1. Probability $= \frac{\text{cases we want}}{\text{Total cases}}$

$P(\text{Type A}) = \frac{\#\text{ people with blood type A}}{\#\text{ people Total}} = \frac{67}{150}$

$P(\text{Type AB}) = \frac{\#\text{ people AB}}{\#\text{ people total}} = \frac{6}{150}$

$P(\text{A or AB}) = P(A) + P(AB) = \frac{73}{150}$ **D**

2. Mean $= \frac{\text{Total}}{\#\text{ of entries}}$

$\frac{\$370 + \$310 + \$380 + \$340 + \$310}{5} = \frac{\$1710}{5} = \$342$

H

3. $\frac{1}{2}$ inch $\Rightarrow$ 18 miles According to map scale.

$2\frac{1}{2}\text{ inch} = 5(\frac{1}{2})\text{inch} \Rightarrow 5(18)\text{ miles}$

90 miles **E**

or $\frac{\frac{1}{2}\text{ inch}}{18\text{ miles}} = \frac{2\frac{1}{2}\text{ inch}}{x\text{ miles}}$

Cross multiply,

$x = 90$ miles

1. $f = cd^3$ $f = 450$ $d = 10$

$450 = c(10)^3$

$\frac{450}{1000} = c$

$\frac{45}{100} = c$

$.45 = c$

F

5. $f(x) = (3x+7)^2$

$f(1) = (3(1)+7)^2 = (10)^2 = 100$ **E**

6. Current wage: \$12.00 per hour

New wage = Current wage + 6%(current wage) = 1.06(Current wage)

$\$12.00(1.06) = \$12.72$ **H**

7. $\underbrace{1, -3, 9, -27}_{\text{Given by problem}}, \underbrace{81, -243, 729}_{\text{by pattern identification } (a_{n+1} = a_n \cdot (-3))}$ **E**

or $a_n = a_0(r)^n$

Note: because we set up the explicit formula starting at a_0, a_6 is the seventh term!

$a_6 = 1(-3)^6 = 729$

8. 15 pound box puts it in 10-25lb category.

cost = fee + (price per pound · weight)

$= \$10 + (\$.65 \cdot 15) = \$10 + \$9.75 = \$19.75$ **H**

9. Total thickness = Top thickness + bottom thickness + (inner layer thickness · # inner layers)

$.32\text{cm} = .03\text{cm} + .03\text{cm} + (.02\text{cm} \cdot n)$

$.26\text{cm} = .02\text{cm} \cdot n$

$13 = n$ **A**

10. 13, 15, 16, 19, 19, 22, 25, 25, 26, 27, 28, 29 ⇐ ordered to ease finding median

Since we have an even number of entries, median = $\frac{\text{Sum of middle entries}}{2}$

$= \frac{47}{2} = 23.5$ **K**

11. We are told the rate at which the cart travels is constant, so a function describing distance, d, with respect to time, t, will be linear. $d = rt + b$ (rate, starting point)

By table, $d(0) = 14$ $b = 14$ $(14 = r(0) + b)$

by table, $d(1) = 20 = r(1) + 14$

$6 = r$

$d(1) = 6t + 14$

C

p. 3

12. Area of rectangle = Length × Width

$54\,cm^2 = 9\,cm \times W$

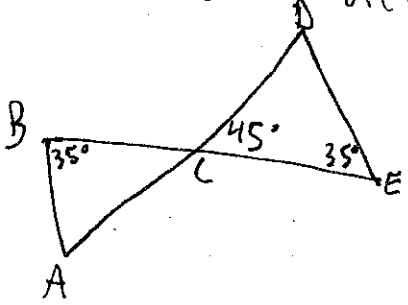
$6\,cm = W$

Perimeter $= 2L + 2W$

$2(9\,cm) + 2(6\,cm) = 18\,cm + 12\,cm = 30\,cm$

K

13.



Want $\angle BAC$.

$\angle BCA = 45°$ because $\angle BCA$ and $\angle ECD$ are vertical angles.

$180° = \angle ABC + \angle BCA + \angle BAC = 35° + 45° + x$

$180° = 80° + x$

$100° = x$

OR observe that these are similar triangles, so $\angle BAC$ is congruent to $\angle EDC$. Saves one step!

B

14. Core subjects = 4 hours

Total time = 9 hours

To make a pie chart, inner angle for core subject wedge $= \frac{4}{9} \cdot 360°$

(fraction of total time spent on core subjects · degrees in a circle)

$= 160°$

H

15. 70 figurines sold. Large sell for \$12, small sell for \$8. \$ earned from large = \$ earned from small

$70 = L + S$ $12L = 8S \Rightarrow \frac{3}{2}L = S$

by substitution,

$70 = L + \frac{3}{2}L$ $70 = \frac{5}{2}L$ $L = 28$

B

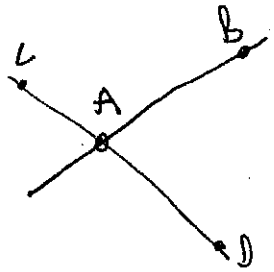
L = large figurines sold

S = small figurines sold

16. Car accelerates from 88fps to 220 fps in 3 seconds, constant acceleration

$a = \frac{\Delta V}{\Delta T} = \frac{220-88}{3} = \frac{132}{3} = 44 \frac{fps}{s}$

H

17. 

No diagram given, scenario articulated in words.

$\angle BAC = 47°$ (Given)

$\angle BAC + \angle BAD = 180°$ (supplementary angles)

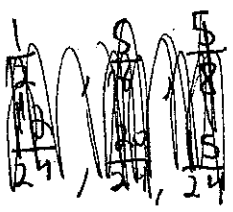
$47° + \angle BAD = 180°$

$\angle BAD = 133°$

D

18. $\frac{1}{2}, \frac{5}{6}, \frac{5}{8}$ in ascending order

$\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$ Use calculator to get decimals, or find common denominator.



$\frac{1}{2} = \frac{12}{24}$

$\frac{5}{6} = \frac{20}{24}$

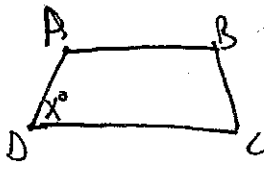
$\frac{5}{8} = \frac{15}{24}$

F

19. $670,000,000 + 700,000,000 = 1,370,000,000$

$= 1.37 \times 10^9$

D

20. 

ABCD is a trapezoid, $AB \parallel CD$

~~$\angle DAB + \angle CDA = 180°$~~ $\angle D = x°$

~~$\angle DAB + x° = 180°$~~

$\angle A + \angle D = 180°$

$\angle A + x° = 180°$

$\angle A = 180° - x°$

F

21. 80% pass written test, 60% of those pass driving test

Passing testers = ~~total~~ (total testers · 80%) · 60%

~~1000~~

$= (1000 \cdot .8) \cdot .6 = 480$

B

22. a, b, c positive integers. $a^b = x$ $c^b = y$

$xy = a^b \cdot c^b = (ac)^b$ H

23. $\frac{1}{2}y^2(6x+2y+12x-2y) = 3xy^2 + y^3 + 6xy^2 - y^3 = 9xy^2$

or combine like terms to get

$\frac{1}{2}y^2(18x) = 9xy^2$ A

24. profit $= 500p - p^2$ for p paintings sold

$60{,}000 = 500p - p^2$

$p^2 - 500p + 60{,}000 = 0$

$(p-200)(p-300) = 0$ H

200 is the smaller of the two values.

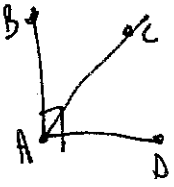
25. Total expenditures = \$900

Clothes = \$254 (the greatest of any expenditure)

$\frac{\$ \text{ clothes}}{\$ \text{ spent}} \cdot 100\% = \%$ of budget used on clothes

$\frac{\$254}{\$900} \cdot 100\% \approx 28\%$ B

26.



$\angle BAC = (x+20)^\circ$

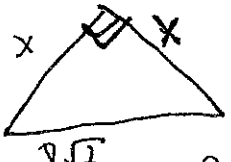
$\angle BAD = 90^\circ$

$\angle BAC + \angle CAD = \angle BAD$

$(x+20)^\circ + \angle CAD = 90^\circ$

$\angle CAD = (70-x)^\circ$ G

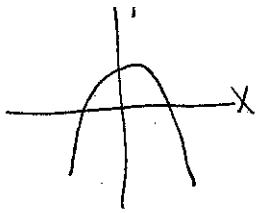
27.



given triangle is isosceles

$x = 8$ (by SOH CAH TOA, or special right triangles)

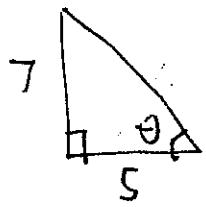
$p = 2x + 8\sqrt{2} = 16 + 8\sqrt{2}$ E

28.  $y = ax^2 + bx + c$. One x-int is positive and one is negative, both are real according to diagram.

H

29. $(-3i+4)(3i+4) = -9i^2 - 12i + 12i + 16 = -9(-1) + 16 = 25$
Calculator can do this easily!
Note difference of squares in funky order.

C

30. 

Extracted from diagram.
$\tan\theta = \frac{7}{5}$, by TOA

G

31. $P(\text{Extra piece}) = \frac{\#\text{ extra pieces}}{\#\text{ total pieces}} = \frac{5}{750+5} = \frac{5}{755}$

D

It's a 750 piece puzzle, and the 5 extra pieces count separately. It's a TRAP!

32. "Halfway" between" two numbers means average.

$$\frac{\frac{2}{3}+\frac{3}{4}}{2} = \frac{\frac{17}{12}}{2} = \frac{17}{24}$$

K

33. $\frac{.25\text{ in}}{2\text{ ft}} = \frac{x\text{ in}}{15\text{ ft}}$ ← given

B

$\frac{15}{8}\text{ in} = 1.875\text{ in} = x$

34. Area not covered by cabinets = Total area − cabinet area
$= 180 - (24 + 4(4)) = 180 - 40 = 140\text{ ft}^2$

Cabinets against wall

4 cabinets in center of room

each cabinet in center of room is 2×2

H

35. Cost = labor + (per cabinet cost · # cabinets)

$2,150 = $650 + (cabinet cost · 10)

$150 = cabinet cost.

Now, double # cabinets

$3,650 = $650 + (20 · $150)

(10 cabinets because 4 are in the middle of the room and 6 2'x2' cabinets fill the 12' wall at the back)

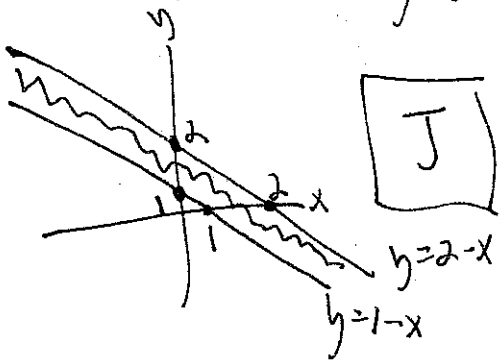
Note: could simply observe that we originally were quoted $1500 for cabinets and double this.

D

36. $1 < x+y$ $x+y<2$ (split inequality into 2 pieces)

$1-x<y$ $y<2-x$

Want area below line $y=2-x$ and above $y=1-x$



J

37. $\{3, 8, 10, 15\}$

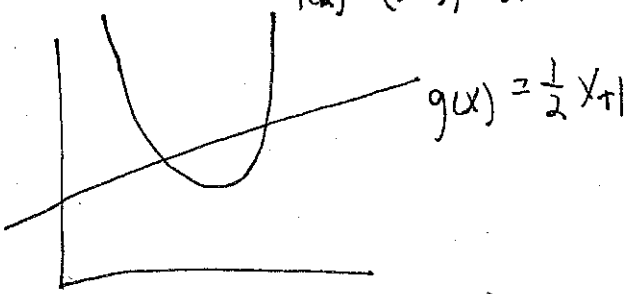
mean $= \frac{3+8+10+15}{4} = 9$

median $= \frac{8+10}{2} = 9$

$9-9=0$

A

38. $f(x) = (x-3)^2+2$



Intersects at 2 distinct points according to diagram, so $f(x)=g(x)$ at those points.

F

39. $C(9,4)$ $D(12,1)$ slope $\overline{CD} = \frac{1-4}{12-9} = \frac{-3}{3} = -1$

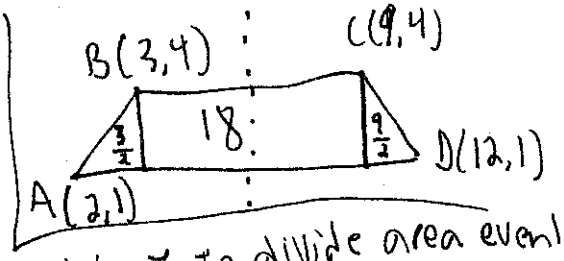
B

40. $D(12,1)$ Reflected over y-Axis $(x,y) \Rightarrow (-x,y)$

$D'(-12,1)$

F

41.



Want to divide area evenly with a vertical line.

So $\frac{3}{2} + A = \frac{9}{2} + (18 - A)$ where A is the area of the portion of the middle rectangle that will be on the left side of the vertical line that cuts the trapezoid in half.

$2A = 3 + 18$

$A = \frac{21}{2}$ so chunk of rectangle cut with left half has area $\frac{21}{2}$. That chunk has height 3, so width of $\frac{7}{2}$. That $\frac{7}{2}$ begins at $x=3$ (where the triangle ends) so vertical line must be drawn at $x = 3 + \frac{7}{2}$

$x = 6.5$

E

Note: backsolving is MUCH more efficient here.

42. $f(x) = x - \frac{1}{x}$ $g(x) = \frac{1}{x}$

~~$f(g(x)) = \frac{1}{\frac{1}{2}} - \frac{1}{\frac{1}{2}} = 2 - 2 = 0$~~

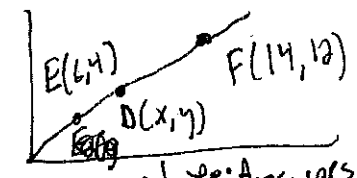
$f(g(\tfrac{1}{2})) = \left(\frac{1}{\frac{1}{2}}\right) - \frac{1}{\left(\frac{1}{2}\right)} = 2 - \frac{1}{2} = \frac{3}{2}$

K

13. $p = \frac{\frac{1}{2}ary + a}{12y}$ if a is doubled, $\frac{\frac{1}{2}(2a)ry + 2a}{12y} = 2\left(\frac{\frac{1}{2}ary + a}{12y}\right) = 2p$

D

14.



G

Note: Answers F & H describe points not on the line. Point D must be closer to point E than point F by construction. G is only possible answer. Note: E, F, H are not on the line, and D is closer to E

$\|EF\| = 4\|DE\|$

$\sqrt{128} = 4\|DE\|$

$\sqrt{8} = \|DE\|$

$8 = (x-6)^2 + (y-4)^2$

$y = x - 2$

$8 = (x-6)^2 + (x-2-4)^2$

$8 = 2(x-6)^2$

$x = 8, 4$ (4 is extraneous since D is between E and F)

$y = 8 - 2$

$y = 6$

(8, 6)

45. $a\begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$

$\begin{bmatrix} 2a & 6a \\ a & 4a \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$ $\quad 27 = 6a$

$\frac{9}{2} = a$

$x = 2\left(\frac{9}{2}\right) = 9$

$z = 4\left(\frac{9}{2}\right) = 18$

$x + z = 27$

D

46. $\frac{1}{8}c + 10 \text{ cups} = \frac{3}{4}c$

$10 \text{ cups} = \frac{5}{8}c$

$16 \text{ cups} = c$

J

p. 10

Test 2: Mathematics—Scoring Key

1572CPRE

Key	Reporting Category* PHM N	A	F	G	S	IES	MDL
1. D					—		
2. H						—	
3. E						—	
4. F						—	
5. E			—				
6. H						—	—
7. E			—				—
8. H						—	
9. A						—	—
10. K						—	
11. C		—					—
12. K						—	
13. B				—			
14. H						—	—
15. B		—					—
16. H	—						—
17. D						—	
18. F						—	
19. D		—					
20. F				—			—
21. B					—		—
22. H	—						
23. A		—					
24. H		—					—
25. B						—	
26. G						—	—
27. E				—			
28. H			—				—
29. C	—						
30. G				—			—

Key	Reporting Category* PHM N	A	F	G	S	IES	MDL
31. D					—		
32. K						—	
33. B						—	
34. H						—	
35. D		—					
36. J		—					
37. A					—		
38. F			—				
39. B			—				
40. F				—			
41. E				—			
42. K			—				—
43. D			—				—
44. G				—			
45. D	—						
46. J						—	—
47. B						—	
48. G	—						
49. A		—					
50. F						—	—
51. E						—	
52. H						—	
53. B						—	
54. K						—	—
55. E					—		—
56. K						—	
57. A			—				—
58. K						—	—
59. E					—		—
60. J				—			

Combine the totals of these columns and put in the blank for PHM in the box below.

***Reporting Categories**
PHM = Preparing for Higher Math
N = Number & Quantity
A = Algebra
F = Functions
G = Geometry
S = Statistics & Probability
IES = Integrating Essential Skills
MDL = Modeling

Number Correct (Raw Score) for:

Preparing for Higher Math (PHM) (N + A + F + G + S)	____ (35)
Integrating Essential Skills (IES)	____ (25)
Total Number Correct for Mathematics Test (PHM + IES)	____ (60)
Modeling (MDL) (Not included in total number correct for mathematics test raw score)	____ (22)