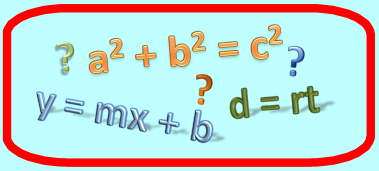
Math 115

Fall 2018

Lecture 5



Review on Ch.2:

① Simplify: $2(x-4)+2x+8$

$= 2x - 8 + 2x + 8 = \boxed{4x}$

② Evaluate $\dfrac{x+4}{x-8}$ for

$x=0$, $x=-4$, and $x=8$.

$\dfrac{0+4}{0-8} = \dfrac{4}{-8} = \boxed{\dfrac{-1}{2}}$

$\dfrac{-4+4}{-4-8} = \dfrac{0}{-12} = \boxed{0}$

$\dfrac{8+4}{8-8} = \dfrac{12}{0}$ undefined $\not\exists$

③ Simplify: $-3(x^2+5x-8)+6(x^2-3x-4)-2x^2$

$= -3x^2 - 15x + 24 + 6x^2 - 18x - 24 - 2x^2$

$= 1x^2 - 33x = \boxed{x^2 - 33x}$

Solve, Place your final answer in a Solution Set.

a) $2x - 7 = -17$

$2x = -17 + 7$

$2x = -10$

$x = \frac{-10}{2}$

$\boxed{x = -5}$ → $\{-5\}$

b) $4x + 12 = -2x - 48$

$4x + 2x = -48 - 12$

$6x = -60$

$x = \frac{-60}{6}$ $\boxed{x = -10}$

$\{-10\}$

c) $\frac{2}{3}x - \frac{1}{4} = \frac{1}{2}x + \frac{5}{6}$

LCD = 12

$12 \cdot \frac{2}{3}x - 12 \cdot \frac{1}{4} = 12 \cdot \frac{1}{2}x + 12 \cdot \frac{5}{6}$

$8x - 3 = 6x + 10$

$8x - 6x = 10 + 3$

$2x = 13$

$\boxed{x = \frac{13}{2}}$

$x = 6\frac{1}{2}$

$x = 6.5$

$\{\frac{13}{2}\}$

d) $-4(2x + 1) = -5x + 5$

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

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

$-3x = 9$

$\boxed{x = -3}$ ⇒ $\{-3\}$

e) $\frac{3x - 2}{5} = \frac{x + 2}{2}$

Cross-Multiply

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

$6x - 4 = 5x + 10$

$6x - 5x = 10 + 4$

$\boxed{x = 14}$ $\{14\}$

f) $4(x - 2) - 2(3 + 2x) = 14$

$4x - 8 - 6 - 4x = 14$

$-14 = 14$

false

No Solution

$\emptyset$ or $\{\ \}$

when we have an equation with more than one variable, we have a formula.

$A = LW$, $A = S^2$, $A = \frac{bh}{2}$ $A = \pi r^2$

$P = 2L + 2W$, $P = 4S$, $P = a + b + c$, $C = \pi d$

$3x + 2y = 6$, $2x - 5y = 15$, $\frac{2}{3}x - \frac{3}{4}y = 1$

Solve $A = LW$ for W.

Isolate W.

$A = L \cdot W$

Divide by L

$\frac{A}{L} = \frac{LW}{L}$

$\frac{A}{L} = W$

Solve for L: $P = 2L + 2W$

Isolate L

$P - 2W = 2 \cdot L$

$\frac{P - 2W}{2} = \frac{2 \cdot L}{2}$

$\frac{P}{2} - \frac{2W}{2} = \frac{2L}{2}$

$\frac{P - 2W}{2} = L$

$\frac{P}{2} - W = L$

Same

Solve for y: $2x + 3y = 6$

$3y = -2x + 6$

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

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

ch.3 Slope-Int form

Solve for y, write answer in $y = mx + b$ form:

$5x - 4y = 8$

$-4y = -5x + 8$

$\frac{-4}{-4}y = \frac{-5}{-4}x + \frac{8}{-4}$

$y = \frac{5}{4}x - 2$

Use LCD to clear fractions, then solve for y: $\frac{x}{4} + \frac{y}{5} = 1$

LCD = 20

$20 \cdot \frac{x}{4} + 20 \cdot \frac{y}{5} = 20 \cdot 1$

$5x + 4y = 20$

$4y = -5x + 20$

$\frac{4}{4}y = \frac{-5}{4}x + \frac{20}{4}$

$y = \frac{-5}{4}x + 5$

Type of equations

When the linear equation has	Equation is called
exactly one Solution	Conditional
infinitely many Solutions	Identity
No Solution	Contradiction

To determine the type of equation → first solve

Determine the type of equation

1) $3(2x-1)+4 = x-21$

$6x-3+4 = x-21$

$6x-x = -21-1$

$5x = -22$

$x = \frac{-22}{5}$ Conditional

2) $2(3x+5)-2x+8 = 4(x+3)+6$

$6x+10-2x+8 = 4x+12+6$

$4x+18 = 4x+18$

$4x-4x = 18-18$

$0 = 0$

True → I.N.O.S.

Identity

3) $5(3-2x)+4(3x+5) = 2x-35$

$15-10x+12x+20 = 2x-35$

$2x+35 = 2x-35$

$35 = -35$

False → $\emptyset$

Contradiction

Find the ratio of 2.5 to 3.

$\frac{2.5}{3} = \frac{2.5(10)}{3(10)} = \frac{25}{30} = \boxed{\frac{5}{6}}$ 5 to 6 , 5:6

True proportion or not? $\frac{3\frac{1}{2}}{2\frac{2}{3}} \stackrel{?}{=} \frac{\frac{3}{8}}{\frac{2}{7}}$

$3\frac{1}{2}\cdot\frac{2}{7} \stackrel{?}{=} 2\frac{2}{3}\cdot\frac{3}{8}$

$\frac{7}{2}\cdot\frac{2}{7} \stackrel{?}{=} \frac{8}{3}\cdot\frac{3}{8} \Rightarrow 1 = 1$ ✓

Solve

① $\frac{x}{8} = \frac{-3}{5}$

$5x = 8(-3)$

$5x = -24$

$x = \frac{-24}{5}$

$\boxed{x = -4.8}$

$\{-4.8\}$

② $\frac{x-3}{x+2} = \frac{2}{3}$

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

$3x - 9 = 2x + 4$

$3x - 2x = 4 + 9$

$\boxed{x = 13}$

$\{13\}$

③ $\frac{3x+1}{4x-5} = \frac{3}{4}$

$4(3x+1) = 3(4x-5)$

$12x + 4 = 12x - 15$

$4 = -15$

false $\rightarrow \emptyset$

Raul painted 3 rooms in 8 days. At this rate, how many rooms of the same type can he paint in 20 days? Round up

Your ans is a whole #.

$$\frac{3 \text{ Rooms}}{8 \text{ Days}} = \frac{x \text{ Rooms}}{20 \text{ Days}}$$

About 8 Rooms

Solve

$$\frac{3}{8} = \frac{x}{20}$$

$$8x = 3(20)$$

$$8x = 60$$

$$x = \frac{60}{8}$$

$$x = 7.5$$

1.75 cm is for 250 miles on the map. The actual distance between two cities is 1000 miles, how far apart are they on the map?

$$\frac{1.75 \text{ cm}}{250 \text{ miles}} = \frac{x \text{ cm}}{1000 \text{ miles}}$$

Solve

$$\frac{1.75}{250} = \frac{x}{1000}$$

$$250x = 1.75(1000)$$

$$x = \frac{1.75(\cancel{1000}^{4})}{\cancel{250}}$$

$$x = 1.75(4)$$

$$x = 7$$

7 cm apart.

An NFL quarterback throws 2 intercepts for every 45 passes. How many intercepts should we expect in a year when he is making 500 passes?

$$\frac{2 \text{ int}}{45 \text{ passes}} = \frac{x \text{ ints.}}{500 \text{ passes}}$$

$$\frac{2}{45} = \frac{x}{500} \qquad 45x = 2(500)$$

$$x = \frac{1000}{45} \qquad x = 22.\overline{2}$$

About 22 interceptions

what is 4% of 500?

$$x = \frac{4}{100} \cdot 500$$

$x = 20$

4% of 500 is 20.

$$\frac{P}{100} = \frac{\text{Part}}{\text{whole}}$$

$$\frac{4}{100} = \frac{x}{500}$$

$$100x = 4(500$$

$$x = \frac{4(500)}{100}$$

$x = 20$

6% of what is 900?

$\frac{6}{100} \cdot x = 900$

$.06x = 900$

$x = \frac{900}{.06}$ $x = 15000$

6% of 15000 is 900.

$\frac{P}{100} = \frac{\text{Part}}{\text{whole}}$

$\frac{6}{100} = \frac{900}{x}$

$6x = 100(900)$

$x = \frac{100(900)}{6}$

$x = 15000$

what percent of 400 is 600?

$\frac{P}{100} \cdot 400 = 600$

$4P = 600$

$P = 150$

150% of 400 is 600.

$\frac{P}{100} = \frac{\text{Part}}{\text{whole}}$

$\frac{P}{100} = \frac{600}{400}$

$4P = 100(6)$

$P = \frac{600}{4}$

$P = 150$

Ben is a real estate agent.

He made 6% of a Sale at $250,000.

how much was his commission?

His Commission is 6% of Sale.

$$x = \frac{6}{100} \cdot 250000$$

$$= 6(2500) = 15000$$

His Commission was $15000.

Maria scored 86% of a test with 35 questions. How many correct answer did she get?

# of correct ans is 86% of 35

$$x = \frac{86}{100} \cdot 35$$

$$= .86(35)$$

$$= 30.5$$

about 31 correct ans.

TV is marked @$800.

It is on sale @ 25% off.

Sale's tax is 8.5% of selling Price.

Roxana is buying this TV.

① Amount of discount ③ Amount of tax

② Selling (discounted) Price ④ Total Cost.

Amount of discount = 25% of Reg. Price

$= .25(800) = \boxed{\$200}$

Discount price = 75% of Reg. Price

$= .75(800) = \boxed{\$600}$

Sale's tax = 8.5% of Selling Price

$= .085(600)$

$= \$51$

Total cost = Selling Price + Amount of tax

$= \boxed{\$651}$

① Solve for b: $A = \frac{bh}{2}$

LCD = 2

$2A = 2 \cdot \frac{bh}{2}$

$2A = bh$

Divide by h

$\frac{2A}{h} = \frac{bh}{h}$

$\boxed{b = \frac{2A}{h}}$

Given $3x - 5y = -15$

a) Find y when x is 0.

$3(0) - 5y = -15$

$0 - 5y = -15$

$-5y = -15$

$y = \frac{-15}{-5}$

$\boxed{y = 3}$

b) Find x when y is 0.

$3x - 5(0) = -15$

$3x - 0 = -15$

$3x = -15$

$x = \frac{-15}{3}$

$\boxed{x = -5}$

7 more than 3 times some number is equal to the number reduced by 13. Find the number.

Let x be the number

$$3x + 7 = x - 13$$

$$3x - x = -13 - 7$$

$$2x = -20$$

$$\boxed{x = -10}$$

The number is -10.

4 times the difference of some number and 5, increased by 20 is equal to -6 times the number. Find the number.

Let x be the number,

$$4(x - 5) + 20 = -6 \cdot x$$

$$4x - 20 + 20 = -6x$$

$$4x + 6x = 0$$

$$10x = 0$$

$$x = \frac{0}{10}$$

$$\boxed{x = 0}$$

The number is 0.