Grade 9 Math Practice Midterm Examination

Section One: Selected Response

1. Which of the following numbers is a perfect square number?
   a) 0.0049 b) 0.049 c) 4.9 d) 490

2. What is the square root of $\frac{36}{81}$? $= \frac{6}{9} = \frac{2}{3}$
   a) 6 b) $\frac{6}{8}$ c) $\frac{6}{9}$ d) $\frac{1296}{6561}$

3. What is the square of $\frac{4}{9}$? $\left(\frac{4}{9}\right)^2 = \left(\frac{4}{9}\right)\left(\frac{4}{9}\right) = \frac{16}{81}$
   a) 2 b) $\frac{2}{3}$ c) $\frac{8}{18}$ d) $\frac{16}{81}$

4. A square garden has an area of 31.5 m2. What's a good estimate for the side length?
   a) 5.6 b) 7.9 c) 15.8 d) 30

   Side length $= \sqrt{\text{Area}}$
   $= \sqrt{31.5}$
   $= 5.6$

5. Which is the least power?
   a) $2^7 = 128$ b) $7^2 = 49$ c) $3^5 = 243$ d) $5^3 = 125$

6. What is 5^7 written as repeated multiplication?
   a) 5×7 b) 7×5 c) (7)(7)(7)(7)(7) d) (5)(5)(5)(5)(5)(5)(5)

7. Identify which statement is equivalent to 3^4
   a) (3)(3)(3)(3) b) 12 c) (4)(3) d) 3+3+3+3

8. Evaluate -5^3
   a) -15 b) -125 c) 125 d) 15

9. In the expression $(-3)^5$, what is -3 called?
   a) Base b) Exponent c) Power d) Product

10. What would $\frac{\left[3^2 \times \left(3^0 \times 3^3\right)^4\right]^2}{\left[3^{12} \div 3^5\right]}$ be written as a single power?

$= \frac{\left[3^2 \times (3^3)^4\right]^2}{3^7} = \frac{\left[3^2 \times 3^{12}\right]^2}{3^7} = \frac{\left[3^{14}\right]^2}{3^7}$

$= \frac{3^{28}}{3^7}$

$= 3^{21}$

   a) 3^{41} b) 3^{21} c) 3^{11} d) 3^1

11. What is -625 written as a power of 5?

a) -125 b) 5^4 c) -5^4 d) $(-5)^4$

12. Any power that has 0 as an exponent will evaluate to what answer?

a) 0 b) 1 c) -1 d) 10

13. Simplify. $-\frac{1}{3} \div \frac{5}{6} = -\frac{1}{3} \times \frac{6}{5} = -\frac{6}{15} = -\frac{2}{5}$

a) $-\frac{5}{18}$ b) $-\frac{2}{5}$ c) $\frac{5}{18}$ d) $\frac{2}{5}$

14. In what number sets would you find -2.5?

a) Integer b) Rational c) Whole d) Irrational

15. $\left(\frac{2}{3} - \frac{1}{6}\right)^2 - 4 = \left(\frac{4}{6} - \frac{1}{6}\right)^2 - 4 = \left(\frac{3}{6}\right)^2 - 4 = \left(\frac{1}{2}\right)^2 - 4 = \frac{1}{4} - \frac{4 \times 4}{1 \times 4} = \frac{1}{4} - \frac{16}{4} = -\frac{15}{4}$

a) 0 b) $\frac{4}{15}$ c) $-\frac{15}{4}$ d) -4

16. A cell phone carrier charges a base amount of $27.50 per month and 1.8 cents per minute, how much would you be charged if you used 30.5 minutes?

27.50 + 1.8 x 30.5

27.50 + 54.9

82.40

a) $0.55 b) $55.00 c) $28.05 d) $82.40

17. On a test with 60 questions, ¼ of the questions are multiple-choice. Sam got $^2/_5$ of the multiple choice questions correct. How many multiple choice questions did Sam get correct?

# of m.c = $\frac{1}{4} \times 60 = 15$

$\frac{2}{5} \times \frac{15}{1} = \frac{30}{5} = 6$

a) 6 b) 10 c) 12 d) 15

18. Which number is the greatest?

the # furtherest right on a # line

a) -2.2 b) $-\frac{17}{8} = -2.125$ c) $-\sqrt{5}$ -2.236 d) $-\frac{32}{15} = -2.1\overline{3}$

19. At 5 AM the temperature outside is 8 degrees. If the temperature increases on average 2.5 degrees an hour what should the temperature, in degrees Celsius, be at 12 noon?

a) 10.5 b) 17 c) 20 d) 25.5

7 hrs x 2.5 = 17.5

8 + 17.5 = 25.5

= 2.5 = 2.375

2.400
2.030
2.500
2.375

20. Order 2.4, 2.03, $\frac{5}{2}$, $\frac{19}{8}$ from least to greatest.

a) $\frac{19}{8}$, 2.4, $\frac{5}{2}$, 2.03
b) 2.4, $\frac{5}{2}$, 2.03, $\frac{19}{8}$
c) 2.03, $\frac{19}{8}$, 2.4, $\frac{5}{2}$
d) $\frac{5}{2}$, 2.4, $\frac{19}{8}$, 2.03

21. How many slices of pepperoni, each $\frac{1}{16}$ inch thick, can be cut from a stick that is 12 inches long?

a) 96
b) 192
c) 288
d) 384

$12 \div \frac{1}{16} = \frac{12}{1} \times \frac{16}{1} = 192$

22. Which sentence is not true?

a) $\frac{5}{12} < \frac{21}{50}$
b) $4\frac{4}{9} = 4.\overline{4}$
c) $\frac{6}{7} > 0.85$
d) $-7.\overline{5} > -7.5$

0.416 0.42 ✓

23. Choose the correct equation for the following graph

(0, 3)

a) y = 2x + 1	2(0)+1 = 1 ✗
b) y = 2x – 3	2(0)-3 = -3 ✓
c) y = -4 + 2x	-4+2(0) = -4 ✗
d) y = 9 – 3x	y=9-3(0)=9 ✗

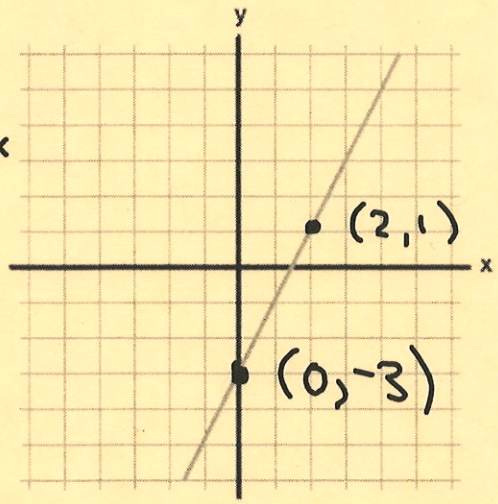
Check 2nd point

(2, 1)

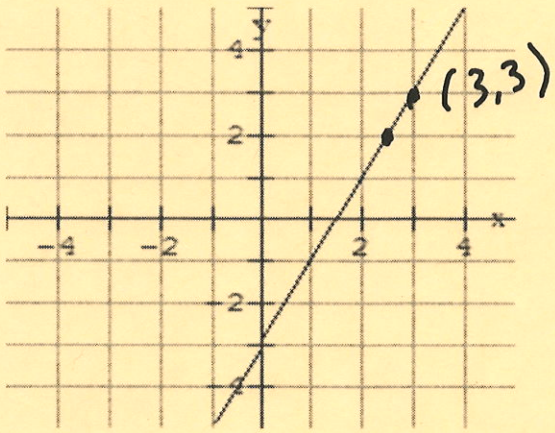
$1 \stackrel{?}{=} 2(2) - 3$

$1 \stackrel{?}{=} 4 - 3$

$1 = 1$ ✓



24. Use the following graph to solve questions 26 and 27



25. When x is equal to 3, then y is equal to....

a) -3 b) 1 c) 2 d) 3

26. When y is equal to 2, then x is equal to....

a) -1 b) 0.5 c) 2.5 d) 3

27. Which equation would create the following table of values?

a) $y = 4.50x + 100$
b) $y = 4.50x - 100$
c) $y = 100 - 4.50x$
d) $y = 100 + 4.50x$

x	y	
0	100	
1	95.5	-4.5
2	91	-4.5
3	86.5	-4.5
4	82	-4.5
5	77.5	-4.5

$-4.5x + 100 = y$

$y = 100 - 4.5x$

28. The equation $C = 0.30m + 20$ represents the cost of a monthly phone bill, where C equals cost and m equals number of minutes. Use this equation for #29 and #30.

29. How much will the bill be if you use 133 minutes?

a) $19.90 b) $59.90 c) $53.50 d) $376.60

$m = 133$ $C = 0.30m + 20$

$= 0.30(133) + 20$

$= 39.9 + 20$

$= 59.90$

30. If the bill costs 35 dollars, how many minutes were used?

a) 30.50 b) 45 c) 50 d) 52

$C = \$35$ $C = 0.30m + 20$

$35 = 0.30m + 20$

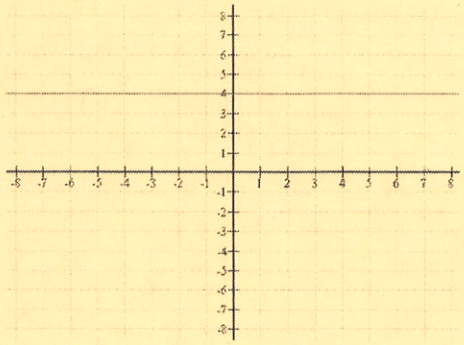
$-20 \quad -20$

$\frac{15}{0.30} = \frac{0.30m}{0.30}$

$m = 50$

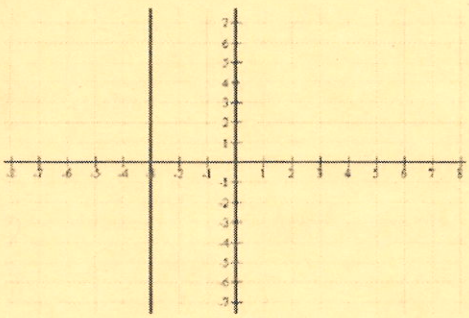
31. Determine the equation of the following graph.

a) x = -4
b) y = -4
c) x = 4
d) y = 4



32. Determine the equation of the following graph.

a) x = -3
b) y = -3
c) x = 3
d) y = 3



33. The equation 5 – y = 8 will create which one of the following graphs.

$5 - y = 8$
$-5 \quad -5$
$\frac{-y}{-1} = \frac{3}{-1}$
$y = -3$

a) horizontal line y = -3
b) horizontal line y = 3
c) vertical line y = -3
d) vertical line y = 3

34. For the equation, A=2n+3, determine the value of A when n is 4.

$= 2(4) + 3$
$= 8 + 3$
$= 11$

a) 1/ 2
b) 5
c) 6
d) 11

35. In the equation x+2y= 10 what is the value of y when x is 6.

$6 + 2y = 10$
$-6 \quad -6$
$\frac{2y}{2} = \frac{4}{2}$
$y = 2$

a) -2
b) 2
c) 4
d) 8

Section Two: Constructed Response

1. Samantha is answering a question on her Math Assignment and she states that the square root of 900 is 450. Is she correct? Explain your answer.

$\sqrt{900} = 30$. Samantha is incorrect, she halfed 900.

2. Write any number that has a square root between 2.3 and 2.4.

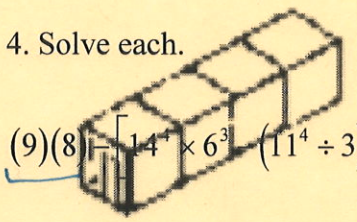
$(2.3)^2 = 5.29$

$(2.4)^2 = 5.76$

any # between 5.29 and 5.76

For example, 5.30 since $\sqrt{5.30} = 2.302$.

3. What is the surface area of the object below if each face is 1 cm²? (6 × #of cubes) - (2 × #of overlaps)



$= (6 \times 4) - (2 \times 3)$

$= 24 - 6$

$= 18\text{cm}^2$

4. Solve each.

$(9)(8) - \left[14^4 \times 6^3 - \left(11^4 \div 3\right)^4\right]^0$

$= 72 - [1]^0$

$= 72 - 1$

$= 71$

$\left[(3-5)^2 \times 5\right]^3 - (2)^3(4 \times 7^0)$

$= \left[(-2)^2 \times 5\right]^3 - 8(4 \times 1)$

$= [4 \times 5]^3 - 8(4)$

$= [20]^3 - 8(4)$

$= 8000 - 32$

$= 7968$

$$\frac{\left[(9-6)^3 \times (3^2)^4\right]}{(12 \div 4)^8}$$

$$= \frac{\left[3^3 \times (9)^4\right]}{3^8}$$

$$= \frac{27 \times 6561}{6561}$$

$$= \frac{177\,147}{6561}$$

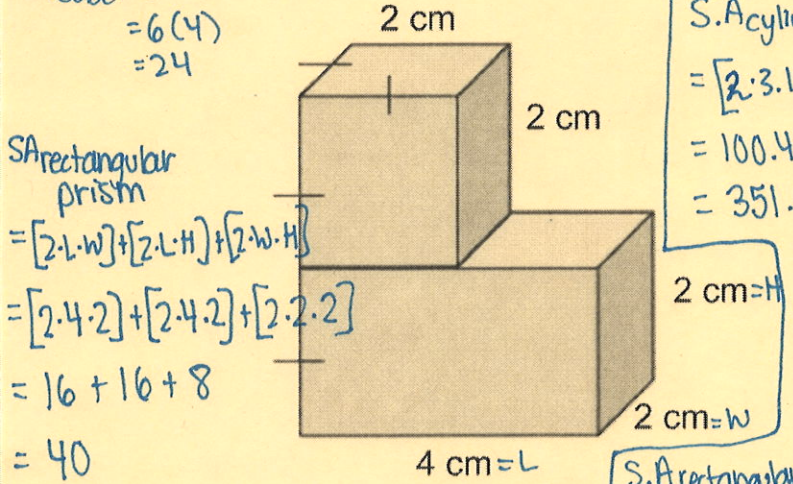
$= 27.$

5. Determine the surface area of these composite shapes.

$SA_{cube} = 6(2 \times 2)$

$= 6(4)$

$= 24$



$SA_{rectangular\ prism} = [2 \cdot L \cdot W] + [2 \cdot L \cdot H] + [2 \cdot W \cdot H]$

$= [2 \cdot 4 \cdot 2] + [2 \cdot 4 \cdot 2] + [2 \cdot 2 \cdot 2]$

$= 16 + 16 + 8$

$= 40$

overlap $= 2(2 \times 2) = 8$

T.S.A $= 24 + 40 - 8$

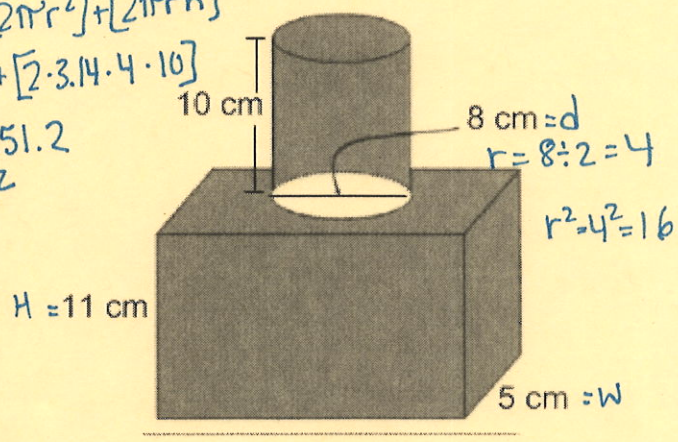
$= 56\text{cm}^2$

$S.A_{cylinder} = [2\pi r^2] + [2\pi rh]$

$= [2 \cdot 3.14 \cdot 4^2] + [2 \cdot 3.14 \cdot 4 \cdot 10]$

$= 100.48 + 251.2$

$= 351.68\text{cm}^2$



$r = 8 \div 2 = 4$

$r^2 = 4^2 = 16$

$S.A_{rectangular\ prism} = [2 \cdot L \cdot W] + [2 \cdot L \cdot H] + [2 \cdot W \cdot H]$

$= [2 \cdot 15 \cdot 5] + [2 \cdot 15 \cdot 11] + [2 \cdot 5 \cdot 11]$

$= 150 + 330 + 110$

$= 810$

overlap $= 2(\pi r^2)$

$= 2(3.14 \times 4^2)$

$= 100.48$

T.S.A $= 351.68 + 810 - 100.48$

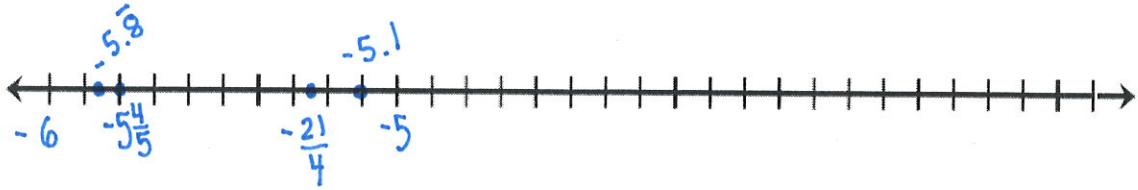
$= 1061.2\text{cm}^2$

6. Find two rational numbers between $\frac{-17}{3}$ and -6.

$\frac{-17}{3} = -5.\overline{6}$

Answers may vary
example, -5.75

7. Arrange these numbers on the number line. $-5.\overline{8}, -5\frac{4}{5}, -5.1, \frac{-21}{4} = -5\frac{1}{4}$



8. Solve

$\left(\frac{-5}{6}\right) \times \frac{1}{4} + \frac{5}{12}$

$\frac{-5}{24} + \frac{5 \times 2}{12 \times 2}$

$\frac{-5}{24} + \frac{10}{24}$

$\frac{5}{24}$

$-1.8 \div (-0.3) + \left[5.1 - \left(-\frac{29}{10}\right)\right]^2$

$-1.8 \div (-0.3) + [5.1 - (-2.9)]^2$

$-1.8 \div (-0.3) + (8)^2$

$-1.8 \div (-0.3) + 64$

$6 + 64$

70

10. A bank account shows the following transactions for the Grade 9 Prom committee:

Jan. 1	Deposit	$225.50
Jan. 2	Withdrawal – DJ	- $625.00
Jan. 3	Withdrawal - Decorations	- $573.41
Jan. 4	Monthly Service Fee	- $ 6.48
Jan. 5	Deposit – Fundraising	$964.56
		- 14.83

A) The opening balance on Dec. 31st was $1105.55; determine the balance on Jan. 6th.

$(1105.55) + (-14.83) = \$1090.72$

B) If the prom committee wants to rent a Bouncy Castle on Jan. 6 that costs $1495.60, how much more money will they need to cover the cost?

$1090.72 - 1495.60 = -404.88$

They will need an extra $404.88

11. Stanley has a recipe which makes 36 chocolate chip cookies. The recipe requires 2 1/3 cups of oatmeal, 1 cup of chocolate chips, 2 1/2 cups of flour, 3 eggs, 1/2 cup of butter, 15 ml of baking powder, and 5 ml of salt. If he wants to adjust the recipe to make 48 cookies how many cups of oatmeal does he need?

$36 = 2\frac{1}{3}$

$48 = x$

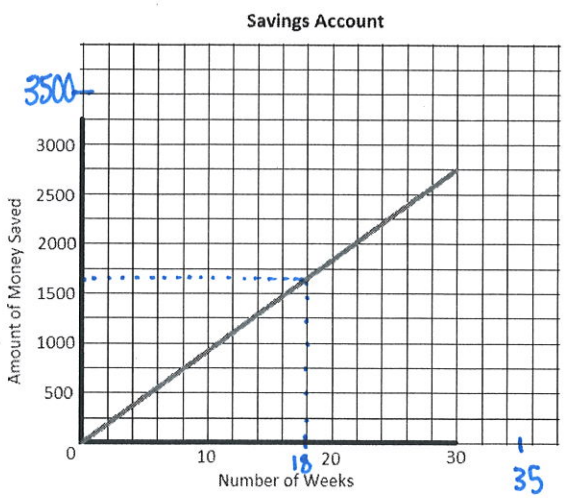
$(2\frac{1}{3} \times 48) \div 36$

$(\frac{7}{3} \times 48) \div 36$

$112 \div 36$

$3\frac{1}{9}$

12. This graph represents Rachel's savings account over the period of several weeks.



A) Estimate the amount of money Rachel has saved by week 18? Is this interpolation or extrapolation?

$1600, this is interpolation because it's inside the given data values.

B) Estimate the amount of money she will have saved by week 35? Is this interpolation or extrapolation?

, extrapolation because it's outside the given data values.

C) Predict how long it will take her to save $3500. What assumptions are you making?

13. Rachel has a blockbuster rewards membership. It costs $20 a year for the membership and each movie she rents costs her $4.80. Create a table that shows the cost for Rachel when she rents up to 5 movies.

Movies Rented	1	2	3	4	5
Cost ($)	24.80	29.60	34.40	39.20	44

A) Write an equation that relates the cost, C, to the number of movies, n.

$C = 20 + 4.80n$

B) What will the charge be when if she rents 14 movies?

$n = 14$

$C = 20 + 4.80n$

$= 20 + 4.80(14)$

$= 20 + 67.20$

$= \$87.20$

C) How many movies did she rent if she spent $130.40 ?

$C = \$130.40$

$C = 20 + 4.80n$

$130.40 = 20 + 4.80n$

$-20 \quad -20$

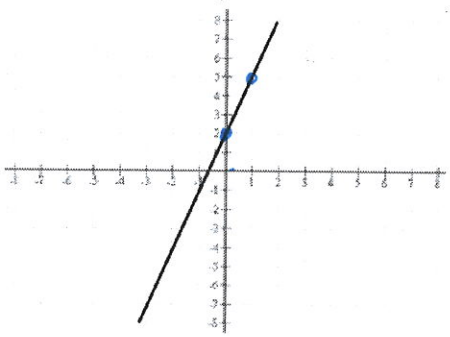
$\frac{110.40}{4.80} = \frac{4.80n}{4.80}$

$n = 23$

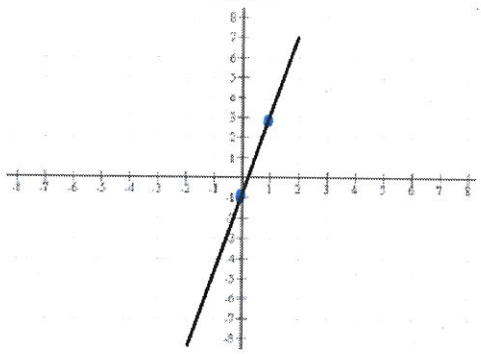
14. Match the following equations to the following graphs. Show ALL your workings.

a) $-2y + 2 = 4x$	b) $y - 3x = 2$	c) $4x - y = 1$	d) $- x - y = 4$
$x=0$ $-2y+2=4(0)$ $-2y+2=0$ $-2 \quad -2$ $\frac{-2y}{-2} = \frac{-2}{-2}$ $y=1$ $(0,1)$	$x=0$ $y-3(0)=2$ $y=2$ $(0,2)$	$x=0$ $4(0)-y=1$ $0-y=1$ $\frac{-y}{-1} = \frac{1}{-1}$ $y=-1$ $(0,-1)$	$x=0$ $0-y=4$ $\frac{-y}{-1} = \frac{4}{-1}$ $y=-4$ $(0,-4)$
$x=1$ $-2y+2=4(1)$ $-2y+2=4$ $-2 \quad -2$ $\frac{-2y}{-2} = \frac{2}{-2}$ $y=-1$ $(1,-1)$	$x=1$ $y-3(1)=2$ $y-3=2$ $+3 \quad +3$ $y=5$ $(1,5)$	$x=1$ $4x-y=1$ $4(1)-y=1$ $4-y=1$ $-4 \quad -4$ $\frac{-y}{-1} = \frac{-3}{-1}$ $y=3$ $(1,3)$	$x=1$ $-(1)-y=4$ $-1-y=4$ $+1 \quad +1$ $\frac{-y}{-1} = \frac{5}{-1}$ $y=-5$ $(1,-5)$
Graph 4	Graph 1	Graph 2	Graph 3

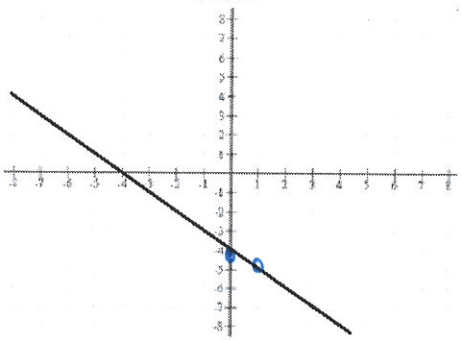
Graph 1



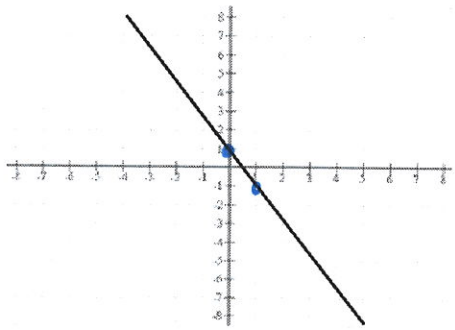
Graph 2



Graph 3



Graph 4



15. For each of the equations below: Fill in a table of values and graph.

$2x - y = 4$

x	y
-2	-8
0	-4
2	0

X=-2

$2x - y = 4$

$2(-2) - y = 4$

$-4 - y = 4$

$+4 \quad +4$

$\frac{-y}{-1} = \frac{8}{-1}$

$y = -8$

X=0

$2x - y = 4$

$2(0) - y = 4$

$0 - y = 4$

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

$y = -4$

X=2

$2x - y = 4$

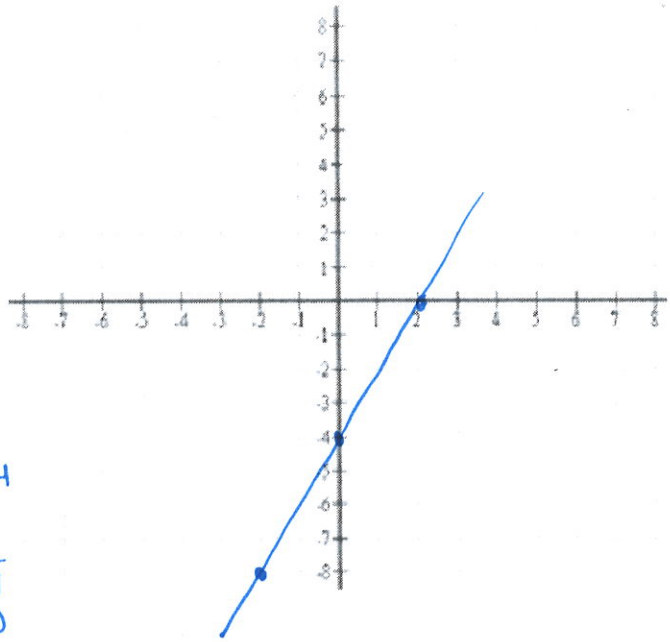
$2(2) - y = 4$

$4 - y = 4$

$-4 \quad -4$

$\frac{-y}{-1} = \frac{0}{-1}$

$y = 0$



$-x + 2y = 6$

[8]

x	y
-4	1
0	3
4	5

X=-4

$-x + 2y = 6$

$-(-4) + 2y = 6$

$4 + 2y = 6$

$-4 \quad -4$

$\frac{2y}{2} = \frac{2}{2}$

$y = 1$

X=0

$-x + 2y = 6$

$0 + 2y = 6$

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

X=4

$-x + 2y = 6$

$-(4) + 2y = 6$

$-4 + 2y = 6$

$+4 \quad +4$

$\frac{2y}{2} = \frac{10}{2}$

$y = 5$