Worksheet 2 Solutions

(1)

(2) nonlinear

(3) $4x+2=5x+7$

$-4x \quad -4x$

$2 = x+7$

$-7 \quad -7$

$\boxed{-5 = x}$

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

Method 1: Multiply by denominator / LCD to get rid of fractions

$3\left[\frac{2}{3}t - 5 = \frac{5}{3}t\right]$

$2t - 15 = 5t$

$-2t \quad -2t$

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

$\boxed{-5 = t}$

Method 2: Leave alone and work with fractions

$\frac{2}{3}t - 5 = \frac{5}{3}t$

$-\frac{2}{3}t \quad -\frac{2}{3}t$

$-5 = \frac{3}{3}t$

$\boxed{-5 = t}$

(5) $5x + 2(2x+1) - (8x-1-2) = 5\frac{1}{4}$

$5x + (2)(2x) + (2)(1) + (-1)(8x-3) = \frac{20+1}{4}$

$5x + 4x + 2 + (-1)(8x) + (-1)(-3) = \frac{21}{4}$

$9x + 2 - 8x + 3 = \frac{21}{4}$

$x + 5 = \frac{21}{4}$

$4\left[x+5 = \frac{21}{4}\right]$

$4x + 20 = 21$

$-20 \quad -20$

$4x = 1$

$\frac{4x}{4} = \frac{1}{4}$

$\boxed{x = \frac{1}{4}}$

(6) $\frac{8}{5}t + \frac{1}{3} = \frac{5}{6} + \frac{3}{5}t - \frac{1}{6}$

Multiply by denominators' LCD ~~5·3~~.

factors $5 = 5$, $3 = 3$, $6 = 2\cdot 3$ $\quad$ LCD $= 5\cdot 3\cdot 2 = 30$

$30\left[\frac{8}{5}t + \frac{1}{3} = \frac{5}{6} + \frac{3}{5}t - \frac{1}{6}\right]$

$30\cdot\frac{8}{5}t + 30\cdot\frac{1}{3} = 30\cdot\frac{5}{6} + 30\cdot\frac{3}{5}t - (30)\left(\frac{1}{6}\right)$

$(6)(8)t + 10 = 5\cdot 5 + 6\cdot 3 - 5\cdot 1$

$48t + 10 = 25 + 18 - 5$

$48t + 10 = 38$

$-10 \quad -10$

$\frac{48t}{48} = \frac{28}{48}$

$t = \frac{28}{48} = \frac{2\cdot 14}{2\cdot 24} = \frac{2\cdot 7}{2\cdot 12} = \boxed{\frac{7}{12}}$

(7) $\frac{-16a}{-16} = \frac{-48}{-16}$

$\boxed{a = 3}$

check $-16(3) = -48$ ✓

(8) $\frac{3p}{7} = -6$

$7\left[\frac{3}{7}p = -6\right]$

$7\left(\frac{3}{7}\right)p = (7)(-6)$

$3p = -42$

$\frac{3}{3} \quad \frac{-42}{3}$

$\boxed{p = -14}$

(9) $7y - 2y = 45$

$\frac{5y}{5} = \frac{45}{5}$

$\boxed{y = 9}$

(10) $7q - 10q = -24$

$\frac{-3q}{-3} = \frac{-24}{-3}$

$\boxed{q = 8}$

(11) $4r - 3(3r - 2) = 8 - 3(r - 4)$

$4r + (-3)(3r-2) = 8 + (-3)(r-4)$

$4r + (-3)(3r) + (-3)(-2) = 8 + (-3r) + (-3)(-4)$

$4r - 9r + 6 = 8 - 3r + 12$

$-5r + 6 = 20 - 3r$

$+5r \qquad +5r$

$6 = 20 + 2r$

$-20 \quad -20$

$\frac{-14}{2} = \frac{2r}{2}$

$\boxed{-7 = r}$

(12) $\frac{5}{6}(r-2) - \frac{2}{9}(r+4) = \frac{7}{18}$

To get rid of fractions, multiply by LCD of denominators.

factors $6 = 2 \cdot 3$

$9 = 3 \cdot 3$ LCD $= 2 \cdot 3 \cdot 3$

$18 = 2 \cdot 3 \cdot 3$ $= 18$

$18\left[\frac{5}{6}(r-2) - \frac{2}{9}(r+4) = \frac{7}{18}\right]$

$18\left(\frac{5}{6}\right)(r-2) - (18)\left(\frac{2}{9}\right)(r+4) = (18)\left(\frac{7}{18}\right)$

$(3)(5)(r-2) - (2)(2)(r+4) = (1)(7)$

$15(r-2) - 4(r+4) = 7$

(12) cont

$15(r-2) - 4(r+4) = 7$

$15(r) - (15)(2) + (-4)(r+4) = 7$

$15r - 30 + (-4)(r) + (-4)(4) = 7$

$15r - 30 - 4r - 16 = 7$

$11r - 46 = 7$

$+46 \quad +46$

$11r = 53$

$\boxed{r = 53/11}$

(13)

~~FOIL~~

$4(2p - 3) - 3(3p + 1) = -18 - p + 3$

$(4)(2p) + (4)(-3) + (-3)(3p) + (-3)(1) = -15 - p$

$8p - 12 - 9p - 3 = -15 - p$

$-p - 15 = -15 - p$

$+15 \quad +15$

$-p = -p \rightarrow$ identity

therefore there are infinitely many solutions.

(14) $8k + 14 = 2(k+2) + 3(2k+1)$

$8k + 14 = 2k + 2(2) + 3(2k) + (3)(1)$

$8k + 14 = 2k + 4 + 6k + 3$

$8k + 14 = 8k + 7$

$-7 \qquad -7$

$8k + 7 = 8k$

$-8k \qquad -8k$

$7 = 0$ Not TRUE!

Therefore there are no solutions

↑ top of page

Worksheet 2 Solutions

(15) $p \cdot r = 17$

(16) $4x - 2 = 3 + 6x$

$+2 \quad +2$

$4x = 5 + 6x$

$-6x \quad -6x$

$-2x = 5$

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

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

(17) Low grade $= x$

High grade $= x + 38$

$x + x + 38 = 142$

$2x + 38 = 142$

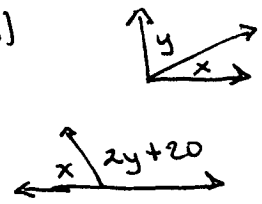
$-38 \quad -38$

$2x = 104$

$\frac{2x}{2} = \frac{104}{2}$

lowest grade → $\boxed{x = 52}$

(18)



x = angle we want to find

y = complement of x.

$y + x = 90$ $\quad x + 2y + 20 = 180$

$y = 90 - x$ → $x + 2(90 - x) + 20 = 180$

plug in $\quad x + 2(90) + (2)(-x) + 20 = 180$

$x + 180 - 2x + 20 = 180$

$-x + 200 = 180$

$-200 \quad -200$

$\frac{-x}{-1} = \frac{-20}{-1}$

$\boxed{x = 20}$

(19) smaller: x } consecutive even integers

longer: $x + 2$ }

$x + 2(x+2) = 292$

$x + 2x + 4 = 292$

$3x + 4 = 292$

$-4 \quad -4$

$\frac{3x}{3} = \frac{288}{3}$

$\boxed{x = 96}$

$\boxed{\begin{array}{l}\text{smaller} = 96 \\ \text{longer} = 98\end{array}}$

(20) $I = prt$ $\quad I = 288,\ r = 0.04,\ t = 3$

$288 = (p)(0.04)(3)$ $\quad 0.04 = \frac{4}{100}$

$\left[288 = \frac{3 \cdot 4}{100} \cdot p\right] 100$

$\frac{28800}{12} = \frac{12 \cdot p}{12}$

$\boxed{2400 = p}$

(21) $A = p + prt$

factor p

$A = p(1 + rt)$

$\frac{A}{(1+rt)} = \frac{p(1+rt)}{(1+rt)}$

$\boxed{p = \frac{A}{(1+rt)}}$

(22)

$r = 6$

$V = 1356.48$

$h = ?$

$V = \pi r^2 \cdot h$

$1356.48 = \pi (6)^2 \cdot h$

$\frac{1356.48}{36\pi} = \frac{36\pi h}{36\pi}$

$= h$

Worksheet 2 Solutions

(23) They are supplementary

$(3x-30)+(x+10)=180$

$4x-20=180$

$+20 \quad +20$

$\frac{4x}{4}=\frac{200}{4}$

$x=50$

Left Angle	Right Angle
$3(50)-30$	$50+10$
$=150-30$	$=\boxed{60}$
$=\boxed{120}$	

(24) $\frac{9 \text{ dollars}}{48 \text{ quarters}}$

$9 \text{ dollars} = 9 \cdot 4 \text{ quarters}$

$= 36 \text{ quarter}$

$\frac{36}{48}=\frac{12 \cdot 3}{12 \cdot 4}=\boxed{\frac{3}{4}}$

(25) $\frac{5 \text{ months}}{2 \text{ years}}$

$2 \text{ years} = 2 \cdot 12 \text{ months}$

$= 24 \text{ months}$

$\frac{5 \text{ months}}{24 \text{ months}}=\boxed{\frac{5}{24}}$

(26)

1-lb $\frac{\$1.29}{1}$

2-lb $\frac{\$2.31}{2}=\frac{\$1.155}{1}$

3-lb $\frac{\$3.32}{3}=\frac{\$1.106}{1}$

5-lb $\frac{\$4.44}{5}=\frac{\$0.88}{1}$

5-lb is the better buy

(27) $\frac{g}{5}=\frac{g-2}{2}$

multiply by LCD = 10

or cross multiply

$10\left[\frac{g}{5}=\frac{g-2}{2}\right]$

$10(g/5)=10\left(\frac{g-2}{2}\right)$

$2g=5(g-2)$

$2g=5g-5(2)$

$2g=5g-10$

$-5g \quad -5g$

$\frac{-3g}{-3}=\frac{-10}{-3} \rightarrow \boxed{g=\frac{10}{3}}$

(28) Cross Multiply

$\frac{4}{z+1}=\frac{2}{z+7}$

$4(z+7)=2(z+1)$

$4z+28=2z+2$

$-28 \quad -28$

$4z=2z-26$

$-2z \quad -2z$

$\frac{2z}{2}=\frac{-26}{2} \rightarrow \boxed{z=-13}$

(29)

$\frac{8}{30}=\frac{20}{x}$

$8 \cdot x=(30)(20)$

$\frac{8x}{8}=\frac{600}{8}$

$\boxed{x=75 \text{ mins}}$

Worksheet 2 Sol'ns

(30) Amount of alcohol = $50 \cdot 45\%$

$= \frac{50}{1} \cdot \frac{45}{100}$

$= \frac{45}{2} =$ **22.5 liters**

(31) y = student tickets

x = adult tickets

$x + y = 300 \qquad x \cdot 5 + y \cdot 3 = 1130$

$x = 300 - y$ → plug in

$(300 - y) \cdot 5 + y \cdot 3 = 1130$

$300 \cdot 5 - y \cdot 5 + y \cdot 3 = 1130$

$1500 - y \cdot 5 + y \cdot 3 = 1130$

$-1500 \qquad -1500$

$\frac{-2y}{-2} = \frac{-370}{-2}$

$y = 185$

$x = 300 - 185$

$x = 115$

(32) x = money at 5%

$x + 5000$ = money at 9%

interest income = money · interest rate

$(x)(.05) + (x+5000)(0.09) = 1430$

$x\left(\frac{5}{100}\right) + (x+5000)\cdot\left(\frac{9}{100}\right) = 1430$

$100\left[(x)\left(\frac{5}{100}\right) + (x+5000)\left(\frac{9}{100}\right) = 1430\right]$

$x \cdot (100)\left(\frac{5}{100}\right) + (x+5000)(100)\left(\frac{9}{100}\right) = 1430(100)$

$5 \cdot x + (x+5000)(9) = 143000$

$5x + 9x + 9(5000) = 143000$

$14x + 4500 = 143000$

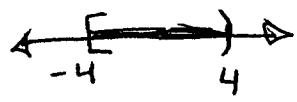
$-4500 \qquad -4500$

$\frac{14x}{14} = \frac{138500}{14}$

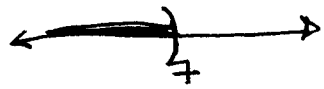
$x \approx 9892$ money at 5%

$x + 5000 \approx 14892$ money at 9%

(33)



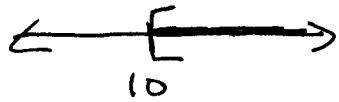
(34)



(35) $2\left[\frac{1}{2}r \geq 5\right]$

$2\left(\frac{1}{2}r\right) \geq 5(2)$

$r \geq 10$



(36) $3 - \frac{1}{4}z \leq 2 + \frac{3}{8}z$

$-2 \qquad -2$

$1 - \frac{1}{4}z \leq \frac{3}{8}z$

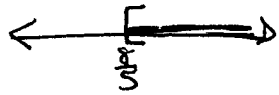
$+\frac{1}{4}z \qquad +\frac{1}{4}z$

$1 \leq \frac{3}{8}z + \frac{1}{4}z \cdot \frac{2}{2}$

$1 \leq \frac{3}{8}z + \frac{2}{8}z$

$\frac{8}{5}\left[1 \leq \frac{5}{8}z\right]$

$\frac{8}{5} \leq z$

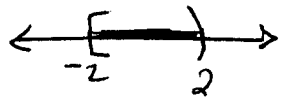


(37) $-10 \leq 4t - 2 < 6$

$+2 \qquad +2 \qquad +2$

$\frac{-8}{4} \leq \frac{4t}{4} < \frac{8}{4}$

$-2 \leq t < 2$



(38) $\frac{1}{3}(x+24) \leq 10$

$3\left[\frac{1}{3}(x+24) \leq 10\right]$

$3\left(\frac{1}{3}\right)(x+24) \leq (10)(3)$

$(x+24) \leq 30$

$-24 \qquad -24$

$x \leq 6$