

## ACT SUBJECT BREAKDOWN

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### **ENGLISH**

#### **A. BREAKDOWN**

- a. **75 questions, 45 minutes** (36 sec. per question)
- b. **5 passages, 15 questions per passage** (9 min. per passage)

#### **B. LESSON LIST**

- a. Four ways to **combine full sentences** (avoid **comma splices**) (period, semicolon, comma + conjunction, colon)
- b. **Subject-verb** agreement/tense & conjugation
- c. **Introductory** words & phrases (punctuation, implication)
- d. **Active vs. passive** voice
- e. Standard English convention (**SEC**)
- f. **Adverbs vs. adjectives**
- g. **Dashes & parentheses**
- h. Word/sentence **order**/passage **organization**
- i. **Consistency** & formatting
- j. **Grammar vs. style**

#### **C. STRATEGY**

- a. Don't read the passage first and then answer questions, but make sure you **pick up where you left off** reading rather than jumping down to the next question.
- b. When possible, make the changes **in your head** that you would make if you were editing this passage, then check to see if that option is there. But be **willing to change your opinion**, as you might not realize what the author is really going for until you see the right option (usually because the others have grammatical errors or severe stylistic errors).
- c. **Grammar** is your **first priority**, but **style** is still **important**. A stylistically adequate sentence with a grammatical error is unacceptable, but oftentimes a grammatically correct but 'wordy' sentence will have to suffice.

- d. Circle/star questions that you are unsure of along the way, so that any extra time can be used most productively on those questions. (Consider 3-tiered notation: **single** circle for 'unsure,' **double** for 'very unsure,' **triple** for 'no clue,' focusing first on *single circles* with any extra time.)
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## MATH

### A. BREAKDOWN

- a. **60 questions, 60 minutes** (1 min. per question)
- b. Only section that gets progressively harder: first half should take, on average, 40 seconds per question, so that during the second half, you have, on average, 1 min. 20 sec. per question. But there will be some (especially in the first 10) that take < 20 sec.

### B. LESSON LIST ([GENERAL MATH GUIDE](#))

#### a. ALGEBRA (PRE-, ELEM., INTER.)

- i. **Linear Equations:**  $y=mx+b$  (*slope-intercept form*)
  1. **Slope** (3+ definitions)
  2. **Midpoints** (average X's, average Y's)
  3. **Length of line segment** (Pythag. The., *not* distance formula!)
- ii. **Averages:** mean, median, mode
  1. **Average speed** (total distance/total time)
- iii. **Probabilities:** (positive cases)/(total possible cases)
  1. **Compound** (2+ events occurring)
- iv. **Combinations:** *total combinations* = (options in slot 1) x (options in slot 2) x (options in slot 3) ... (Cafeteria example).
- v. **Percentages:** x is (=) 30% (0.30) of (x) 100. (x=30)
  1. **Percent decrease:** (100%-x%) (.85 after 15% discount)
  2. **Percent increase:** (100%+x%) (1.15 after 15% surcharge)
- vi. **Quadratics:**  $ax^2+bx+c=0$  (*standard form*),  $(x \pm a)(x \pm b)=0$  (*binomial form\**) ( $x=\pm a, \pm b$ ) (*\*solved in binomial form*)
  1. **FOILing:** binomial form  $\rightarrow$  standard form
  2. **Factoring:** standard form  $\rightarrow$  binomial form (must multiple to C, combine to b)
- vii. **Ratios:** 2 types of problems (easy/hard)
  1. **Easy:** camp is  $\frac{\%}{100}$  boys/girls, total of 8 boys, how many girls?
  2. **Hard:** camp is  $\frac{\%}{100}$  boys/girls, total of 28 kids, how many boys? Girls?
- viii. **Tools for Solving Equations**

1. **Exponential rules** (addition, subtraction, multiplication, division; negative exponents; fractional exponents)
2. **Square roots** (opposite of exponents; convert from fractional exponents to square root notation; simplifying) (third root = 'to the power of one-third')
3. **Factoring out vs. distributing**
4. **Identification:** linear (solve for x), quadratic (set = to 0), cubic (solve for x, third root)
5. **Simplify, simplify, simplify** (even what they give you!)

#### b. GEOMETRY (COORDINATE, PLANE)

##### i. COORDINATE

1. **Length of line segment** (used to calculate areas in coordinate planes)
2. **Calculating slope** (long & quick ways)

##### ii. PLANE

1. **Area of square, rectangle, circle, triangle, parallelogram, trapezoid**
2. **Volume of cube, rectangular prism, circular prism, triangular prism, trapezoidal prism**
3. **Circles:** radius, diameter, circumference, arc length, arc degree measure, percentages of circumferences
  - a. **Equation:**  $(x-h)^2+(y-k)^2=r^2$  (center at (h,k), radius=r)

#### c. TRIGONOMETRY

- i. **Special Right Triangles: 30-60-90, 45-45-90**
- ii. **Pythagorean Triples: 3-4-5, 5-12-13, 7-24-25** (+multiples of all! [6-8-10, 10-24-26, 14-48-50])
- iii. **Isosceles (45-45-90) & equilateral (60-60-60) triangles**
- iv. **Sine, cosine, tangent (SOHCAHTOA) ( $\sin[x]/\cos[x]=\tan[x]$ )**
  1. **Easy:** identifying sines, cosines, tangents from identified triangles
  2. **Hard:** given a particular sine and incomplete side lengths, find cosine or tangent

#### C. STRATEGY

- a. Hopefully coming out of the first section with no more than 4-5 missed questions.
  - b. Circle/star questions that you are unsure of along the way, so that any extra time can be used most productively on those questions. (Consider 3-tiered notation: **single** circle for 'unsure,' **double** for 'very unsure,' **triple** for 'no clue,' focusing first on *single circles* with any extra time.)
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## READING

### A. BREAKDOWN

- a. **40 questions, 35 minutes** (52.5 sec. per question)
- b. **4 passages, 10 questions per passage** (8 min. 45 sec. per passage)
- c. 1 **Prose Fiction** passage, 1 **Social Science** passage, 1 **Humanities** passage, 1 **Natural Science** passage

### B. STRATEGY

- a. **Invest time** to read the passage: it is better to go through the questions somewhat quickly with a good understanding of the passage and ‘where to look’ than reading quickly and having to re-read after each question.
  - b. Read **introductions** and titles of all passages; note date and read somewhat slower if in **Old English**.
  - c. The reading section is about **what is in the passage**, not literary interpretation or textual analysis. The more ‘steps’ removed you are from the passage (the more you find yourself saying ‘Well, that *could* be interpreted this way...’), the more you should be suspicious of the answer. Take them at their word. They are being **explicit**, and so should you. There is almost always a specific part of the text which has the answer, **except** for overall ‘**tone**’ or ‘**purpose**’ questions.
  - d. Try first, when possible, to answer the question **for yourself** before you read the answer options. They are good at designing answer choices that lead you astray. Then confirm that your answer is there (in different wording, of course), and try to **identify the ‘trap’** that they are trying to set with the other answer choices.
  - e. Circle/star questions that you are unsure of along the way, so that any extra time can be used most productively on those questions. (Consider 3-tiered notation: **single** circle for ‘*unsure*,’ **double** for ‘*very unsure*,’ **triple** for ‘*no clue*,’ focusing first on *single circles* with any extra time.)
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## SCIENCE

### A. BREAKDOWN

- a. **40 questions, 35 minutes** (52.5 sec. per question)
- b. **7 passages, 5-6 questions per passage** (5 min. per passage)

**B. STRATEGY**

- a. If simply a reading passage with competing hypotheses, **invest time** to read the passage: it is better to go through the questions somewhat quickly with a good understanding of the passage and ‘where to look’ than reading quickly and having to re-read after each question.
- b. There is no single timing strategy for science (except aiming for 5 minutes per passage *on average*), since some passages will go very quickly and others will involve reading quite a bit, so you will often be well **above and below that 5 minute per passage rate**.
- c. Look for **data trends**: usually both **vertically** and **horizontally** (one might be more meaningful and important than the other).
  - i. Are numbers going **up** or **down**? Are **some** variables going up, and others going down?
  - ii. What variables are **correlated**, and how? (**Negatively, positively**) (When X goes up, Y goes up/down, or vice versa)
  - iii. Even if multiple variables are rising or falling, which are rising and falling **fastest? slowest?**
  - iv. What in the experimental **context** explains this data? What **conclusions** can we draw based on these trends?
- d. Always make note of **axis titles** so that you know what is being measured; look for small changes between axis labels when presented with several graphs. They will not go out of their way to point out the differences between graphs and sub-experiments. You should note these **as you read** and review the data.
- e. When **comparing hypotheses**, ask what facts the competing scientists are basing their theories on. What are they proposing **a theory of**? What do they **differ** on? What would their hypothesis **explain** that the other would not? What doesn't their hypothesis **explain** that the other does? What would need to be done to **test** both hypotheses?
- f. Circle/star questions that you are unsure of along the way, so that any extra time can be used most productively on those questions. (Consider 3-tiered notation: **single** circle for ‘*unsure*,’ **double** for ‘*very unsure*,’ **triple** for ‘*no clue*,’ focusing first on *single circles* with any extra time.)

## **TIMING EXERCISES**

### **ENGLISH**

**1 PASSAGE = 15 QUESTIONS, 9 MINUTES (36 SEC./QUESTION)**

### **MATH**

**#1-12 = 12 QUESTIONS, 8 MINUTES (40 SEC./QUESTION)\*\*\***

**#13-24 = 12 QUESTIONS, 8 MINUTES (40 SEC./QUESTION)\*\***

**#23-36 = 12 QUESTIONS, 8 MINUTES (40 SEC./QUESTION)\***

**#37-48 = 12 QUESTIONS, 16 MINUTES (80 SEC./QUESTION)\*\***

**#49-60 = 12 QUESTIONS, 16 MINUTES (80 SEC./QUESTION)\*\*\***

*\*(first priority)*

*\*\* (second priority)*

*\*\*\* (third priority)*

### **READING**

**1 PASSAGE = 10 QUESTIONS, 8 MIN. 45 SEC.**

> **READING:** 3.5-4.5 MIN (dependent on difficulty)\*

> **QUESTIONS:** 4.25-5.25 MIN (**28.5 SEC./QUESTION**)

*\*(vary between Prose Fiction, Social Science, Humanities, Natural Science)*

### **SCIENCE**

**3 PASSAGES = 15-18 QUESTIONS, 12-18 MIN.\***

*\*(depending on level of reading vs. data)*