

$$\textcircled{1} r = \sqrt{2}, (h, k) = (4, -2)$$

Sol:

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-4)^2 + (y-(-2))^2 = (\sqrt{2})^2$$

$$(x-4)^2 + (y+2)^2 = 2.$$

Sol is \textcircled{D}

$$\textcircled{2} 6x^2 = -12x - 5$$

Sol:

$$6x^2 + 12x + 5 = 0$$

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

$$x = \frac{-12 \pm \sqrt{144 - (4)(6)(5)}}{2(6)}$$

$$x = \frac{-12 \pm \sqrt{24}}{(2)(6)}$$

$$24 = (4)(6)$$

$$x = \frac{-12 \pm 2\sqrt{6}}{(2)(6)}$$

$$x = \frac{-6 \pm \sqrt{6}}{6}$$

Sol is \textcircled{B} .

③ $Y = KX$

Sol: $0.4 = K(0.8)$

$K = \frac{0.4}{0.8} = 0.5$

$Y = (0.5)X$

Sol is (A)

④ $(-6 + 3i)(4 + i)$

Sol: $= -24 - 6i + 12i + 3(i)^2$

$= -24 + 6i + (3)(-1)$

$= -24 + 6i - 3$

$= -27 + 6i$

Sol is (A)

⑤ (Extra)

| | hours to do the job | Part of the job done in 1 hour |
|----------|---------------------|--------------------------------|
| Tracy | 28 | $\frac{1}{28}$ |
| Trainee | t | $\frac{1}{t}$ |
| Together | 18 | $\frac{1}{18}$ |

$\frac{1}{28} + \frac{1}{t} = \frac{1}{18}$
 $\frac{1}{t} = \frac{1}{18} - \frac{1}{28} = \frac{10}{(18)(28)} = \frac{5}{(9)(28)}$, so $t = \frac{(9)(28)}{5} \approx 50.4$
 Sol is (A)

⑥ Given $Y_1 = 2X$, find $Y_2 \perp Y_1$ containing $(3, 5)$

Y_2 has slope equal to z .

$$(Y - Y_1) = m(X - X_1)$$

$$Y - 5 = 2(X - 3)$$

$$Y - 5 = 2X - 6$$

$$Y = 2X - 1$$

Sol is (A).

⑦ Given $Y_1 = \frac{1}{4}X + 6$, find $Y_2 \perp Y_1$ containing $(5, -5)$

$m_1 = \frac{1}{4}$, then $m_2 = -4$.

$$Y - (-5) = (-4)(X - 5)$$

$$Y + 5 = -4X + 20$$

$$Y = -4X + 15$$

Sol is (B).

⑧ $P_1 = (-0.4, 0.4)$; $P_2 = (-1.8, 2.4)$

$$P_m = \left(\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) = \left(\frac{-0.4 - 1.8}{2}, \frac{0.4 + 2.4}{2} \right)$$

$$= \left(\frac{-2.2}{2}, \frac{2.8}{2} \right) = (-1.1, 1.4)$$

Sol is (D)

$$(9) |4x-7| = |x+6|$$

$$4x-7 = x+6 \quad \text{or}$$

$$4x-7 = -(x+6)$$

$$4x-7 = -x-6$$

$$3x = 13$$

$$x = \frac{13}{3}$$

$$5x = 1$$

$$x = \frac{1}{5}$$

Sol is $\left\{\frac{13}{3}, \frac{1}{5}\right\}$, (A)

$$(10) \frac{8}{9}x = -\frac{4}{5}$$

$$x = \frac{-(4)(9)}{(8)(5)} = \frac{-36}{40} = \frac{-9}{10}$$

(D)

(11) If $x < 12$, then

$$x-12 < 0$$

Sol is C

$$(12) |x+3| < 1, \quad \underline{a < x+z < b} \quad ?$$

$$-1 < x+3 < 1$$

$$-1-1 < x+3-1 < 1-1$$

$$-2 < x+z < 0$$

$$a = -2$$

$$b = 0$$

(C)

$$\textcircled{13} \quad x^6 + 63x^3 - 64 = 0$$

$$\text{let } u = x^3$$

$$u^2 = (x^3)^2 = x^6$$

$$u^2 + 63u - 64 = 0$$

$$(u + 64)(u - 1) = 0$$

$$\downarrow$$
$$u = -64$$

$$x^3 = -64$$

$$x = \sqrt[3]{-64} = -4$$

$$\textcircled{x = -4}$$

Sol is $\{-4, 1\}$

$$\rightarrow u = 1$$
$$x^3 = 1$$
$$x = \sqrt[3]{1} = 1$$

$$\textcircled{x = 1}$$

$$\textcircled{D}$$

$$\textcircled{14} \quad 4x - 1 > 3x + 2$$

$$x > 3,$$

Sol is $(3, \infty)$

