{8}y = -24$.

$\left(-\frac{8}{3}\right)$ $\left(-\frac{8}{3}\right)$

$y = 64$

6. Solve $5x + 3 = 23$.

$-3 \quad -3$

$5x = 20$

$x = 4$

7. Solve $2x + 7 = 5x + 16$.

$-2x \quad -2x$

$7 = 3x + 16$

$-16 \quad -16$

$-9 = 3x$

$x = -3$

8. Solve $\frac{2}{3}(6x + 30) = -x + 5(x + 4)$.

$4x + 20 = 4x + 20$

same

A 6 B 0 C all numbers D no solution

9. Solve $2x - y = y$ for x.

A $x = 2y - 2$ B $x = y - 2$ C $x = y$ D $x = 0$

$2x = 2y$

$x = y$

10. In 2005, there were 12,000 students at Beacon High. In 2010, there were 12,250. What is the rate of change in the number of students?

$m = \frac{\Delta y}{\Delta x} = \frac{12000 - 12250}{2005 - 2010} = \frac{-250}{-5} = 50$

11. Elliot's Electricians advertises his rate using the following table. From the information given, determine Elliot's hourly rate.

Hours	2	3	4	5
Charge	$40	$60	$80	$100

$m = \frac{\Delta y}{\Delta x}$ (any 2 coordinates) $\rightarrow \frac{60 - 80}{3 - 4} = \frac{-20}{-1} = 20$

A $5 per hour B $15 per hour C $20 per hour D $40 per hour

12. What is the slope-intercept form of the equation of a line with a slope of 5 and a y-intercept of –8?

A $y = -8x + 5$ B $y = 8x - 5$ C $5x - y = -8$ D $y = 5x - 8$

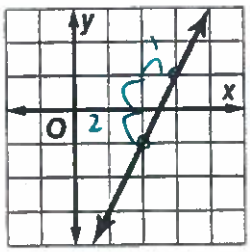
$y = mx + b$

13. Which equation below is parallel to the line graphed at the right?

F $y = -2x + 1$ H $y = 2x + 1$

G $y = -\frac{1}{2}x + 1$ J $y = \frac{1}{2}x + 1$

same slope



$m = \frac{2}{1} = 2$

14. Which is an equation of the line that passes through (2, –5) and (6, 3)?

A $y = \frac{1}{2}x - 6$ C $y = 2x + 12$

B $y = \frac{1}{2}x$ D $y = 2x - 9$

$m = \frac{-5 - 3}{2 - 6} = \frac{-8}{-4} = 2$

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

$y - 3 = 2x - 12$

$+3 \quad +3$

15. What is the equation of a horizontal line through (–2, –3)?

F $x = -2$ G $y = -3$ H $-2x - 3y = 0$ J $-3x + 2y = 0$

16. Find the slope-intercept form of the equation of the line that passes through (–5, 3) and is parallel to $-3y = -12x + 10$.

$\frac{-3y}{-3} = \frac{-12x}{-3} + \frac{10}{-3}$

pt. slope $\rightarrow y - 3 = 4(x + 5)$

slope int $\rightarrow y = 4x + 23$

same

$y = 4x - \frac{10}{3}$

17. If line q has a slope of $-\frac{3}{8}$, what is the slope of any line perpendicular to q?

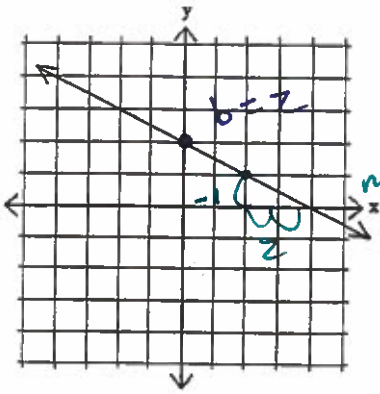
1 is opp recip

$\frac{8}{3}$

Use the graph to the right for questions 18 and 19.

18. What is the equation, in slope-~~intercept form~~, of the line graphed?

$y = -\frac{1}{2}x + 2$



19. Fill out the table:

Domain:	$\mathbb{R}$
Range:	$\mathbb{R}$
x-intercept:	$(4,0)$
y-intercept:	$(0,2)$
End Behavior:	As x increases, y approaches ∞ As x decreases, y approaches ∞

20. Find the slope-intercept form of the equation that passes through (2, 3) and is perpendicular to $y = -\frac{1}{3}x - 5$

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

$y = 3x - 3$

$m = -\frac{1}{3}$

$m = 3$

21. Find the inverse of {(4, –1), (3, –2), (6, 9), (8, 5)}.

F {(8, 5), (6, 9), (3, –2), (4, –1)}

H {(–1, 4), (–2, 3), (9, 6), (5, 8)}

G {(–4, 1), (–3, 2), (–6, –9), (–8, -5)}

J {(–1, –2), (9, 5), (4, 3), (6, 8)}

22. If $f(x) = 3x - 4$, find $f^{-1}(x)$.

A $f^{-1}(x) = 4x - 3$

B $f^{-1}(x) = \frac{x+4}{3}$

C $f^{-1}(x) = \frac{x-4}{3}$

D $f^{-1}(x) = -4 - 3x$

$y = 3x - 4$

$x = 3y - 4$ (now solve for 'y')

$+4 \quad +4$

$x + 4 = 3y$

$\frac{x}{3} + \frac{4}{3} = y$

23. The table of values represents all points in the function $f(x)$. What is the value of $f^{-1}(2)$?

x	$f(x)$
0	2
1	4
2	6

$x \quad f^{-1}(x)$

$2 \quad 0$

$4 \quad 1$

$6 \quad 2$

A. 0 B. 1 C. 4 D. 6

24. Solve: $-51 \leq x + 38$

$-38 \quad -38$

$-89 \leq x$ also written $x \geq -89$

25. Solve: $\frac{t}{-2} > 4$ $(\cdot -2)$

$t < -8$

↑ switch sign

26. Solve: $4w - 6 > 6w - 20$

$-4w \quad -4w$

$-6 > 2w - 20$

$+20 \quad +20$

$14 > 2w$

$7 > w$ also written $w < 7$

27. Which compound inequality has the solution set shown in the graph?

open closed

'AND'

A $-1 < n < 2$

B $-1 \le n < 2$

C $n \ge -1$ or $n < 2$

D $-1 < n \le 2$

28. Which of the following is the solution set of $-4 < 3t + 5 \le 20$?

F $-3 < t \le 5$

G $-3 < t \le 5$ whoops

H $t < -3$ -5 -5 -5

J $t < -3$ or $t \ge 5$

$\frac{-9}{3} < \frac{3t}{3} \le \frac{15}{3}$

$-3 < t \le 5$

'OR'

29. Which of the following is the solution set of $|2x - 3| > 4$?

A $x < -0.5$ or $x > 3.5$

B $x < -1$ or $x > 7$

C $-0.5 < x < 3.5$

D $x < 0.5$ or $x > 3.5$

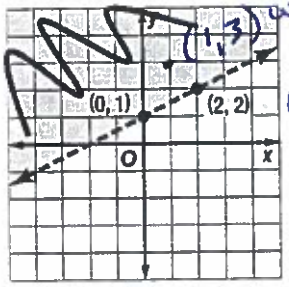
$2x - 3 > 4$ OR $2x - 3 < -4$

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

$\frac{2x}{2} > \frac{7}{2}$ OR $\frac{2x}{2} < \frac{-1}{2}$

$x > \frac{7}{2}$ OR $x < -\frac{1}{2}$

30. Which inequality is graphed at the right?



works!

$M = \frac{1}{2}$

F $y < 2x + 1$

G $y > 2x + 1$

H $y < \frac{1}{2}x + 1$

J $y > \frac{1}{2}x + 1$

$3 < \frac{1}{2}(1) + 1$

$3 < 1.5$

$3 > \frac{1}{2}(1) + 1$

$3 > 1.5$ ✓

31. Determine which of the ordered pairs are a part of the solution of $y + 1 > \frac{1}{2}x + 3$.

Plug in to see what works!

F (2, 3) $4 > 4$

G (–4, 0) $1 > 1$

H (1, 2) $3 > 3.5$

J (–3, 1) $2 > 1.5$

32. Laurie and Maya sold at most $50 worth of get-well and friendship cards. The friendship cards, x, were sold for $2 each and the get-well cards, y, were sold for $1.50 each. Which point represents a reasonable number of cards sold?

$2x + 1.50y \le 50$

F (20, 10) $55 \not\le 50$

G (15, 10) $45 \le 50$ ✓

H (18, 20) $66 \not\le 50$

J (10, 30) $\approx 65 \not\le 50$

33. Which statement is true about the solution to the system of equations?

$y + 4 = -\frac{1}{2}x - 4$ $\quad -4$

$x + 2y = -8$

$y = -\frac{1}{2}x - 4$

A. The two lines intersect at exactly one point.

B. The two lines do not intersect.

C. The two lines intersect at exactly 2 points.

D. The two lines coincide.

$x + 2\left(\frac{-1}{2}x - 4\right) = -8$

$x - x - 8 = -8$

$-8 = -8$

interpret

Many 50.....

34. Solve the system if $x = 2y + 3$ and $4x - 5y = 9$.

$4(2y + 3) - 5y = 9$

$8y + 12 - 5y = 9$

$3y = -3$

$y = -1$

Plug into original

$x = 1$

$(1, -1)$

√ it

35. Solve the system if $x - 5y = 20$ and $x + 3y = -4$.

$-1(x - 5y = 20) \rightarrow -x + 5y = -20$

$8y = -24$

$y = -3$

$x - 5(-3) = 20$

$x + 15 = 20$

$-15 \quad -15$

$x = 5$

$(5, -3)$

36. Your teacher is giving a test that has 4-point questions (x) and 6-point questions (y). The test has 25 total questions and is worth 120 points. Which system represents this information?

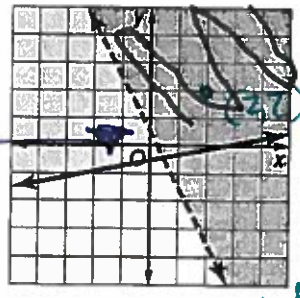
A $x + y = 120$
$4x + 6y = 25$

B $x + y = 25$
$6x + 4y = 120$

C $x - y = 25$
$6x + 4y = 120$

D $x + y = 25$ ← ?s
$4x + 6y = 120$ ← Pts

37. What system of inequalities is represented in the graph?



← overlap

solid line shade up → solid so ≥

dashed + up so >

F $y < -2x + \frac{1}{2}$
$y \geq \frac{1}{5}x - \frac{1}{2}$

G $y > -2x + \frac{1}{2}$
$y \leq \frac{1}{5}x - \frac{1}{2}$

(2,2) should work

H $y < -2x + \frac{1}{2}$
$y \geq \frac{1}{5}x - \frac{1}{2}$

$2 > -.5$ ✓

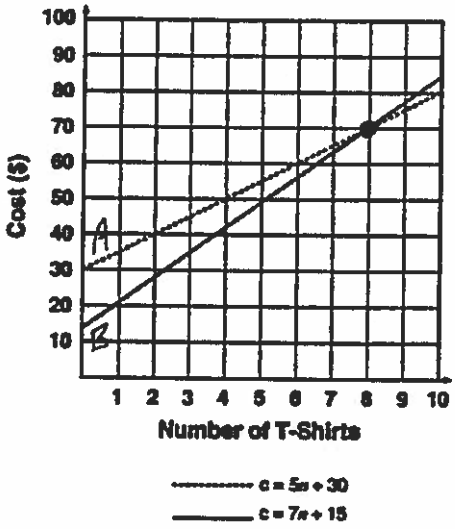
$2 > -.1$ ✓

J $y > -2x + \frac{1}{2}$
$y \geq \frac{1}{5}x - \frac{1}{2}$

38. A club will create t-shirts for a fundraiser. The club members need to compare the cost of creating the t-shirts between two companies. Company A charges \$30 for setup, plus \$5 per t-shirt. Company B charges \$15 for setup, plus \$7 per t-shirt. The situation is shown on the graph to the right.

How many t-shirts are manufactured for the cost to be equal?

8



39. Simplify $(x^3)^8$.

x^{24}

40. Simplify $(-2hk)^4(4h^3k^5)^2$.

$(-2)^4 h^4 k^4 (4)^2 h^6 k^{10}$

$4^2(-2)^4 h^{10} k^{14}$

41. Simplify $\frac{36b^4c^2}{96b^3c^5}$. Assume the denominator is not equal to zero.

b^1

$\frac{4b^5}{1c^3}$

42. Simplify $\frac{(3y^4n^6)^2}{(y^2n^{-3})^4}$. Assume the denominator is not equal to zero.

$3^2 y^8 n^{12} \quad n^{12}$

$y^8 n^{-12}$

F $\frac{9}{y^{16}}$

G $\frac{9}{n^{24}}$

H $9y^{16}$

J $9n^{24}$

43. Write $10y^{\frac{1}{2}}$ in radical form.

A $\sqrt{10y}$ B $10\sqrt{y}$ C $10\sqrt{10y}$ D $y\sqrt{10}$

44. Evaluate $81^{\frac{3}{4}}$.

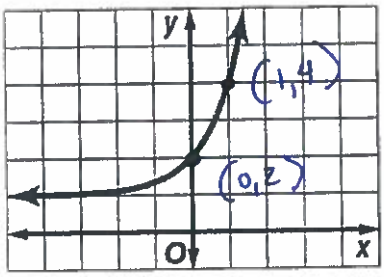
$\sqrt[4]{81^3}$ or 27

45. Which equation represents exponential growth?

A $y = 5(0.84)^x$ B $y = 5x$ C $y = 0.3x^3$ D $y = 5(1.06)^x$

$b < 1$ decay linear cubic $b > 1$

Use the graph shown to the right to answer questions 46 – 47.



46. Which equation corresponds to the graph shown?

F $y = (3)^x + 1$ G $y = 2(3^x + 1)$ H $y = 2(3^x)$ J $y = (2 \cdot 3)^x + 1$

(1,4) doesn't work

47. Find the domain and range

D: $\mathbb{R}$

R: $y > 1$

48. Solve: $2^{5x+4} = 512$

$2^{5x+4} = 2^9$

$5x + 4 = 9$

$-4 \quad -4$

$5x = 5$

$x = 1$

Yes!

$2^{5(1)+4} = 512$

$512 = 512$

49. A certain fast-growing bacteria increases 6% per minute. If there are 100 bacteria now, about how many will there be 12 minutes later?

F 172 G 201 H 48 J 190

.06

$100(1.06)^{12}$

201.2196...

50. A city's population is about 954,000 and is decreasing at an annual rate of 0.1%. Predict the population in 50 years.

A 577,176 B 906,300 C 1,002,888 D 907,450

subtract .001

$954{,}000(1 - .001)^{50}$

907,450.1653