

$$\textcircled{1} \frac{[2(4^2-3^2)] + [6+4(1^2-6^0)]}{[2^3+1^4] - [3^3-2^4]}$$

$$\frac{2(16-9) + 6 + 4(0)}{(8+1) - (27-24)} = \frac{2 \cdot 7 + 6}{9-3} = \frac{20}{6} = \boxed{\frac{10}{3}}$$

$$\textcircled{2} \begin{array}{l} x+4=12 \\ x=8 \end{array} \quad \begin{array}{l} 3x=24 \\ 3 \cdot 8=24 \\ 24=24 \\ y=12 \end{array} \quad \begin{array}{l} 8-z=5y \\ 8-z=5 \cdot 12 \\ 8-z=60 \\ -z=52 \\ z=-52 \end{array}$$

$$\text{So } 8+12-52 = \boxed{-32}$$

$$\textcircled{3} \quad 24x^2 + 11x - 28$$

$$(3x+4)(8x-7)$$

$$\text{So } 3+4+8-7 = \boxed{8}$$

$$\textcircled{4} \quad u \diamond v = u^2 - 2uv + 4v$$

$$12 \diamond x = 12^2 - 2 \cdot 12 \cdot x + 4x = 4$$

$$144 - 24x + 4x = 4$$

$$140 = 20x$$

$$x = \boxed{7}$$

$$\textcircled{5} \quad \begin{array}{l} 1 = 1 \\ 4 = 2+2 \\ 9 = 3+3+3 \\ 16 = 4+4+4+4 \\ 25 = 5+5+5+5+5 \\ 36 = 6+6+6+6+6+6 \\ 28 = 7+7+7+7 \end{array}$$

119

2 digit perfect squares	Difference
16	5
25	3
36	3
49	5
64	2
81	7

$$\text{So } \begin{array}{r} 16 \\ +49 \\ \hline \boxed{65} \end{array}$$

$$\textcircled{7} \quad \begin{array}{l} ax+by=c \\ by=-ax+c \\ y = \frac{-a}{b}x + \frac{c}{b} \end{array} \quad \begin{array}{l} dx+ey=f \\ ey=-dx+f \\ y = \frac{-d}{e}x + \frac{f}{e} \end{array}$$

$$\text{slope} = \frac{-a}{b} \quad \text{slope} = \frac{-d}{e}$$

$$\frac{-a}{b} = \frac{-d}{e} \Rightarrow \boxed{\frac{ad}{be}}$$

$$\textcircled{8} \quad \begin{array}{l} d \cdot r = 100\pi \\ 2r \cdot r = 100\pi \\ 2r^2 = 100\pi \\ r^2 = 50\pi \end{array} \quad d=2r$$

$$\text{Area} = \pi r^2 = \pi (50\pi) = \boxed{50\pi^2}$$

12 ways

ACBD BCAD
 ADBC BDAC
 ACDB BCDA
 ADCB BDCA
 CADB CBD A
 DACB DBCA

$$\textcircled{10} \quad \begin{array}{l} 4.2w+w+4.3 = 8.1+4.2w-3.8 \\ 5.2w+4.3 = 4.2w+4.3 \\ w = 0 \end{array}$$

$$\begin{array}{l} 7.2y-37.6 = 98.4+4.5y-60.8 \\ 7.2y-37.6 = 4.5y+37.6 \\ 2.7y = 75.2 \\ y = 27.\overline{851} \end{array}$$

$$\begin{array}{l} 4x - 2(3x-7) = 12 \\ 4x - 6x + 14 = 12 \\ -2x = -2 \\ x = 1 \end{array}$$

$$\begin{array}{l} w-x-y = 0-1-27.\overline{851} \\ = \boxed{-28.\overline{851}} \end{array}$$

$$\begin{aligned} 8g &= 1m \\ 6m &= 1p \\ 8p &= 1w \\ 10w &= 1q \end{aligned}$$

$$\begin{aligned} 1q &= 10w \\ 5q &= 50w \\ 5q &= 50 \cdot 8p \\ 5q &= 400p \\ 5q &= 400 \cdot 6m \\ 5q &= 2400m \\ 5q &= 2400 \cdot 8g \\ 5q &= \boxed{19200g} \end{aligned}$$

$$(15) \quad 5^1 = 5^x = 5^{\frac{1}{3}y} = (5z)^{\frac{1}{3}} = w^{\frac{1}{3}}$$

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

$$5z = w$$

$$\text{So } x = 1$$

$$5z = 125$$

$$\frac{1}{3}y = 1$$

$$z = 25$$

$$y = 3$$

$$\text{So } w \cdot x \cdot y \cdot z$$

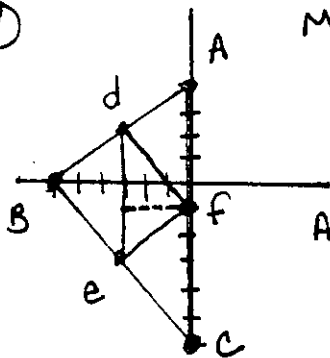
$$5 = w^{\frac{1}{3}}$$

$$= 125 \cdot 1 \cdot 3 \cdot 25$$

$$125 = w$$

$$= \boxed{9375}$$

(12)



Midpoints

$$AB = (-3, 2)$$

$$BC = (-3, -3)$$

$$AC = (0, -1)$$

$$\text{Area} = \frac{1}{2} b \cdot h$$

$$= \frac{1}{2} \cdot 5 \cdot 3 = \frac{15}{2}$$

$$= \boxed{7.5}$$

(13)

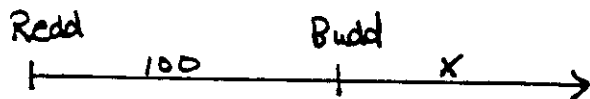
$$|r+4| = 5$$

$$r+4 = 5 \quad \text{or} \quad r+4 = -5$$

$$r = 1 \quad \text{or} \quad r = -9$$

$$\text{So } \frac{1}{1} + \frac{-1}{9} = \boxed{\frac{8}{9}}$$

(14)



$$\text{Redd's distance} = 100 + x$$

$$\text{Budd's distance} = x$$

$$\text{Redd's time} = \text{Budd's time} = t$$

$$\text{Redd's rate} = 8$$

$$\text{Budd's rate} = 6$$

$$d = r t \quad \begin{array}{l} \text{Redd} \quad 100 + x = 8t \\ \text{Budd} \quad x = 6t \end{array}$$

$$100 = 2t$$

$$\boxed{t = 50} \text{ seconds}$$