**Mathematics** Assessment Program ***CCR-A2***

# College and Career Readiness Mathematics

Time allowed: 40 minutes

These tasks give you a chance to show what you know and how you reason, and to solve mathematical problems.

Please show your work and reasoning in the spaces provided. Explain any assumptions you make.

**Try as many tasks as you can in the time given.**
**If you get stuck on a task, move on to the next task.**

Name: _____ Male Female

School: _____ City: _____

Teacher: _____ Grade: _____

Date: _____

Do not write in the box below:

| **CCR-A2** | Short Tasks | Giant burgers | Printing Tickets | Circles in Triangles | Total |
|---|---|---|---|---|---|
| **11** | | | | | |

These tests were developed with support from the Bill and Melinda Gates Foundation

## Short Tasks

1. For all real numbers $x$, $(3x + 2)(2x - 5) = ax^2 + kx + n$.
   Find the values of a, k, and n.

2. If $V = \dfrac{12R}{(r + R)}$, make R the subject of the equation.

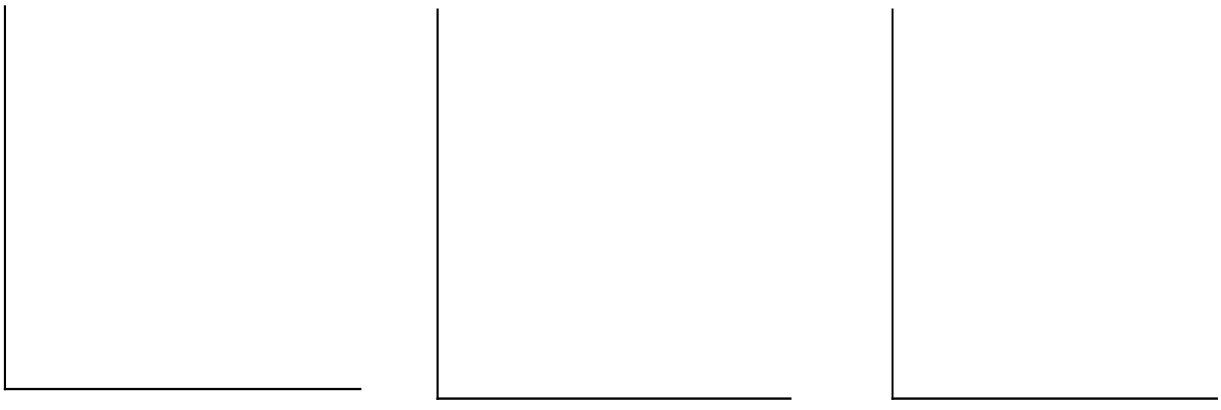
3. a. One of these tables represents a linear relationship, one represents an exponential growth and one represents an exponential decay. Label each table correctly.

| x | y |
|---|---|
| 1 | 6 |
| 2 | 9 |
| 3 | 12 |
| 4 | 15 |

| x | y |
|---|---|
| 1 | 56 |
| 2 | 28 |
| 3 | 14 |
| 4 | 7 |

| x | y |
|---|---|
| 1 | 6 |
| 2 | 9 |
| 3 | 13.5 |
| 4 | 20.25 |

b. Sketch graphs showing each of these relationships.



c. Write an equation representing the linear relationship.

# Giantburgers

This headline appeared in a newspaper.

**Every day 7% of Americans eat at Giantburger restaurants**

Decide whether this headline is true using the following information.

- There are about $8 \times 10^3$ Giantburger restaurants in America.
- Each restaurant serves about $2.5 \times 10^3$ people every day.
- There are about $3 \times 10^8$ Americans.

Explain your reasons and show clearly how you figured it out.

## Printing Tickets

Susie is organizing the printing of tickets for a show.

She has collected prices from several printers and these two seem to be the best.

**SURE PRINT**
Ticket printing
25 tickets for $2

**BEST PRINT**
Tickets printed
$10 setting up
plus
$1 for 25 tickets

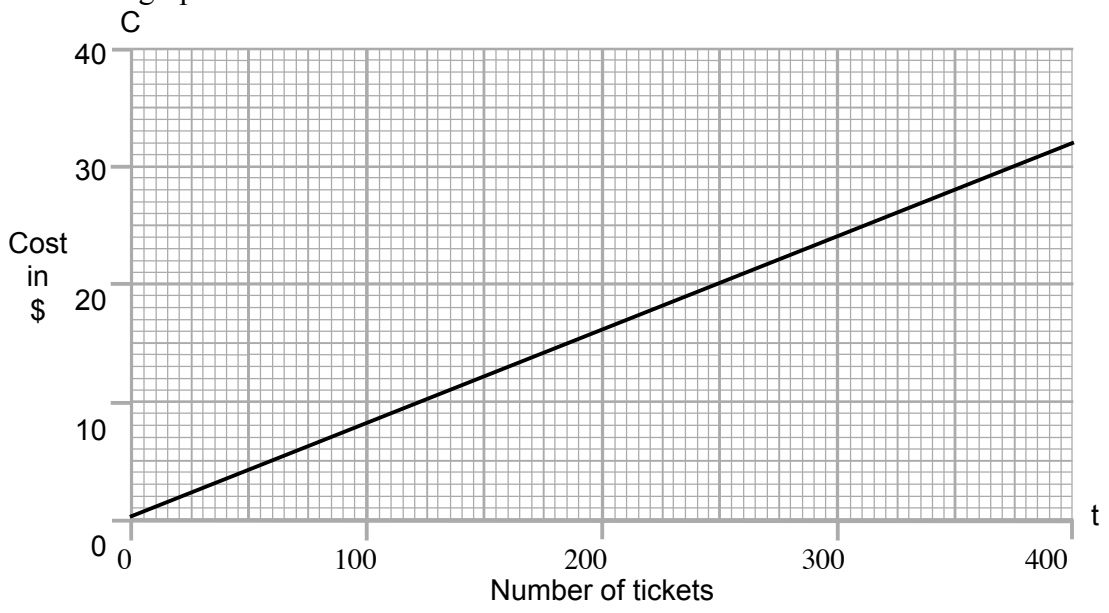
1. Using **C** for the cost of the printing and **t** for the number of tickets, Susie writes a formula for each of the printers. Here is her formula for *Sure Print*:

   *Sure Print* $C = \frac{2\mathbf{t}}{25}$

   Write the formula for Best Print:

   *Best Print* C =

2. Susie's brother Rob has drawn *Sure Print*'s graph on a grid.
   Draw the graph for *Best Print*.



3. Susie uses algebra to find the values of C and t when the cost of printing the tickets is the same for both of the printers.

C = _____ t = _____

Show how Susie may have calculated C and t.

4. What do Rob's graphs and Susie's calculations tell us about the cost of the tickets? Which company should Susie choose under what circumstances?

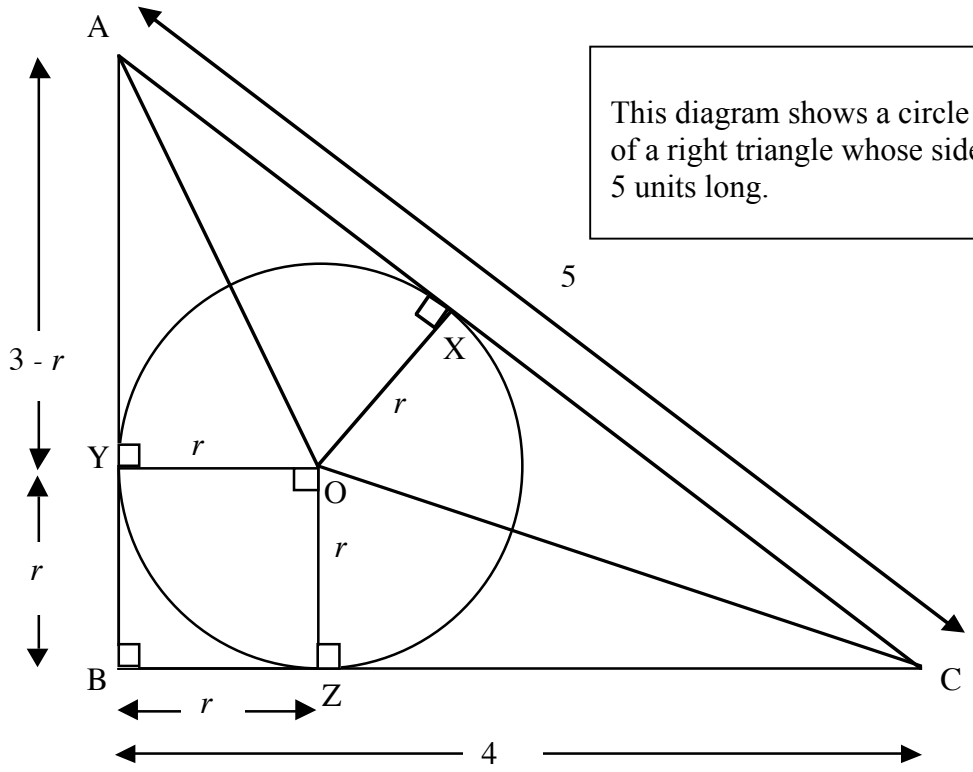
_____

_____

_____

_____

## Circles in Triangles



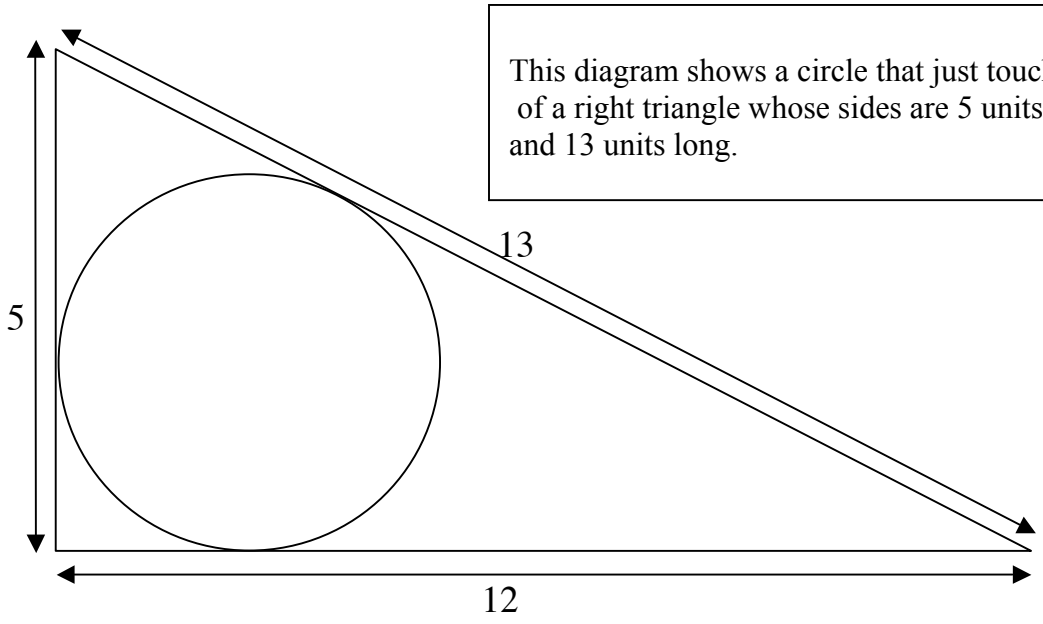

This diagram shows a circle that just touches the sides of a right triangle whose sides are 3 units, 4 units, and 5 units long.

1. Prove that triangles AOX and AOY are congruent.

2. What can you say about the measures of the line segments CX and CZ?

3. Find *r,* the radius of the circle. Explain your work clearly and show all your calculations.

4.




This diagram shows a circle that just touches the sides of a right triangle whose sides are 5 units, 12 units, and 13 units long.

Draw construction lines as in the previous task, and find the radius of the circle in this 5, 12, 13 right triangle. Explain your work and show your calculations.