

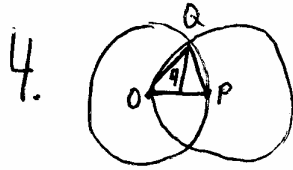
3 intersections A

$$2. S = \frac{24}{1-r} = \frac{24}{1-\frac{1}{4}} = \frac{24 \cdot 4}{3} = 32 \quad B$$

$$3. \log_{12} \left( \frac{48}{x} \right) = 2$$

$$\frac{48}{x} = 144$$

$$x = \frac{48}{144} = \frac{12}{36} = \frac{1}{3} \quad B$$



$\triangle OPQ$  is ~~not~~ equilateral.

$$r = \frac{r}{2} \quad r = \frac{8\sqrt{3}}{3} \quad A$$

$$5. V = \frac{1}{3} Bh = \frac{1}{3} (32 \cdot 18) \cdot 12 = 2304 \text{ m}^3 \quad C$$

6. number is  $TU \equiv 10T + U$

$$\begin{cases} T+U=10 \\ 10T+U=10U+T+54 \end{cases}$$

$$9T-9U=54$$

$$T-U=6$$

$$2T=16$$

$$T=8, U=2$$

$$82 = 2 \cdot 41$$

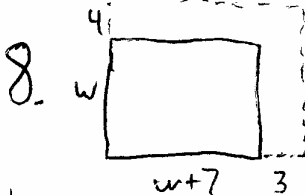
D

7. Bill's rate:  $\frac{1}{180}$  room/min  
 Brian's:  $\frac{1}{100}$  room/min

$$\left( \frac{1}{180} + \frac{1}{100} \right) t = 5$$

$$\frac{28}{1800} t = 5$$

$$t = \frac{5 \cdot 1800}{28} = \frac{2250}{7} \quad C$$



$$\begin{aligned} (w+4)(w+10) - w(w+7) &= 44 \\ w^2 + 14w + 40 - w^2 - 7w &= 44 \end{aligned}$$

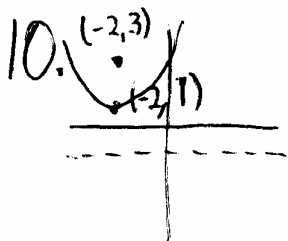
$$7w = 4$$

$$w = \frac{4}{7} \quad A$$

$$9. 8 \cdot 15 + x \cdot 0 = (8+x) \cdot 1$$

$$.4 = .1x$$

$$4 = x \quad A$$



$$y = \frac{1}{4p}(x+2)^2 + 1 \quad p=2$$

$$y = \frac{1}{8}(x+2)^2 + 1 \quad B$$

$$13. \frac{1+2i}{4-3i} \cdot \frac{4+3i}{4+3i} = \frac{4+8i+3i-6}{16+9}$$

$$= \frac{-2+11i}{25} \quad D$$

$$14. \begin{array}{r} -2i \\ -4 \quad 8i \\ 16 \quad -32i \\ -64 \quad 128i \\ 256 \quad -512i \\ -1024 \\ \hline -820 - 410i \end{array} \quad B$$

$$17. (2^2 \cdot 3)^x \cdot (2 \cdot 3^2)^y = 2^3 \cdot 3^4$$

$$\begin{array}{l} 2x+y=3 \\ x+2y=4 \end{array} \Rightarrow \begin{array}{l} y=5 \\ y=\frac{5}{3} \end{array} \quad D$$

11. A

$$12. \begin{array}{r} -1-3i \\ 4+2i \\ 5i \\ 1-6i \\ \hline 4-2i \end{array} \quad C$$



$$R = r\sqrt{2}$$

$$\frac{A_c}{A_s} = \frac{\pi R^2}{\pi r^2} = \left(\frac{R}{r}\right)^2 = 2 \quad D$$

$$16. x^2 - 3x - 14 = 0$$

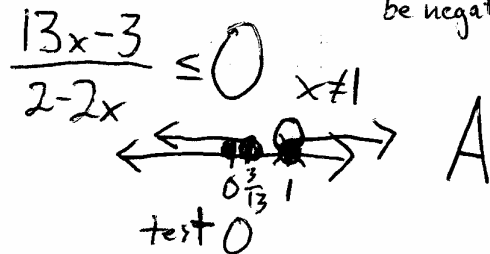
$$x^2 - 3x - 18 = 0$$

$$(x-6)(x+3) = 0$$

$$x = 6 - 3 \quad 6 + 3 = 3 \quad D$$

$$18. \frac{3x+7}{2-2x} - \frac{10-10x}{2-2x} \leq 0$$

Don't cross-multiply, 2-2x might be negative

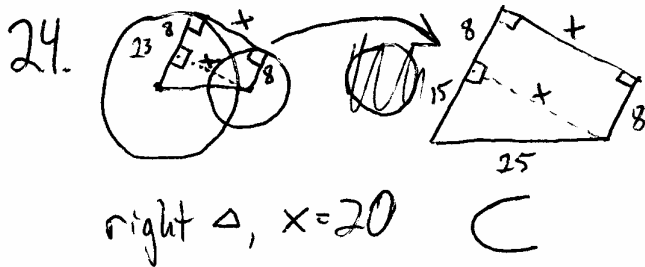


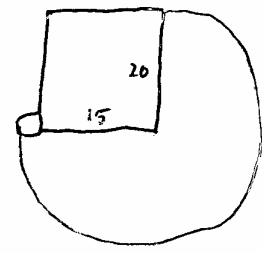
19.  $\frac{t-1}{2} \geq 5-2t$     $\frac{t-1}{2} > 3t+1$     $5-2t > 3t+1$    20.  $f(7) = -13$   
 $t-1 \geq 10-4t$     $t-1 > 6t+2$     $4 > 5t$     $g(-13) = 169-5$   
 $5t \geq 11$     $-3 > 5t$     $\frac{4}{5} > t$     $= 164$  A  
 $t \geq \frac{11}{5}$  ★    $-\frac{3}{5} > t$  ★  
 incompatible    $\emptyset$  E

21.  $\left(\frac{3+8}{2}, \frac{14+20}{2}\right) = \left(\frac{-5}{2}, 17\right)$  C

23.  $\frac{\pi r^2 h}{\frac{4}{3} \pi r^3} = \frac{3 \cdot 6 \cdot 18^3}{4 \cdot 12^3} = \frac{3 \cdot 3}{4 \cdot 2^3} = \frac{9}{32}$  D

22.  $\frac{3000}{8} \cdot \frac{3900}{6} = 375 \cdot 650$   
 $= 243750$  B



25.   
 $A = \frac{3}{4} \pi (20)^2 + \frac{1}{4} \pi (5)^2$   
 $= \frac{\pi 1225}{4}$  D

26.  $2^{6x+4} = 2^7$   
 $6x+4=7$   
 $6x=3$   
 $x = \frac{1}{2}$  B

27.  $\log_8(\log_6(x)) = \frac{1}{3}$   
 $\log_6(x) = 2$   
 $x = 36$  A

28.  $\begin{bmatrix} 1-2-2 & 5 & 1-3-2 \\ 4-2+3 & 5 & 4-3+1 \\ & & 3-2 \end{bmatrix} = \begin{bmatrix} -8 & -7 \\ 23 & -8 \end{bmatrix}$  C

30.  $AB=I \Rightarrow B=A^{-1} = \frac{1}{|A|} A^{adj}$

29.  $4 \cdot 3 - 2 \cdot 7 = 12 + 14 = 26$  B

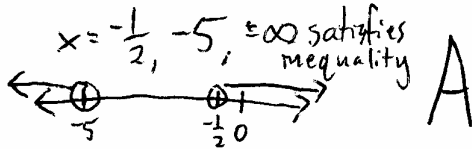
$B = -\frac{1}{6} \begin{bmatrix} -2 & 0 \\ -5 & 3 \end{bmatrix} = \begin{bmatrix} \frac{1}{3} & 0 \\ \frac{5}{6} & -\frac{1}{2} \end{bmatrix}$  A

31.  $12x - (x)(2x+1) > -6$

$12x - (2x^2 + x + 1) > -6$

$2x^2 + 11x + 5 > 0$

$(2x+1)(x+5) > 0$



32.  $M = 3^3 \cdot 2^3 \cdot 5^1 \cdot 7^1$

# factors =  $(3+1)(3+1)(1+1)(1+1)$

$= 4 \cdot 4 \cdot 2 \cdot 2 = 64$  E

33.  $S = \frac{N(N+1)}{2} = 8 \cdot 11 \cdot k$

$N = 32$  satisfies D

34.  $4, 11, 18, 25 = 4 + 7n$

58 B

36. It's a fair coin, so  $p(H) = p(T) = \frac{1}{2}$

$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$  E

35.  $P(\text{at least one}) = 1 - P(\text{none})$

odd cards: A, 3, 5, 7, 9 20 total

$1 - \frac{\binom{32}{8}}{\binom{52}{13}} = 1 - \frac{31}{51} = 1 - \frac{248}{663} = \frac{415}{663}$  D

37.  $\frac{\binom{7}{2} + \binom{4}{2}}{\binom{11}{2}} = \frac{7 \cdot 6 + 4 \cdot 3}{11 \cdot 10} = \frac{54}{110}$

$= \frac{27}{55}$  B

38.  $4, 7, 12, 19, 28$

$3 \ 5 \ 7 \ 9$

quadratics have linear differences B

39.  $k(i(m)) = 5 - 2(2m - 5)$

$= 5 - 4m + 10$

$= 15 - 4m$  B

40.  $d = (2x+1) - (x-3) = (x+18) - (2x+1)$

$x+4 = -x+17$

$2x = 13$

$x = \frac{13}{2} \Rightarrow d = \frac{21}{2}$

$\frac{13}{2} - 3 = \frac{7}{2}$  first term

$\frac{7}{2} + 4\left(\frac{21}{2}\right) = \frac{91}{2}$  fifth term D