

Name:

Exam Style Questions

Substitution



Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 20



Answers and Video Solutions



1. Find the value of $5c + 2$ if $c = 6$



$$30 + 2 = 32$$

.....
32
.....
(1)

2. Find the value of $4a - b$ when $a = 9$ and $b = 8$



$$36 - 8 = 28$$

.....
28
.....
(2)

3. Find the value of $12h + 9t$ when $h = 11$ and $t = 3$



$$132 + 27 = 159$$

.....
159
.....
(2)

4. Circle the expression that has the greatest value when $y = 10$



$2y$

$31 - y$

$y + 9$

$\frac{y}{2}$

20

21

19

5

(1)

5. If $x = 6$ and $y = -2$, find the value of



(a) x^2

$$6^2$$

$$\begin{array}{r} 36 \\ \hline \end{array} \quad (1)$$

(b) $5x + y$

$$30 + (-2)$$

$$\begin{array}{r} 28 \\ \hline \end{array} \quad (1)$$

(c) $x + y^2$

$$6 + (-2)^2$$

$$6 + 4$$

$$\begin{array}{r} 10 \\ \hline \end{array} \quad (1)$$

(d) $\frac{y + 20}{x}$

$$\frac{-2 + 20}{6}$$

$$\frac{18}{6}$$

$$\begin{array}{r} 3 \\ \hline \end{array} \quad (2)$$

6. $P = 2W + 2L$



Find P if $W = 3$ and $L = 9$

$$\begin{aligned} P &= 6 + 18 \\ &= 24 \end{aligned}$$

$$\begin{array}{r} 24 \\ \hline \end{array} \quad (2)$$

7. You are given that $m = 0.5$, $p = 0.75$ and $c = 2.2$



Find the value of

(a) $3c + m$ $6.6 + 0.5$

$$\begin{array}{r} 7.1 \\ \hline \end{array} \quad (2)$$

(b) $m + p + c$ $0.5 + 0.75 + 2.2 = 3.45$

$$\begin{array}{r} 3.45 \\ \hline \end{array} \quad (1)$$

8. The cost of hiring a hot tub is found using the formula



Hire cost = £50 plus an extra £45 per day

(a) Work out the hire cost for hiring the hot tub for 21 days.

$$\begin{aligned} 50 + 21 \times 45 \\ 50 + 945 = 995 \end{aligned}$$

$$\begin{array}{r} £995 \\ \hline \end{array} \quad (2)$$

Alex hires the hot tub for a number of days and the cost is £545

(b) How many days did Alex hire the hot tub?

$$545 - 50 = 495$$

$$495 \div 45 = 11$$

$$\begin{array}{r} 11 \text{ days} \\ \hline \end{array} \quad (2)$$

9. This formula can be used to convert between Celsius (C) and Fahrenheit (F).



$$F = 1.8C + 32$$

- (a) Convert 2°C into Fahrenheit

$$1.8 \times 2 + 32$$

$$3.6 + 32 = 35.6$$

$$\frac{35.6^{\circ}\text{F}}{\dots\dots\dots}$$

(2)

- (b) Convert 50°F into Celsius

$$50 - 32 = 18$$

$$18 \div 1.8 = 10$$

$$\frac{10^{\circ}\text{C}}{\dots\dots\dots}$$

(2)

-
10. Given that $a = 4$, $b = 9$ and $c = -5$



Work out the value of

$$\frac{ab + 24}{2c}$$

$$\frac{36 + 24}{-10}$$

$$\frac{60}{-10} = -6$$

$$\frac{-6}{\dots\dots\dots}$$

(3)

11. (a) Find the value of $5(a + c)$ when $a = 4$ and $c = 9$



$$5(13)$$

$$\begin{array}{r} 65 \\ \hline \end{array} \quad (2)$$

- (b) Find the value of $7x + 2y$ when $x = 2$ and $y = -9$

$$14 + (-18)$$

$$\begin{array}{r} -4 \\ \hline \end{array} \quad (2)$$

12. $P = 2W + 2L$



Find W if $P = 30$ and $L = 11$

$$30 = 2W + 22$$

$$2W = 8$$

$$W = 4$$

$$\begin{array}{r} 4 \\ \hline \end{array} \quad (2)$$

13. $y = w - 2a^2$



$$w = 400$$

$$a = 5$$

Work out the value of y

$$\begin{aligned} y &= 400 - 2a^2 \\ y &= 400 - 2 \times 5^2 \\ &= 400 - 2 \times 25 \\ &= 400 - 50 \end{aligned}$$

$$\begin{array}{r} 350 \\ \hline \end{array} \quad (2)$$

14. The cost in pounds, C , of hiring a car is given by
 $C = 25d + 45$



where d is the number of days the car is hired.

- (a) Find C if $d = 4$

$$25 \times 4 + 45$$

$$100 + 45$$

$$\underline{\hspace{1.5cm}} \\ \pounds 145$$

(2)

- (a) Find d if $C = 245$

$$245 - 45 = 200$$

$$200 \div 25 = 8$$

$$\underline{\hspace{1.5cm}} \\ 8 \text{ days}$$

(2)

-
15. $W = 2x + 5y$



- (a) Work out the value of W when $x = 8$ and $y = -3$

$$16 + (-15)$$

$$\underline{\hspace{1.5cm}} \\ 1$$

(2)

- (b) Work out the value of x when $W = 59$ and $y = 7$

$$59 = 2x + 35$$

$$24 = 2x$$

$$x = 12$$

$$\underline{\hspace{1.5cm}} \\ 12$$

(2)

16. The amount of medicine, s ml, to give to a puppy, up to 18 months old, can be worked out using the formula.



$$s = \frac{am}{18}$$

s is the amount of medicine, in ml.
 a is the dose for an adult dog, in ml.
 m is the age of the puppy, in months.

A puppy is 3 months old.
An adult dog's dose is 45ml.

Work out the amount of medicine the puppy should be given.

$$\begin{aligned} s &= \frac{45 \times 3}{18} \\ &= \frac{135}{18} \\ &= 7.5 \text{ ml} \end{aligned}$$

.....ml
(3)

- 17.



$$m = abc$$

Find m if $a = 3$, $b = -8$ and $c = 2$

$$\begin{aligned} m &= 3 \times (-8) \times 2 \\ &= -48 \end{aligned}$$

.....
(2)

18. Heidi is a plumber.



She uses this formula to work out the cost to charge her customers.

$$C = 40h + p + 0.5d$$

C is the total cost of the job, in pounds.

h is the number of hours worked.

p is the cost of any parts used, in pounds.

d is the distance travelled, in miles.

Heidi's last job took 3 hours and the cost of the parts used was £17.50

The total cost of the job was £156

Work out how far Heidi travelled in miles.

$$156 = 120 + 17.50 + 0.5d$$

$$156 = 137.5 + 0.5d$$

$$18.5 = 0.5d$$

$$d = 37$$

.....37.....miles
(3)

19. $x + 3 = 10$



Work out the value of $\frac{5x - 3}{4}$

$$x = 7$$

$$\frac{5 \times 7 - 3}{4}$$

$$\frac{35 - 3}{4}$$

$$\frac{32}{4}$$

.....8.....
(2)

20. $v = u + at$



- (a) Work out v when $u = 23$, $a = 4$ and $t = 3$

$$\begin{aligned}v &= 23 + 12 \\ &= 35\end{aligned}$$

$$\begin{array}{r}35 \\ \hline\end{array} \quad (2)$$

- (b) Work out u when $v = 30$, $a = 2$ and $t = 8$

$$\begin{aligned}30 &= u + 16 \\ u &= 14\end{aligned}$$

$$\begin{array}{r}14 \\ \hline\end{array} \quad (2)$$

- (c) Work out t when $v = 40$, $u = 12$ and $a = 4$

$$\begin{aligned}40 &= 12 + 4t \\ 28 &= 4t \\ t &= 7\end{aligned}$$

$$\begin{array}{r}7 \\ \hline\end{array} \quad (2)$$

21. $2x - y = 17$



- (a) Work out the value of $6x - 3y$

$$17 \times 3$$

$$\begin{array}{r}51 \\ \hline\end{array} \quad (2)$$

- (b) Work out the value of $y - 2x$

$$\begin{array}{r}-17 \\ \hline\end{array} \quad (1)$$

22. $y = 7x^2$



Explain what happens to the value of y when the value of x doubles.

let $x = 10$

$$y = 7 \times 10^2$$

$$= 7 \times 100$$

$$= 700$$

$x = 20$

$$y = 7 \times 20^2$$

$$= 7 \times 400$$

$$= 2800$$

$$2800 \div 700 = 4$$

When x is doubled, y is 4 times larger.

(2)

23.

$$y = \frac{800}{x^3}$$



let $x = 1$

$$y = \frac{800}{1} = 800$$

$x = 2$

$$y = \frac{800}{8} = 100$$

Explain what happens to the value of y when the value of x doubles.

When x doubles, y is 8 times smaller.

(2)

24. Calculate the value of $x^y - y^x$



when $x = 3$ and $y = 6$

$$3^6 - 6^3$$

$$729 - 216 = 513$$

513

(2)

25. $80 = 2mn$



m and n are negative integers.

Write down a pair of possible values for m and n.

any from:

$$40 = mn$$

- 1
 - 2
 - 4
 - 5
 - 8
 - 10
 - 20
 - 40
- 40
 - 20
 - 10
 - 8
 - 5
 - 4
 - 2
 - 1

m = and n = (2)

26. $y = (x - 5)(x + 1)$



Find y if $x = -3$

$$y = (-8)(-2) = 16$$

16 (2)

27. $w = \frac{x}{2y}$



$$4w + 3y = 30$$

Work out the value of x when $y = 4$

$$4w + 12 = 30$$

$$4w = 18$$

$$w = 4.5$$

$$4.5 = \frac{x}{8}$$

$$x = 36$$

$$\begin{array}{r} 36 \\ \hline \end{array} \quad (3)$$