

*A.N.5: Solve algebraic problems arising from situations that involve fractions, decimals, percents (decrease/increase and discount), and proportionality/direct variation.*

1. 060223a, P.I. A.N.5

If the instructions for cooking a turkey state "Roast turkey at  $325^{\circ}$  for 20 minutes per pound," how many hours will it take to roast a 20-pound turkey at  $325^{\circ}$ ?

2. 010117a, P.I. A.N.5

In a molecule of water, there are two atoms of hydrogen and one atom of oxygen. How many atoms of hydrogen are in 28 molecules of water?

[A] 14      [B] 29      [C] 42      [D] 56

3. 060505a, P.I. A.N.5

A cake recipe calls for 1.5 cups of milk and 3 cups of flour. Seth made a mistake and used 5 cups of flour. How many cups of milk should he use to keep the proportions correct?

[A] 2.5      [B] 2      [C] 1.75      [D] 2.25

4. 080809a, P.I. A.N.5

If a machine that prints designs on T-shirts prints 500 shirts in 3 hours, how many hours will it take to print designs on 1,800 shirts?

[A] 10.8      [B] 12      [C] 9.8      [D] 6

5. 010431a, P.I. A.N.5

Julio's wages vary directly as the number of hours that he works. If his wages for 5 hours are \$29.75, how much will he earn for 30 hours?

6. 080101a, P.I. A.N.5

The perimeter of an equilateral triangle varies directly as the length of a side. When the length of a side is doubled, the perimeter of the triangle is

[A] divided by 3      [B] halved

[C] multiplied by 3      [D] doubled

7. 060215a, P.I. A.N.5

If the circumference of a circle is doubled, the diameter of the circle

[A] is doubled      [B] remains the same

[C] increases by 2      [D] is multiplied by 4

8. 080005a, A.N.5

Which table does *not* show an example of direct variation?

[A]

$x$	$y$
-4	-20
-3	-15
-2	-10
-1	-5

[B]

$x$	$y$
2	24
4	12
6	8
8	6

[C]

$x$	$y$
1	$\frac{1}{2}$
2	1
3	$\frac{3}{2}$
4	2

[D]

$x$	$y$
1	4
2	8
3	12
4	16

9. 010708a, P.I. A.N.5

Which equation represents the direct variation

relationship of the equation  $\frac{x}{y} = \frac{1}{2}$ ?

[A]  $x = 2y$                       [B]  $y = x + \frac{1}{2}$

[C]  $y = 3x$                       [D]  $y = 2x$

10. 010806a, P.I. A.N.5

If  $x$  varies directly as  $y$ , and  $x = 8$  when  $y = 24$ , what is the value of  $x$  when  $y = 6$ ?

[A] 2            [B] 3            [C] 1            [D] 4

11. 010902a, P.I. A.N.5

Granola bars cost \$0.55 each. Which table represents this relationship?

[A]

Number of Bars	Total Cost
0	\$0.55
2	0.55
4	0.55

[B]

Number of Bars	Total Cost
0	\$0.00
2	1.00
4	2.00

[C]

Number of Bars	Total Cost
0	\$0.00
2	1.10
4	2.20

[D]

Number of Bars	Total Cost
0	\$0.55
2	1.10
4	2.20

12. 010933ia, P.I. A.N.5

The table below represents the number of hours a student worked and the amount of money the student earned.

Number of Hours ( $h$ )	Dollars Earned ( $d$ )
8	\$50.00
15	\$93.75
19	\$118.75
30	\$187.50

Write an equation that represents the number of dollars,  $d$ , earned in terms of the number of hours,  $h$ , worked. Using this equation, determine the number of dollars the student would earn for working 40 hours.

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[2]  $6\frac{2}{3}$  or 6 hr 40 min or  $6.\overline{66}$  or an

equivalent answer, and appropriate work is shown.

[1] 400 min, but the answer is not converted into hours.

or [1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but the answer is rounded to the nearest hour.

or [1]  $6\frac{2}{3}$  or 6 hr 40 min or  $6.\overline{66}$  or an

equivalent answer, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[1] incorrect procedure.

[2] D

[3] A

[4] A

[2] \$178.50, and appropriate work is shown, such as solving a proportion, using a table, or trial and error with at least three trials and appropriate checks.

[1] Appropriate work is shown, but one computational error is made.

or [1] An appropriate proportion is set up, but no solution or an incorrect solution is found.

or [1] An incorrect proportion is set up, but an appropriate solution is found.

or [1] \$178.50, but no work is shown or fewer than three trials with appropriate checks are shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure.

[6] D

[7] A

[8] B

[9] D

[10] A

[11] C

[2]  $d = 6.25h$  or an equivalent equation and 250, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] A correct equation is written, but no further correct work is shown.

or [1] Appropriate work is shown to find 250, but the equation is missing or is incorrect.

[0] 250, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[12] obviously incorrect procedure.