

PEMDAS

Example 1: Evaluate.

$$-10 - 24 + 6 = -34 + 6 = \boxed{-28}$$

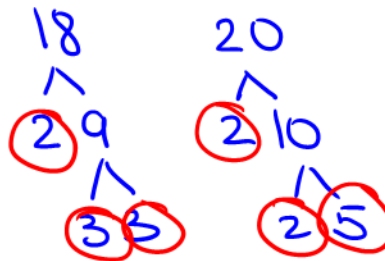
$$\rightarrow 72 \div 6 \cdot 4 = 12 \cdot 4 = \boxed{48}$$

$$4 - 3(12 \div 6 \cdot 2) = 4 - 3(4) = 4 - 12 = \boxed{-8}$$

Example 2 Find the least common multiple (LCM) of:

18, 20

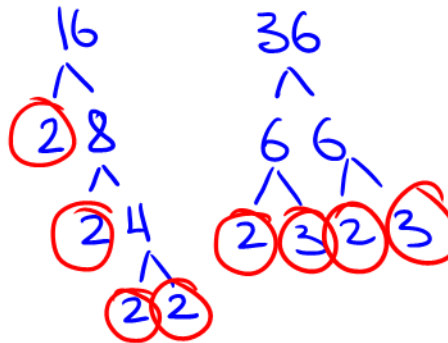
$$\begin{aligned} \text{LCM} &= 2^2 \cdot 3^2 \cdot 5 \\ &= 4 \cdot 9 \cdot 5 \\ &= \boxed{180} \end{aligned}$$



$$\begin{aligned} 18 &= 2 \cdot 3^2 \\ 20 &= 2^2 \cdot 5 \end{aligned}$$

16, 36

$$\begin{aligned} \text{LCM} &= 2^4 \cdot 3^2 \\ &= 16 \cdot 9 = \boxed{144} \end{aligned}$$



$$\begin{aligned} 16 &= 2^4 \\ 36 &= 2^2 \cdot 3^2 \end{aligned}$$

Example 3 Simplify.

$$\left(\frac{4x^{-6}y^{14}x^2}{2x^{-3}y^4} \right)^2 = \left(\frac{4x^{-4}y^{14}}{2x^{-3}y^4} \right)^2 = \left(\frac{2x^{-4}y^{14}}{x^{-3}y^4} \right)^2 = \left(\frac{2x^1y^{14}}{x^1y^4} \right)^2$$

$$= \left(\frac{2}{x} y^{14-4} \right)^2 = \left(\frac{2}{x} y^{10} \right)^2 = \boxed{\frac{4y^{20}}{x^2}}$$

$$\begin{aligned} x^{-n} &= \frac{1}{x^n} \\ \frac{x^n}{x^m} &= x^{n-m} \end{aligned}$$

$$\frac{x^3}{x^4} = x^{3-4} = x^{-1} = \frac{1}{x}$$

$$4 = 2^2$$

$$9 = 3^2$$

$$16 = 4^2$$

$$25 = 5^2$$

$$\sqrt{96} = \sqrt{16 \cdot 6} = \sqrt{16} \cdot \sqrt{6} = 4\sqrt{6}$$

$$\sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3}$$

Example 4: Let $-4x + 7y = 56$. Find the y-intercept.

set $x=0$

$$-4(0) + 7y = 56$$

$$\frac{7y}{7} = \frac{56}{7}$$

$$y = 8 \quad (0, 8)$$

Example 5: Let $\frac{3y}{3} = \frac{-7x}{3} - \frac{10}{3}$. Find the slope and the y-intercept

$$y = mx + b$$

↑ slope ↑ y-int.

$$y = \left[\frac{-7}{3}\right]x + \left[\frac{-10}{3}\right]$$

slope y-int

Example 6: Find the slope of the line that passes through $(-8, 4)$ and $(-3, -6)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 - 4}{-3 - (-8)} = \frac{-10}{-3 + 8} = \frac{-10}{5} = -2$$

Example 7: Find the equation of the line that passes through $(-2, 8)$ and has slope 4.

$$y - y_1 = m(x - x_1)$$

$$y - 8 = 4(x - (-2))$$

$$y - 8 = 4(x + 2)$$

$$y - 8 = 4x + 8$$

$$y = 4x + 16$$

Example 8: Complete the table given. Then sketch the graph of the line $y = 4x - 16$ by plotting the points in the completed table

x	y
-2	-22
4	0
1	-12

$$y = 4(-2) - 16 = -8 - 16 = -22$$

$$y = 4(1) - 16 = 4 - 16 = -12$$

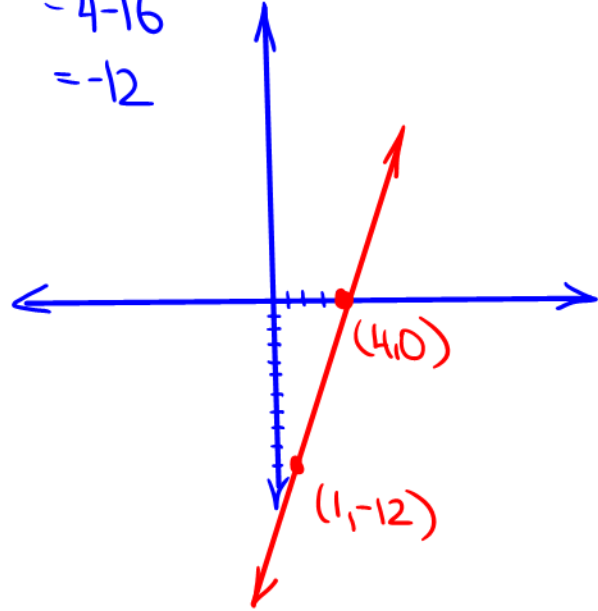
$$0 = 4x - 16$$

$$+16 \quad +16$$

$$\frac{16}{4} = \frac{4x}{4}$$

$$4 = x$$

$$x = 4$$



Example 9: Find the coordinates of the y-intercept for: $y = -4x^2 - 8x + 2$.

set $x = 0$

$$y = -4(0)^2 - 8(0) + 2 \quad y = 2$$

$$(0, 2)$$

Example 10: Let $f(x) = -3x^2 + 10$. Find

$$f(-2) = -3(-2)^2 + 10 = -3(4) + 10$$

$$= -12 + 10$$

$$= -2$$

$$f(3) = -3(3)^2 + 10$$

$$= -3(9) + 10$$

$$= -27 + 10$$

$$= -17$$

Example 11: Simplify.

$$(4x^2 - 2x + 9) - (5x^2 - 7x - 1)$$

$$= 4x^2 - 2x + 9 - 5x^2 + 7x + 1$$

$$= -x^2 + 5x + 10$$

(x-5)(x+7) FOIL

$$= x^2 + 7x - 5x - 35$$

$$= x^2 + 2x - 35$$

(x-4)(x+4) $(a-b)(a+b) = a^2 - b^2$

$$= x^2 - 4^2 = x^2 - 16$$

$$a^2 - b^2 = (a-b)(a+b)$$

Example 12: Factor.

$$16x^2 - 144 = 16(x^2 - 9) = 16(x-3)(x+3)$$

\uparrow \uparrow \uparrow
 16·9 a b

$$x^2 + 13x + 36 = (x+9)(x+4)$$

Factors of 36
Add up to 13 9, 4

$$x^2 + 2x - 48$$

$$(x+8)(x-6)$$

Factors of -48 8, -6
Add up to 2

$$x^3 - 9x^2 + 4x - 36 = x^2(x-9) + 4(x-9)$$

$$(x-9)(x^2+4)$$

Example 13: Solve for x.

$$x^2 - 9 = 0$$

$$(x-3)(x+3) = 0$$

$$x-3=0 \quad x+3=0$$

$$x=3 \quad x=-3$$

$$x^2 - 5x - 84 = 0$$

$$(x-12)(x+7) = 0$$

$$x-12=0 \quad x+7=0$$

$$x=12 \quad x=-7$$

Factors of -84 -12, 7
Add up to -5

Example 14: Find the domain of $f(x) = \frac{x+5}{x-7}$

$$x-7=0$$

$$x=7$$

