

Each question comes from the same numbered unit in the course.

This PreTest is meant to help assess your strengths and weaknesses, and give you a brief overview of the course content.

If you don't know how to do a particular question, leave it blank and move on.

1a. Combine $\frac{5}{3} - \frac{1}{2} + \frac{7}{12}$. get a common denominator. LCD is 12.

$$\frac{5 \times 4 - 1 \times 6 + 7}{12} = \frac{20 - 6 + 7}{12} = \frac{21}{12} = \frac{7}{4}$$

1b. Find the Lowest Common Denominator (LCD) for the fractions $\frac{1}{21}$ and $\frac{2}{15}$.

$$\begin{aligned} 15 &= 3 \times 5 \\ 21 &= 3 \times 7 \\ \text{LCD} &= 3 \times 5 \times 7 = 105 \end{aligned}$$

2a. Simplify $\frac{3+7(-3)}{-6-4(-3)}$. = $\frac{3-21}{-6+12} = \frac{-18}{6} = -3$

2b. Simplify by removing parentheses and collecting like terms $-7(x - 3y^2 + 4) + 3y(4 - 6y)$.

$$\begin{aligned} &= -7x + 21y^2 - 28 + 12y - 18y^2 \\ &= -7x + 3y^2 - 28 + 12y \end{aligned}$$

3. Solve for z : $3z - 5 + 2 = 4z - (2z + 8)$.

$$3z - 3 = 4z - 2z - 8$$

$$3z - 3 = 2z - 8$$

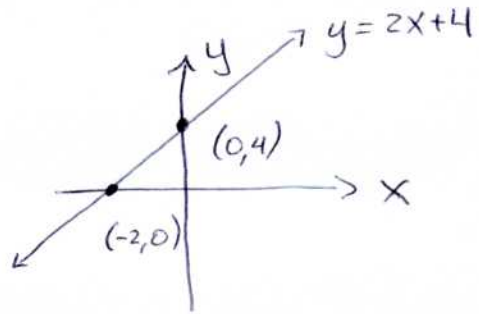
$$z = -5$$

4a. Graph $y = 2x + 4$ on an xy -axis.

Two points on line:

$$\text{if } x=0, y=4 \Rightarrow (0,4)$$

$$\text{if } y=0, 0=2x+4 \Rightarrow (-2,0)$$



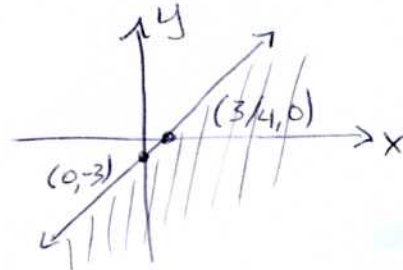
4b. Sketch the region in the xy -plane that satisfies the inequality $4x - y \geq 3$.

sketch $4x - y = 3$

Two points on line:

$$\text{if } x=0, y=-3 \Rightarrow (0,-3)$$

$$\text{if } y=0, x=3/4 \Rightarrow (3/4, 0)$$



Test point $(0,0)$.
 $0 \geq 3$ False!
 Shade other side.

5. Solve the following system of equations $3x - 4y = 2$ and $x + y = 1$.

\hookrightarrow Solve for $x = 1 - y$.

sub into other:

$$3(1-y) - 4y = 2$$

$$3 - 3y - 4y = 2$$

$$-7y = -1$$

$$y = 1/7$$

Now,
 $x = 1 - y$
 $= 1 - \frac{1}{7}$
 $= \frac{6}{7}$.

Solution $(\frac{6}{7}, \frac{1}{7})$

6. Simplify by multiplying out and collecting any like terms $(4y - 1)(5y^2 + 2)$.

distributive property.

$$= 4y(5y^2 + 2) - 1(5y^2 + 2)$$

$$= 20y^3 + 8y - 5y^2 - 2$$

7a. Factor $x^2 - 3x - 10$ into a product of two factors.

by inspection (trial & error):

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

7b. Solve $3x^2 + 5x + 2 = 0$ by factoring.

Look for two numbers whose product is 6, sum is 5

$\Rightarrow 2, 3$.

factor by grouping.

$$\begin{aligned} 3x^2 + 5x + 2 &= 3x^2 + 3x + 2x + 2 \\ &= 3x(x+1) + 2(x+1) \\ &= (3x+2)(x+1) \end{aligned}$$

8a. Subtract $\frac{8x}{x^2-16} - \frac{4}{x-4}$.

get a common denominator.

$$\begin{aligned} &= \frac{8x}{x^2-16} - \frac{4(x+4)}{(x-4)(x+4)} = \frac{8x}{x^2-16} - \frac{4x+16}{x^2-16} \\ &= \frac{8x - 4x - 16}{x^2-16} \\ &= \frac{4x-16}{x^2-16} = \frac{4(x-4)}{(x+4)(x-4)} \\ &= \frac{4}{x+4} \end{aligned}$$

9a. Simplify $\sqrt[3]{-64}$.

since $(-4)(-4)(-4) = -64$,

we can say $\sqrt[3]{-64} = -4$.

9b. Rationalize the denominator in $\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} \times \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} + \sqrt{3}} = \frac{(\sqrt{5} + \sqrt{3})^2}{5-3}$

$$= \frac{(\sqrt{5} + \sqrt{3})^2}{2} = \frac{5+3+2\sqrt{15}}{2} = 4 + \sqrt{15}$$

10. Solve $\frac{8}{x} + \frac{2}{5} = -\frac{2}{x}$ for x .

$$\frac{8}{x} + \frac{2}{x} = -\frac{2}{5}$$

$$\frac{10}{x} = -\frac{2}{5}$$

$$50 = -2x$$

$$\frac{50}{-2} = x$$

$$-25 = x$$

11a. Solve $(4x - 3)^2 = 36$ for x .

$$4x - 3 = \pm 6$$

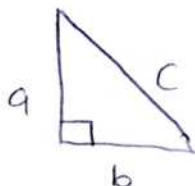
$$\begin{aligned} 4x - 3 &= 6 \\ 4x &= 9 \\ x &= \frac{9}{4} \end{aligned}$$

$$\begin{aligned} \text{or } 4x - 3 &= -6 \\ 4x &= -3 \\ x &= -\frac{3}{4} \end{aligned}$$

11b. Write down the quadratic formula which gives the solution to $ax^2 + bx + c = 0$.

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

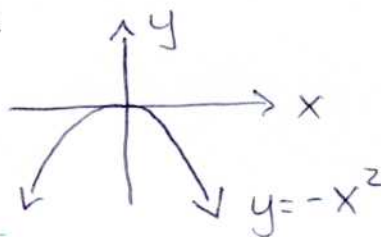
12a. What is the Pythagorean Theorem?



$$a^2 + b^2 = c^2$$

relates lengths of sides of right triangle.

12b. Sketch the graph of $y = -x^2$.



13a. Simplify $\log_{10}(0.1)$.

we need the power ~~of~~ ^{that} 10 ~~that~~ must be raised to that gives us 0.1. since $10^{-1} = 0.1$, $\log_{10}(0.1) = -1$

13b. Simplify $a^2 \times (2a)^3$.

$$\begin{aligned} &(a^2)(2a)^3 \\ &= (a^2)(2^3 a^3) \\ &= 8a^5. \end{aligned}$$