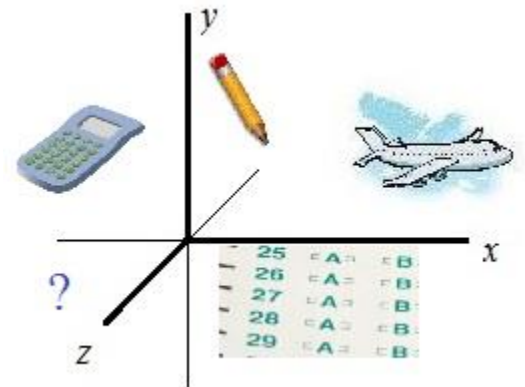


SAT Math Level 2

Practice Test C

24 multiple choice math questions (and solutions)



[Mathplane.com](https://www.mathplane.com)

Topics include probability, exponential functions, matrices, geometry, imaginary numbers, factoring, and more.

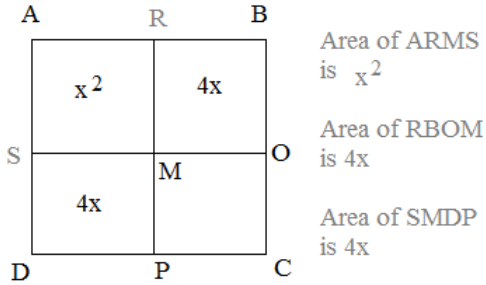
SAT Subject Test - Math Level 2 Practice III

- 1) A game has 2 spinners. Spinner #1 has a probability of landing red of $\frac{2}{3}$. And, spinner #2 has a probability of landing red of $\frac{1}{5}$. What is the probability spinner #1 lands red AND spinner #2 does NOT land red?
- a) $\frac{2}{15}$
 b) $\frac{8}{15}$
 c) $\frac{13}{15}$
 d) $\frac{1}{5}$
 e) $\frac{3}{5}$
- 2) For some positive real number 'b', the first 3 terms in a geometric sequence (progression) are $b - 1$, $b + 4$, $3b + 2$. What is the numerical value of the fourth term?
- a) 16
 b) 20
 c) 24
 d) 28
 e) 40

3) Which equation best models the following data in the table:

x	-6.7	-1.3	3.2	8.8
y	1.30	3.47	7.89	21.89

- a) $y = 1.2(4.4)^x$
 b) $y = 4.4(1.2)^x$
 c) $y = -1.2(4.4)^x$
 d) $y = -4.4(1.2)^x$
 e) $y = 1.2x^{4.4}$
- 4) The figure shows a square region divided into 4 rectangle regions. If the area of ABCD is 100 what is the area of MOCP?

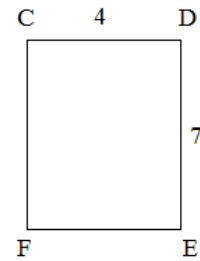


- 5) $\sin(\tan^{-1} 3) =$
- a) $\frac{1}{3}$ b) $\frac{3\sqrt{10}}{10}$ c) $\frac{1}{2}$ d) $\frac{\sqrt{2}}{3}$ e) $\frac{3}{10}$

SAT Subject Test - Math Level 2 Practice III

6) If rectangle CDEF is rotated about side DE, it creates a cylinder of volume:

- a) 28π
- b) 56π
- c) 98π
- d) 112π
- e) 196π



7) Find m and p :

$$\begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 0 & m \\ 3 & p \end{bmatrix} = \begin{bmatrix} 9 & 6 \\ 12 & 19 \end{bmatrix}$$

- a) $m = 3$
 $p = 15$
- b) $m = -3$
 $p = 4$
- c) $m = 1$
 $p = 16$
- d) $m = 2$
 $p = 5$
- e) $m = 8$
 $p = -3$

8) A pole is 20 feet high. A taut wire that is 46 feet extends from the top of the pole to the ground. What is the angle of depression, to the nearest degree, from the top of the pole to the bottom of the wire?

- a) 23
- b) 26
- c) 43
- d) 64
- e) 67

9) Identify the range of the greatest integer function $y = \lceil x - 3 \rceil$ for $-3 < x < 3$

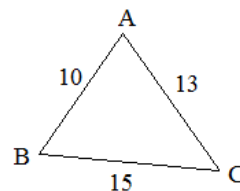
- a) $-5 < x < 0$
- b) $-6 < x < 0$
- c) $-7 < x < -1$
- d) $x = -6, -5, -4, -3, -2, -1, 0$
- e) $x = -6, -5, -4, -3, -2, -1$

10) $4 \times 2^3 + 6 \div 2 =$

- a) 15
- b) 19
- c) 21
- d) 28
- e) 35

SAT Subject Test - Math Level 2 Practice III

- 11) If $|-2x + 3| > 5$, which is a possible value of x ?
- a) -4
 - b) -1
 - c) 0
 - d) 1
 - e) 4
- 12) A pizza parlor cuts its 14-inch (diameter) pizzas into 8 equal slices. What is the size (in square inches) of each slice?
- a) 5.5
 - b) 19.2
 - c) 44.1
 - d) 60.4
 - e) 77.0
- 13) A vertical line l passes through the point $(2, 3)$. A horizontal line m passes through the point $(-1, 6)$. Where do lines l and m intersect?
- a) $(0, 5)$
 - b) $(2, 6)$
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 - d) $(-1, 3)$
 - e) $(3, -1)$
- 14) If the polar coordinate $(-2, 135^\circ)$ were converted and placed on a rectangular coordinate plane, which quadrant would it lie?
- a) I
 - b) II
 - c) III
 - d) IV
 - e) The point lies on the x-axis
- 15) What is the measure (in degrees) of angle A ?
- a) 53.4
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 - e) 80.3



16) What is the maximum value of the function $f(x) = -3(x + 4)(x + 8)$

- a) -36
- b) -3
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- d) 12
- e) 36

17) In the complex plane, what is the distance of $4 - 2i$ from the origin?

- a) 2
- b) 3.46
- c) 4.47
- d) 6
- e) 12

18) Evaluate $\lim_{x \rightarrow \infty} \frac{(2x + 5)(5 - 2x)}{(x + 1)^2}$

- a) -4
- b) -1
- c) 0
- d) 2
- e) $5/2$

19) Which is a factor of $x^3 + 9x^2 - 6x - 4$?

- a) $x + 1$
- b) $x - 1$
- c) $x + 4$
- d) $x - 4$
- e) none of the above

20) What is the 4th term in the binomial expansion $(a + b)^{10}$?

- a) $a^7 b^3$
- b) $a^6 b^4$
- c) $210a^6 b^4$
- d) $120a^7 b^3$
- e) $120a^3 b^7$

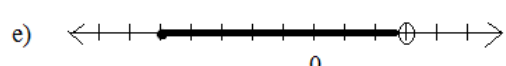
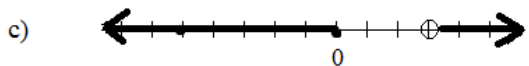
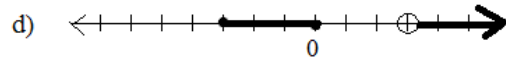
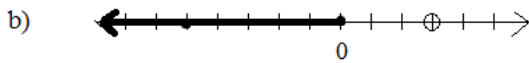
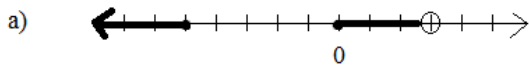
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- a) 72.80
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- d) 82.60
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22) A 14-sided regular polygon has how many diagonals?

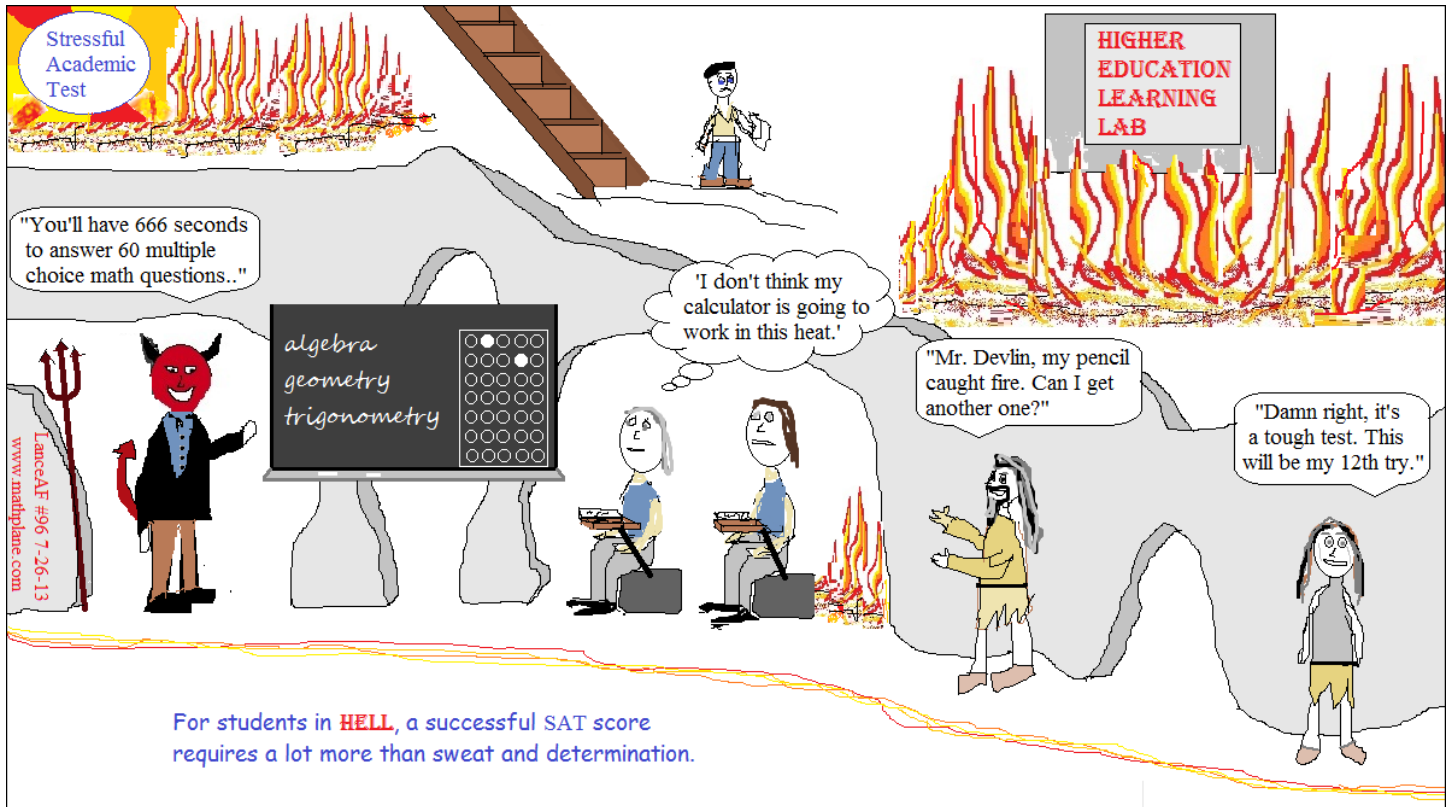
- a) 14
- b) 28
- c) 77
- d) 154
- e) 182

23) The solution to $y \leq \frac{x(x+5)^2}{(x-3)}$ is represented by which number line?



24) Which letter has line symmetry?

- a) a
- b) b
- c) c
- d) d
- e) e



Solutions ->

- 1) A game has 2 spinners. Spinner #1 has a probability of landing red of $\frac{2}{3}$. And, spinner #2 has a probability of landing red of $\frac{1}{5}$. What is the probability spinner #1 lands red AND spinner #2 does NOT land red?

- a) $\frac{2}{15}$
b) $\frac{8}{15}$
 c) $\frac{13}{15}$
 d) $\frac{1}{5}$
 e) $\frac{3}{5}$

Probability of 2 (independent) events = $P(\text{event 1}) \times P(\text{event 2})$

$$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

- 2) For some positive real number 'b', the first 3 terms in a geometric sequence (progression) are $b - 1$, $b + 4$, $3b + 2$. What is the numerical value of the fourth term?

- a) 16
 b) 20
 c) 24
 d) 28
e) 40

Since this is a *geometric* sequence, there is a common ratio between terms...

$$\frac{\text{term 2}}{\text{term 1}} = \frac{\text{term 3}}{\text{term 2}} \Rightarrow \frac{b+4}{b-1} = \frac{3b+2}{b+4}$$

since $b = 6$, the terms are 5, 10, 20, geometric ratio is 2...

4th term is **40**

Cross multiply and solve to find b

$$(b+4)(b+4) = (b-1)(3b+2)$$

$$b^2 + 8b + 16 = 3b^2 - b - 2$$

$$2b^2 - 9b - 18 = 0$$

$$(2b+3)(b-6) = 0$$

$$b = -\frac{3}{2} \text{ or } 6$$

In this example, 'b' is some positive real number, so we can eliminate $-\frac{3}{2}$

- 3) Which equation best models the following data in the table:

- a) $y = 1.2(4.4)^x$
b) $y = 4.4(1.2)^x$
 c) $y = -1.2(4.4)^x$
 d) $y = -4.4(1.2)^x$
 e) $y = 1.2x^{4.4}$

x	-6.7	-1.3	3.2	8.8
y	1.30	3.47	7.89	21.89

since all the y outputs are positive, this eliminates c) and d)...

$(4.4)^{8.8}$ and $(1.2)^{8.8}$ will produce significantly different outputs (eliminating a)

- 4) The figure shows a square region divided into 4 rectangle regions. If the area of ABCD is 100 what is the area of MOCP?

- a) 16**
 b) 24
 c) 28
 d) 36
 e) 64

$$\text{MOCP} = 4 \times 4 = 16$$

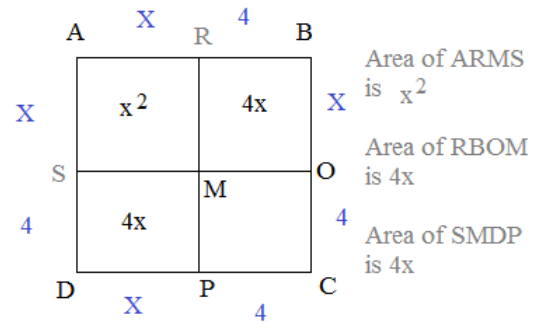
$$\text{also, } (x+4)^2 = 100$$

$$x^2 + 8x + 16 = 100$$

$$x^2 + 8x - 84 = 0$$

$$(x+14)(x-6) = 0$$

$x = 6$ or -14 cannot be negative



- 5) $\sin(\tan^{-1} 3) =$

a) $\frac{1}{3}$

b) $\frac{3\sqrt{10}}{10}$

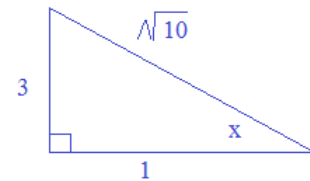
c) $\frac{1}{2}$

d) $\frac{\sqrt{2}}{3}$

e) $\frac{3}{10}$

$$\sin x = \frac{3}{\sqrt{10}}$$

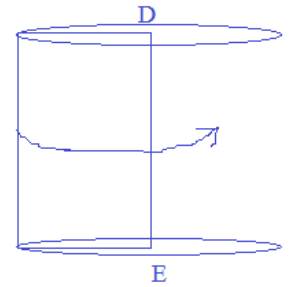
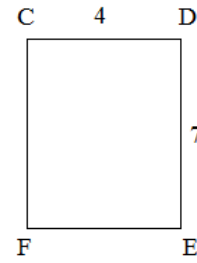
$$\tan = \frac{\text{opposite}}{\text{adjacent}} = \frac{3}{1}$$



6) If rectangle CDEF is rotated about side DE, it creates a cylinder of volume:

- a) 28π
- b) 56π
- c) 98π
- d) 112π**
- e) 196π

$$\begin{aligned} \text{Volume (cylinder)} &= \text{area of top}(\text{height}) \\ &= \pi r^2(\text{height}) \\ &= \pi(4)^2(7) \\ &= 112\pi \end{aligned}$$



7) Find m and p :

$$\begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 0 & m \\ 3 & p \end{bmatrix} = \begin{bmatrix} 9 & 6 \\ 12 & 19 \end{bmatrix}$$

$$\begin{aligned} 2m + 3p &= 6 \\ -1m + 4p &= 19 \end{aligned}$$

using combination/elimination:

a) $m = 3$
 $p = 15$

**b) $m = -3$
 $p = 4$**

c) $m = 1$
 $p = 16$

d) $m = 2$
 $p = 5$

e) $m = 8$
 $p = -3$

$$\begin{aligned} 2m + 3p &= 6 \\ -2m + 8p &= 38 \end{aligned}$$

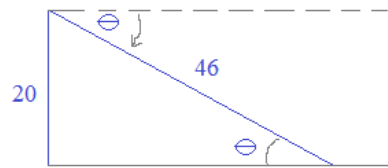
$$\begin{aligned} 11p &= 44 \\ p &= 4 \end{aligned}$$

if $p = 4$, then
 $m = -3$

8) A pole is 20 feet high. A taut wire that is 46 feet extends from the top of the pole to the ground. What is the angle of depression, to the nearest degree, from the top of the pole to the bottom of the wire?

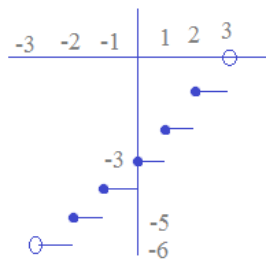
- a) 23
- b) 26**
- c) 43
- d) 64
- e) 67

$$\begin{aligned} \sin \theta &= \frac{20}{46} = .435 \\ \text{(take inverse sine of .435)} \\ \theta &= 25.8 \text{ (approx)} \end{aligned}$$



9) Identify the range of the greatest integer function $y = \lfloor x - 3 \rfloor$ for $-3 < x < 3$

- a) $-5 < x < 0$
- b) $-6 < x < 0$
- c) $-7 < x < -1$
- d) $x = -6, -5, -4, -3, -2, -1, 0$
- e) $x = -6, -5, -4, -3, -2, -1$**



the y values in the graph are $-1, -2, -3, -4, -5$, and -6

10) $4 \times 2^3 + 6 \div 2 =$

- a) 15
- b) 19
- c) 21
- d) 28
- e) 35**

PEMDAS
P Parentheses
E Exponent
M Multiplication/Division
D Addition/Subtraction

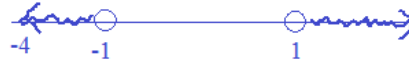
$$\begin{aligned} 4 \times 2^3 + 6 \div 2 \\ 4 \times 8 + 6 \div 2 \\ 32 + 3 \\ 35 \end{aligned}$$

11) If $|-2x + 3| > 5$, which is a possible value of x ?

- a) -4
- b) -1
- c) 0
- d) 1
- e) 4

$$-2x + 3 > 5 \quad \text{or} \quad -2x + 3 < -5$$

$$x < -1 \quad \quad \quad x > 1$$



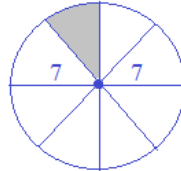
12) A pizza parlor cuts its 14-inch (diameter) pizzas into 8 equal slices. What is the size (in square inches) of each slice?

- a) 5.5
- b) 19.2
- c) 44.1
- d) 60.4
- e) 77.0

area of entire pizza:

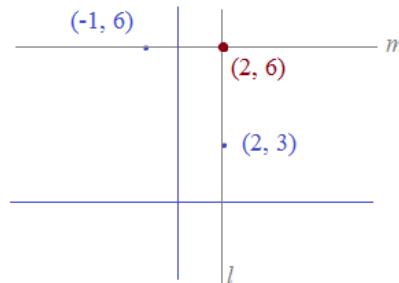
$$\pi r^2 = 49\pi$$

each slice: $\frac{49\pi}{8} = 19.2$



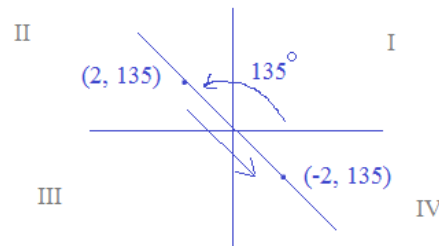
13) A vertical line l passes through the point $(2, 3)$. A horizontal line m passes through the point $(-1, 6)$. Where do lines l and m intersect?

- a) $(0, 5)$
- b) $(2, 6)$
- c) $(6, 2)$
- d) $(-1, 3)$
- e) $(3, -1)$



14) If the polar coordinate $(-2, 135^\circ)$ were converted and placed on a rectangular coordinate plane, which quadrant would it lie?

- a) I
- b) II
- c) III
- d) IV
- e) The point lies on the x-axis



15) What is the measure (in degrees) of angle A?

- a) 53.4
- b) 58.7
- c) 63.6
- d) 70.1
- e) 80.3

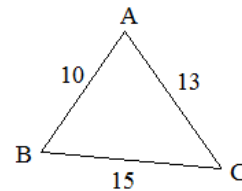
Law of cosines: $a^2 = b^2 + c^2 - 2bc(\cos A)$

$$(15)^2 = (13)^2 + (10)^2 - 2(13)(10)(\cos A)$$

$$225 = 169 + 100 - 260(\cos A)$$

$$-44 = -260(\cos A)$$

$$\cos A = .169 \quad A = 80.25$$

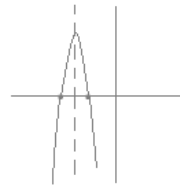


- 16) What is the maximum value of the function $f(x) = -3(x + 4)(x + 8)$
- a) -36
 - b) -3
 - c) 0
 - d) 12**
 - e) 36

Since $f(x)$ has a degree of 2, it is a parabola. The coefficient of the lead term will be -3, so the parabola will "face down" (and the maximum value will be the vertex!)

To find the vertex, recognize that the zeros (x-intercepts) will be at -4 and -8.. therefore, the axis of symmetry will be at $x = -6$...

$f(-6) = 12$
so, the vertex is $(-6, 12)$

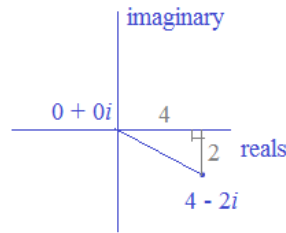


- 17) In the complex plane, what is the distance of $4 - 2i$ from the origin?
- a) 2
 - b) 3.46
 - c) 4.47**
 - d) 6
 - e) 12

$$\sqrt{(4 - 0)^2 + (-2 - 0)^2} = \sqrt{20}$$

approx 4.47

(also the "magnitude" of the complex number)



- 18) Evaluate $\lim_{x \rightarrow \infty} \frac{(2x + 5)(5 - 2x)}{(x + 1)^2}$

- a) -4**
- b) -1
- c) 0
- d) 2
- e) 5/2

$$\frac{-4x^2 + 25}{x^2 + 2x + 1}$$

For limit approaching infinity, determine degrees of numerator and denominator...

Deg. of num: 2

Deg. of den: 2

since they are equal, look at the lead coefficients...

lead coefficient of num: -4

lead coefficient of den: 1

lim is -4/1

- 19) Which is a factor of $x^3 + 9x^2 - 6x - 4$?
- a) $x + 1$
 - b) $x - 1$**
 - c) $x + 4$
 - d) $x - 4$
 - e) none of the above

Consider the factor/remainder theorem:

$f(-1) = -1 + 9 + 6 - 4 = 10$ not zero

$f(1) = 1 + 9 - 6 - 4 = 0$ 1 is a zero! therefore, $x - 1$ is a factor...

- 20) What is the 4th term in the binomial expansion $(a + b)^{10}$?

- a) $a^7 b^3$
- b) $a^6 b^4$
- c) $210a^6 b^4$
- d) $120a^7 b^3$**
- e) $120a^3 b^7$

or, $10C2$

$$a^{10}b^0 + \binom{10}{1}a^9b^1 + \binom{10}{2}a^8b^2 + \binom{10}{3}a^7b^3 + 210a^6b^4 + \dots$$

$$a^{10} + 10a^9b + 45a^8b^2 + 120a^7b^3$$

1st 2nd 3rd 4th term..

21) At the "30% off" book sale, a calculus book costs \$56. What is the original price of the book?

- a) 72.80
- b) 77
- c) 80**
- d) 82.60
- e) 86

$$\begin{aligned} &\text{original price} && \text{discount} && \text{cost} \\ &B &+ &(-.30)B &= & \$56 \\ &&&&&& .70B = \$56 \\ &&&&&& B = \$80 \end{aligned}$$

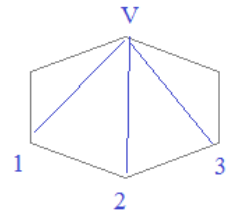
22) A 14-sided regular polygon has how many diagonals?

- a) 14
- b) 28
- c) 77**
- d) 154
- e) 182

$$\begin{aligned} \# \text{ of diagonals} &= \frac{n(n-3)}{2} && \text{(where } n \text{ is the number} \\ &&& \text{of sides)} \\ &= \frac{14(14-3)}{2} = 77 \end{aligned}$$

consider a hexagon:

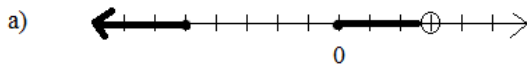
each vertex connects to another EXCEPT the 2 adjacent ones (and itself)



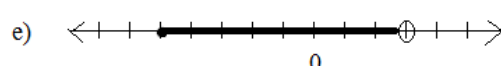
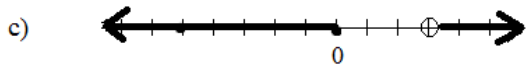
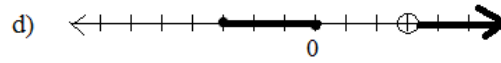
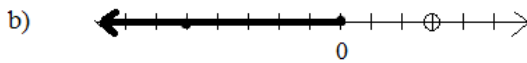
V to 1 is the same as 1 to V. So, to avoid "double counting" divide the total by 2

$$\frac{(n-3)}{2}$$

23) The solution to $y \leq \frac{x(x+5)^2}{(x-3)}$ is represented by which number line?



Identify key values; then, test regions... c)



24) Which letter has line symmetry?

- a) a
- b) b
- c) c**
- d) d
- e) e



C has horizontal line symmetry..

Want more test prep questions?

- 1) A game has 2 spinners. Spinner #1 has a probability of landing red of $\frac{2}{3}$. And, spinner #2 has a probability of landing red of $\frac{1}{5}$.
What is the probability spinner #1 lands red AND spinner #2 does NOT land red?

- a) $\frac{2}{15}$
- b) $\frac{8}{15}$
- c) $\frac{13}{15}$
- d) $\frac{1}{5}$
- e) $\frac{3}{5}$

- 2) For some positive real number 'b',
 $b - 1$, $b + 4$, $3b + 2$. What is the

- a) 16
- b) 20
- c) 24
- d) 28
- e) 40

- 3) Which equation best models the following data in the table:

a) $y = 1.2(4.4)^x$

b) $y = 4.4(1.2)^x$

x	-6.7	-1.3	3.2	8.8
	1.20	2.47	7.80	21.80

150 SAT Subject Test Math Level 2 Practice Questions

(and, Solutions)

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(\$5 for .pdf or .docx packet)

The proceeds go to site maintenance and treats for Oscar the Dog.

We appreciate your support. Thanks for visiting!