Math 10
Final Review ("Warm Up")

Name Key.
Date:_____ Blk___

Chp 1. Conversions between Metric and Imperial Units

1. Convert each measurement to the nearest tenth.

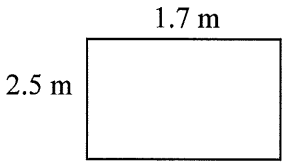
a) 16 in = 40.6 cm b) 5 yd = 4.6 m c) 6 mi = 9.7 km

d) 19 m = 62.3 ft e) 150 km = 93.2 mi f) 10 lb = 4.5 kg

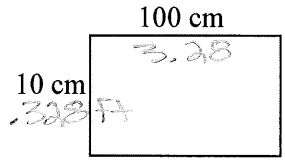
2. Convert Between SI Units for Area

Determine the area of each rectangle for the given square unit

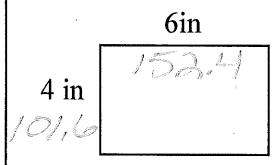
a) area: 42500 cm^2



b) area: 1.1 ft^2



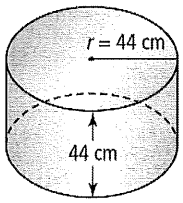
c) area: 15000 mm^2



Chp 2. Surface Area and Volume

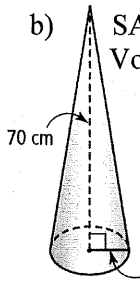
1. Find the surface area and volume for each 3-D figure.

a) SA_____
Volume_____



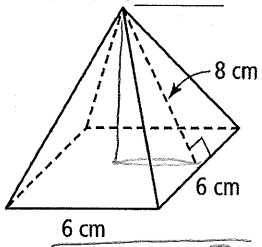
SA = 24328 cm^2
Vol = 267613 cm^3

b) SA_____
Volume_____



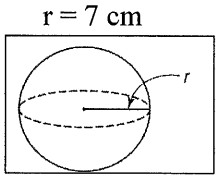
SA = 6720 cm^2
Vol = 38778 cm^3

c) SA_____
Volume_____



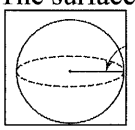
$h = \sqrt{8^2 - 3^2}$
$= 7.416$
SA = 132 cm^2
Vol = 89 cm^3

d) SA_____
Volume_____



SA = 616 cm^2
Vol = 1437 cm^3

2. The surface area of a sphere is 459 cm^2. Find the diameter.



$d = \sqrt{\frac{459}{\pi}} = 12 cm$

Chp 3. Trigonometry: *SOH-CAH-TOA* make sure calculator in degree mode.

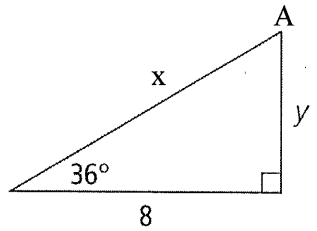
1. Solve the following.

a) tan 72° = 3.0777 b) sin 42° = 0.6691 c) cos 68° = 0.3746

d) tan A = 2.580
A = 68.8° e) sin A = 0.4384
A = 26.0° f) cos A = 0.2079
A = 78.0°

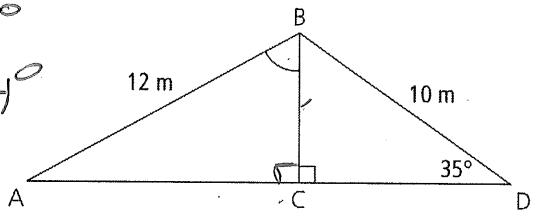
2. Find the unknown values.

∠A = 54°
x = 9.9
y = 5.8



3. Solve the following angles and lengths.

∠ABC = 61.6°
∠A = 28.4°
BC = 5.7
AD = 18.7

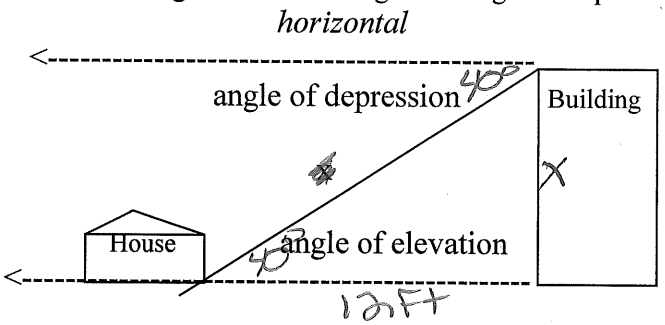


$\overline{BC} = 10\sin 35° = 5.735764$

$AD = \sqrt{12^2 - 5.7^2} + \sqrt{10^2 - 5.7^2}$

$\cos B = \frac{5.7}{12}$

4. Determine the height of the building if the angle of depression is 40°. The building is 12 feet from the house.



$\tan 40° = \frac{x}{12}$

x = 10.1 ft

Chp 4. Exponents and Radicals

1. Determine whether each of the following is a perfect square, perfect cube, both or neither.

a) 196 yes (13) b) 81 yes (9) c) 343 no

2. Determine the prime factorization for each value.

a) 200 2x2x5x2x5 b) 729 9x9x9 =>
3x3x3x3x3x3

3. Evaluate.

a) $\sqrt{289}$ $= 17$

b) $\sqrt[3]{5832}$ $= 18$

4. Convert from a power to a radical

a) $64^{1/2}$ $= \sqrt{64}$

b) $16^{3/4}$ $= \sqrt[4]{16^3}$

c) $(8x^2)^{1/3}$ $\sqrt[3]{8x^2}$

5. Convert from a Radical to a Power.

a) $\sqrt[4]{4^3}$ $= 4^{3/4}$

b) $\sqrt[5]{3^4}$ $= 3^{4/5}$

c) $\sqrt{y^3}$ $y^{3/2}$

6. Convert Mixed Radicals to Entire Radicals

a) $5\sqrt{11}$ $= \sqrt{275}$

b) $2\sqrt[3]{5}$ $= \sqrt[3]{40}$

c) $1.5\sqrt[3]{6}$ $= \sqrt[3]{20.25}$

7. Convert Entire Radicals to Mixed Radicals

a) $\sqrt{27}$ $= 3\sqrt{3}$

b) $\sqrt{50}$ $5\sqrt{2}$

c) $\sqrt[4]{80}$ $2\sqrt[4]{5}$

8. Write each expression with positive exponents.

a) $3c^{-4}$ $\frac{3}{c^4}$

b) $\left(\frac{4}{7}\right)^{-2}$ $\frac{7^2}{4^2}$

c) $\frac{2^{-3}}{3^{-2}}$ $\frac{3^2}{2^3}$

d) $-5x^{-3}y^{-2} =$ $\frac{-5}{x^3y^2}$

9. Simplify each expression. State the answer using positive exponents.

a) $\left[(4)(2^{-3})\right]^{-2}$

$\frac{2^6}{4^2} = 4$

b) $(-3m^2n)(-4m^4n^{-2})$

$\frac{12m^6}{n}$

c) $\left(\frac{6mn^3}{4m^2n}\right)^2$

$\frac{9n^4}{4m^2}$

d) $\frac{\left[4x^{\frac{1}{3}}\right]^{\frac{1}{2}}(9x)^{-\frac{3}{2}}}{(27x)^{-\frac{1}{3}}}$

$\frac{(4^{1/2}x^{\frac{1}{6}})(27^{1/3}x^{1/3})}{9^{3/2}x^{3/2}}$

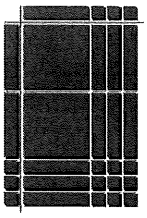
$\frac{(2)(3)}{27x} = \frac{2}{9x}$

e) $\frac{\left[q^{-\frac{2}{3}}\right]\left[q^{\frac{1}{3}}\right]}{q^{\frac{4}{3}}}$

$\frac{1}{= q^{5/3}}$

Chp 5. Polynomials

1.What product does the diagram below represent? Assume all tiles are positive.



$(x+3)(2x+3) = 2x^2+9x+9$

2. Find the product .

a) $(x-3)(2x+1)$

$3x^2\ 5x-3$

b) $(5m-1)(2m-3)$

$10m^2-17m+3$

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

$2x^3-5x^2+x+4x^2-10x+2$

$2x^3-x^2-9x+2$

d) $(x+14)(x-14)$

x^2-196

e) $(y+10)^2$

$y^2+20y+100$

f) $(8-m)^2$

$64-2m+m^2$

3. Factor the polynomials.

a) $15x^2+10x^2$ $5x^2(3+2)$

$52x^2$ or $(5x)^2$

b) $7a^2b-28ab+14ab^2$

$7ab(a-4+2b^2)$

c) $3x(x-4)+5(x-4)$

$(3x+5)(x-4)$

d) $y^2+8xy+2y+16x$

$y(y+2)+8x(y+2)$

$(8x+y)(y+2)$

e) x^2+4x+6 P: 6 S: 4

NF

f) $x^2-29x+28$ P: 28 S: -29

$(x-28)(x-1)$

g) $3x^2+2x+4$ P: 12 S: 2

NF

h) $6x^2-5xy+y^2$ $-6, 1$ $6x^2-6xy-xy+y^2$

$6x(x-y)-y(x-y)$

$(6x-y)(x-y)$

4. Factor these special polynomials: Difference of Squares and Perfect Squares

a) $x^2 - 9$

$(x+3)(x-3)$

b) $25a^2 - 16c^2$

$(5a+4c)(5a-4c)$

c) $x^2 - 6x + 9$

$(x-3)^2$

d) $2x^2 - 44x + 242$ $\quad 2(x^2 - 22x + 121)$

$2(x-11)^2$

e) $16x^2 - 4y^2 = 4(4x^2 - y^2)$

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

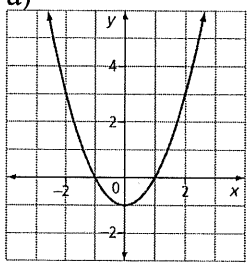
f) $9x^3 - 36x$ $\quad 9x(x^2-4)$

$9x(x+2)(x-2)$

Chp 6. Relations and Functions

1. Use set notation to determine the domain and range of each relation.

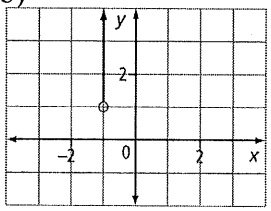
a)



Domain: $\{x \mid x \in R\}$

Range: $\{y \mid -1 \leq y, y \in R\}$

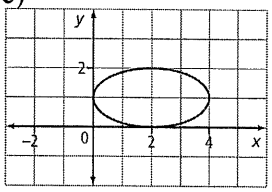
b)



Domain: $\{x \mid x = -1, x \in R\}$

Range: $\{y \mid 1 < y, y \in R\}$

c)



Domain: $\{x \mid 0 \leq x \leq 4, x \in R\}$

Range: $\{x \mid 0 \leq y \leq 2, y \in R\}$

2. For the function $f(x) = 3x + 7$, determine

a) $f\left(\frac{1}{3}\right) = 3(1/3) + 7$
$= 8$

b) $f(-2) = 3(-2) + 7$
$= 1$

c) x if $f(x) = 34$

$34 = 3x + 7$
$27 = 3x$
$\boxed{9 = x}$

3. For the function $g(x) = \frac{1}{4}x + \frac{3}{4}$, determine

a) $g(5) = \frac{1}{4}(5) + \frac{3}{4}$
$= \frac{8}{4} = 2$

b) $g(-3) = \frac{1}{4}(-3) + \frac{3}{4}$
$= 0$

c) x if $g(x) = -\frac{3}{2}$

$-\frac{3}{2} = \frac{1}{4}x + \frac{3}{4}$
$-\frac{9}{4} = \frac{1}{4}x$
$\boxed{x = -9}$

4. Use the slope formula to determine the slope of the line passing through each pair of points.

a) A(2, –1), B(3, 4)

$m = \frac{4-(-1)}{3-2} = \frac{5}{1} = 5$

b) C(0, 7), D(–3, 7)

$m = \frac{7-7}{-3-0} = 0$

c) G(4, –2), H(4, –5)

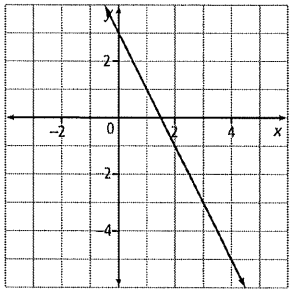
$m = \frac{-5-(-2)}{4-4}$

undefined.

Chp 7. Linear Equations and Graphs

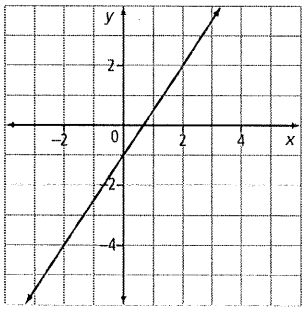
1. Determine the equation of each line.

a)



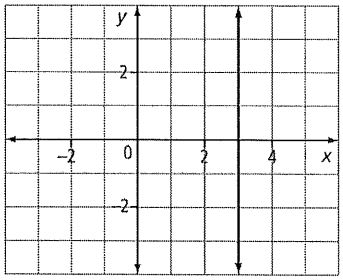
$y=-2x+3$

b)



$y=\frac{3}{2}x-1$

c)



$x=3$

2. Determine the slope and y-intercept of each line.

a) $4x + 2y = 12$

$y=-2x+6$

$m=-2$ yint: $(0,6)$

b) $3x - 2y - 600 = 0$

$y=\frac{3}{2}x-300$

$m=\frac{3}{2}$ yint: $(0,-300)$

3. Given the equation $y = 4x + b$, and a point on the graph of a line, find b.

a) $(2, 4)$ $4=4(2)+b$

$b=-4$

b) $(-3, 7)$ $7=4(-3)+b$

$19=b$

4. Convert slope-intercept form to the General Form.

a) $y=-\frac{2}{3}x+6$

$2x+3y-18=0$

b) $y=\frac{3}{4}x-2$

$3x+4y-8=0$

5. Given the following equation, find the x-intercept and y-intercept. Then graph each equation on the grid.

a) $y = 7x + 9$

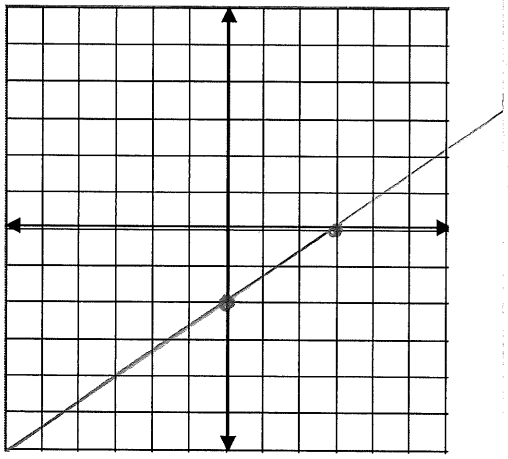
yint: $(0,9)$

xint: $(\frac{-9}{7},0)$

b) $4x - 6y - 12 = 0$

yint: $(0,-2)$

xint: $(3,0)$



6. Write the equation of a line, given a point on the line and the slope, m.

a) Given $(-2, 5)$ and slope $= -3$

$y-5=-3(x+2)$

b) Given $(3,-4)$ and slope $= 2$

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

7. State whether the lines in each pair are parallel, perpendicular or neither.

a) $y = 4x + 3$
$y = 4x - 5$

parallel

b) $y = 3x - 6$
$y = -2/3x + 4$

neither

c) $y = 2x + 6$
$6x + 3y + 3 = 0$

neither

8. Write an equation perpendicular to $y = 3x - 4$ and passes through (6, 5)

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

$y - 5 = \frac{-1}{3}(x - 6)$

9. Write an equation perpendicular to: $2x - y + 4 = 0$ and passes through (1,-6) $y = 2x + 4$

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

$y + 6 = \frac{-1}{2}(x - 1)$

Chp 8. Solving Systems of Linear Equations Graphically

1. Is the given point a solution to the system of linear equations? Justify your answer.

a) $y = 5x + 13$ (4, 7)
$y = -7x - 35$

NO

$7 = 5(4) + 13$

$7 \neq 33$

b) $4x - 5y = 20$ (–5, –8)
$x + 3y = -29$

$-5 + 3(-8) = -29$

$-29 = -29$

yes

$4(-5) - 5(-8) = 20$

$20 = 20$

2. Predict the number of solutions for each system of linear equations. Justify your answers.

a) $y = 5x - 1$
$y = 4x + 3$

1 soln

different m

b) $2x + 3y = 20$
$6x - y = 20$

parallel

different y int

no soln

c) $x - 5y = 1$
$-x + 5y = 1$

same line

∞ soln

3. In the system of linear equations $y = 8x + 5$ and $y = 8x + b$, what values of b will result in a system that has

a) **no** solution?

any number except for 5

b) an **infinite** number of solutions?

$b = 5$

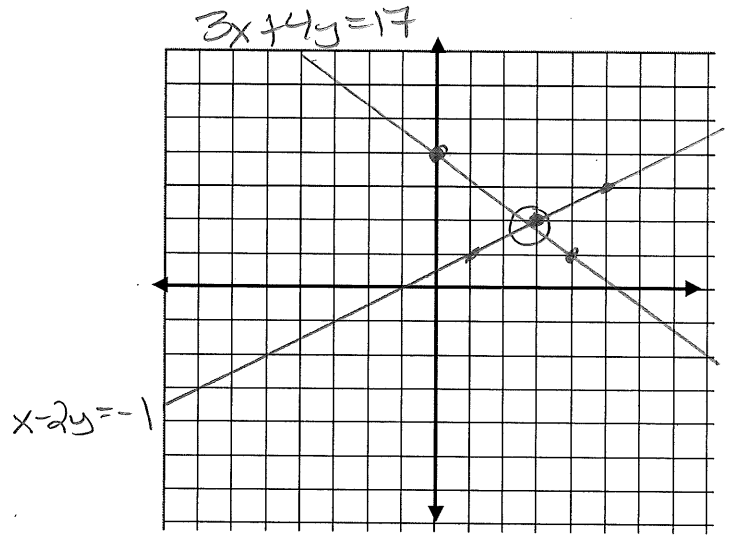
4. Graph the system of linear equations on the grid. Determine the solution to the system.

$3x + 4y = 17$
$x - 2y = -1$

$y = -\frac{3}{4}x + \frac{17}{4}$

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

soln $\approx (3, 2)$



Chp 9. Solving Systems of Linear Equations Algebraically

1. Solve by **substitution.**

a) $y = -5x - 8$ ①

$y = 4x + 1$ ②

$4x+1 = -5x-8$

$9x = -9$

$x = -1$

$y = 4(-1)+1$

$y = -3$

b) $x + y = 9 \rightarrow y = -x+9$

$-10x + 6y = 6$

$-10x+6(-x+9) = 6$

$-10x-6x+54 = 6$

$-16x = -48$

$x = 3$

$y = -3+9$

$y = 6$

c) $\frac{x}{2} + \frac{y}{3} = 6$

$3x - 2y = 12$

$(8, 18)$

2. Solve by **elimination.**

a) $5 = 6x + 2y$

$2y = x + 5$

soln $(0, \frac{5}{2})$

b) $3x + 2y = 0$

$8x + 7y = 5$

$(-2, 3)$

c) $\frac{1}{2}x - \frac{3}{2}y = -4$

$x + 7y = 12$

$(-2, 2)$

3. A small plane took 3 hours to fly 960 km from Ottawa to Halifax with a tailwind. On the return trip, flying into the wind, the plane took 4 hours. Find the wind speed and the speed of the plane in still air.

Equation 1: $3p+3w = 960$
Equation 2: $4p-4w = 960$

Wind speed 40 Km/h
Plane speed 280 Km/h

4. A spa is offering two deals. Clients can get five facials and three manicures for $128, or two facials and three manicures for $62. What are the special prices of a facial and a manicure? (2 marks)

Equation 1: $5f+3m = 128$
Equation 2: $2f+3m = 62$

Facial $22
Manicure $18

5. For a spirit rally, students on the school baseball team sell T-shirts. The cost of the T-shirts includes a $500 design fee plus $5 per T-shirt. They plan to sell the T-shirts for $25 each. The break-even point is when the cost to design and purchase the items equals the money earned by selling the items. How many T-shirts must the team sell in order to break even?

Equation 1 (Cost): $C = 500+5t$
Equation 2 (Money earned): $C = 25t$

$25t = 500+5t$

$20t = 500$

$t = 25$

need to sell 25 t-shirts to break even