INDIVIDUAL TEST SOLUTIONS

1) $(48174 + 72624) \div 2 = 60{,}399$ **B**

2) **C**

3) **A** is the only answer that fulfills the requirements of the problem.

4) t = time in hours after Ken joined in

$\frac{1}{6}t + \frac{1}{8}t = \frac{5}{6}$ → 4t + 3t = 20 → $t = \frac{20}{7}$ or $2\frac{6}{7}$ hours
B

5) det[A] = 10 - (-40) = 50

$A^{-1} = \frac{1}{50}\begin{bmatrix} 2 & 8 \\ -5 & 5 \end{bmatrix} = \begin{bmatrix} .04 & .16 \\ -.1 & .1 \end{bmatrix}$ **D**

6) $\frac{(2)(50)(40)}{40+50} = \frac{4000}{90} = 44\frac{4}{9}$ mph **B**

7) $\begin{matrix} \frac{8}{x} - \frac{5}{y} = -1 \\ \frac{4}{x} - \frac{4}{y} = 4 \end{matrix}$ → $\begin{matrix} \frac{8}{x} - \frac{5}{y} = -1 \\ \frac{-8}{x} + \frac{8}{y} = -8 \end{matrix}$

$\frac{3}{y} = -9$ → -9y = 3 → $y = \frac{-1}{3}$ → $x = \frac{-1}{2}$

$\left(\frac{-1}{2}, \frac{-1}{3}\right)$ **D**

8) $(x + y)^2 = \left(\sqrt{38}\right)^2$

$x^2 + 2xy + y^2 = 38$
$x^2 + 24 + y^2 = 38$
$x^2 + y^2 = 14$ **B**

9) $x^2 + 6x + 9 + y^2 - 4y + 4 = 3 + 9 + 4$
$(x + 3)^2 + (y - 2)^2 = 16$
center : (-3, 2)
3(-3) + 5(2) = C → 1 = C
3x + 5y = 1 **A**

10) $f(x) = \frac{(x+4)(x+3)}{(x+4)(x-2)}$

asymptote : $x_1 = 2$

removable discontinuity : $\left(-4, \frac{1}{6}\right)$

$-4 + \frac{1}{6} + 2 = \frac{-11}{6}$ **C**

11) 3x + 41 = A(x + 7) + B(x - 3)
Let x = -7   20 = -10B → B = -2
Let x = 3   50 = 10A → A = 5
-2 + 5 = 3   **B**

12) $\frac{26}{52} \bullet \frac{25}{51} = \frac{25}{102}$ **D**

13)
$\frac{(x^2+y^2)(x^2-y^2)}{x^2-y^2} \bullet \frac{x+y}{(x^2+y^2)(x^4-x^2y^2+y^4)} \bullet \frac{x^2(x^4-x^2y^2+y^4)}{x^2(x+y)(x-y)}$

$= \frac{1}{x-y}$ **C**

14) $(-1)^{2011} + 2011 = -1 + 2011 = 2010$ **C**

15) $\frac{3}{(x-5)(x-2)} + \frac{2(x-5)(x-2)}{(x-5)(x-2)} = \frac{(x-4)(x-2)}{(x-5)(x-2)}$
$3 + 2x^2 - 14x + 20 = x^2 - 6x + 8$
$x^2 - 8x + 15 = 0$ → (x-3)(x-5) = 0 → x = 3, 5
5 is an excluded value. **D**

16) $\text{time} = \frac{\text{distance}}{\text{rate}}$

$\frac{d}{240} + \frac{d}{300} \le 6.3$ → 5d + 4d ≤ 7560 → 9d ≤ 7560
→ d ≤ 840   **C**

17) Vertex is at (3, -1). If m = distance between the vertex and the focus, $a = \frac{1}{4m} = \frac{1}{4(1)} = \frac{1}{4}$; $a > 0$.

$x - 3 = \frac{1}{4}(y+1)^2$ → $x - 3 = \frac{1}{4}(y^2 + 2y + 1)$ →

$x - 3 = \frac{1}{4}y^2 + \frac{1}{2}y + \frac{1}{4}$ → $x = \frac{1}{4}y^2 + \frac{1}{2}y + \frac{13}{4}$ **A**

18) $i\sqrt{12} \bullet i\sqrt{3} = i^2\sqrt{36} = -6$ **A**

19) $i^{-478} = \frac{1}{i^{478}} = \frac{1}{i^2} = \frac{1}{-1} = -1$ **B**

20) $4^{2r} \bullet 4^{3(3-3r)} = 4^{-5}$ → 2r + 9 - 9r = -5 →
-7r = -14 → r = 2   **B**

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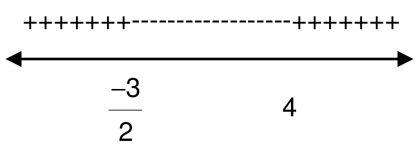
21) $\log_x 2^6 = \log_y 2^{\frac{4}{3}} \rightarrow \frac{6\log 2}{\log x} = \frac{\frac{4}{3}\log 2}{\log y} \rightarrow$

$6\log 2 \bullet \log y = \frac{4}{3}\log 2 \bullet \log x \rightarrow \frac{9}{2} = \frac{\log x}{\log y}$ **D**

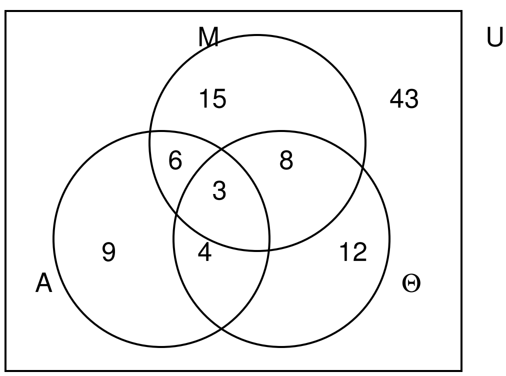
22) even power $\rightarrow \frac{e}{a} = \frac{20}{5} = 4$ **A**

23) $2x^2 - 5x - 12 < 0 \rightarrow (x - 4)(2x + 3) < 0 \rightarrow$
Roots are 4 and $\frac{-3}{2}$.



$\frac{-3}{2} < x < 4$ **B**

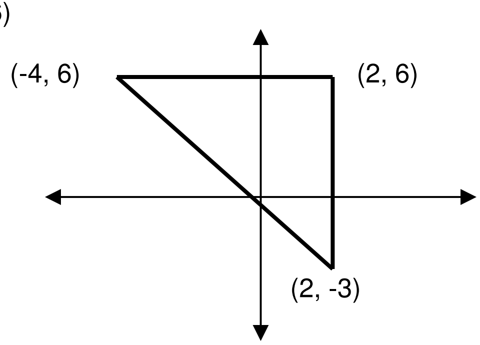
24)



C

25) $S = \frac{1}{1-\left(\frac{-2}{3}\right)} = \frac{1}{\frac{5}{3}} = \frac{3}{5}$ **B**

26)



$6 \bullet 9 \bullet \frac{1}{2} = 27$ **C**

27) $3^{\frac{5}{4}} \div 3^{\frac{3}{2}} \bullet 3^{\frac{6}{8}} \rightarrow \frac{5}{4} - \frac{3}{2} + \frac{3}{4} = \frac{2}{4} = \frac{1}{2} \rightarrow 3^{\frac{1}{2}}$ **A**

28) ${}_6C_4 (x^2)^2 (x^{-1})^4 \rightarrow {}_6C_4 = \frac{6!}{4!2!} = \frac{6 \bullet 5 \bullet 4!}{4! \bullet 2} = 15$ **D**

29) Use Descartes' Rule of Signs.
f(x) has 1 sign change. f(-x) has 2 sign changes.
1 +*R* and 2 *C* is possible. **C**

30) Not closed under subtraction (7 - 10 = -3) nor division ($4 \div 5 = \frac{4}{5}$). Is closed under addition and multiplication. **D**