CHANGING THE SUBJECT (ADVANCED) – PRACTICE QUESTIONS

1.
Make x the subject of the equation

$3x - 4 = y$

$3x = y + 4$

$x = \frac{y+4}{3}$

2.
Make a the subject of the equation

$\frac{a+1}{5} = b - 2$

$a + 1 = 5b - 10$

$a = 5b - 11$

3.
Make c the subject of the equation

$c^2 + 11 = d$

$c^2 = d - 11$

$c = \sqrt{d-11}$

4.
Make e the subject of the equation

$\sqrt{e - 13} = f$

$e - 13 = f^2$

$e = f^2 + 13$

5.
Make g the subject of the equation

$5g - h = 3j - 6g$

$11g - h = 3j$

$11g = 3j + h$

$g = \frac{3j+h}{11}$

6.
Make k the subject of the equation

$$7(2k + 5) = 4(j - k)$$

$14k + 35 = 4j - 4k$

$18k + 35 = 4j$

$18k = 4j - 35$

$$k = \frac{4j - 35}{18}$$

7.
Make m the subject of the equation

$$\frac{3m + 10}{2} = 2n + 1$$

$3m + 10 = 4n + 2$

$3m = 4n - 8$

$$m = \frac{4n - 8}{3}$$

8.
Make p the subject of the equation

$$\sqrt{\frac{p - 1}{9}} = r$$

$$\frac{p - 1}{9} = r^2$$

$p - 1 = 9r^2$

$$p = 9r^2 + 1$$

9.
Make s the subject of the equation

$$\frac{s^2 + t}{u} = u$$

$s^2 + t = u^2$

$s^2 = u^2 - t$

$$s = \sqrt{u^2 - t}$$

10.
Make w the subject of the equation

$$\sqrt{5w^2 - 8} = z$$

$5w^2 - 8 = z^2$

$5w^2 = z^2 + 8$

$$w^2 = \frac{z^2 + 8}{5}$$

$$w = \sqrt{\frac{z^2 + 8}{5}}$$

11.
Make x the subject of the equation

$$\frac{9z-5}{2x} = 3x$$

$9z-5 = 6x^2$

$\frac{9z-5}{6} = x^2$

$x = \sqrt{\frac{9z-5}{6}}$

12.
Make a the subject of the equation

$$b = c + 5ab^2$$

$b-c = 5ab^2$

$a = \frac{b-c}{5b^2}$

13.
Make m the subject of the equation

$$w = t + 9m^3$$

$w-t = 9m^3$

$\frac{w-t}{9} = m^3$

$m = \sqrt[3]{\frac{w-t}{9}}$

14.
Make f the subject of the equation

$$L = \frac{g(f-7)}{2}$$

$2L = gf - 7g$

$2L + 7g = gf$

$f = \frac{2L+7g}{g}$

15.
Make y the subject of the equation

$$12y + x = 3x - ey$$

$12y + ey = 2x$

$y(12 + e) = 2x$

$$y = \frac{2x}{12 + e}$$

16.
Make a the subject of the equation

$$ba - c = d + 11a$$

$ba - 11a = d + c$

$a(b - 11) = d + c$

$$a = \frac{b - 11}{d + c}$$

17.
Make p the subject of the equation

$$p - 3 = t(p + 5)$$

$p - 3 = tp + 5t$

$p - tp = 5t + 3$

$p(1 - t) = 5t + 3$

$$p = \frac{5t + 3}{1 - t}$$

18.
Make z the subject of the equation

$$y(z + 10) = t - 2z$$

$yz + 10y = t - 2z$

$yz + 2z = t - 10y$

$z(y + 2) = t - 10y$

$$z = \frac{t - 10y}{y + 2}$$

19.
Make x the subject of the equation

$$y = \frac{x}{x+3}$$

$y(x+3) = x$

$yx + 3y = x$

$3y = x - yx$

$3y = x(1-y)$

$$x = \frac{3y}{1-y}$$

20.
Make b the subject of the equation

$$c = \frac{b+4}{b+5}$$

$c(b+5) = b+4$

$cb + 5c = b+4$

$cb - b = 4 - 5c$

$b(c-1) = 4-5c$

$$b = \frac{4-5c}{c-1}$$

21.
Make d the subject of the equation

$$\frac{3d+5}{d-3} = T$$

$3d + 5 = T(d-3)$

$3d + 5 = Td - 3T$

$5 + 3T = Td - 3d$

$5 + 3T = d(T-3)$

$$d = \frac{5+3T}{T-3}$$

22.
Make z the subject of the equation

$$r = az + \frac{3z}{2}$$

$2r = 2az + 3z$

$2r = z(2a + 3)$

$$z = \frac{2r}{2a+3}$$

23.
Make r the subject of the equation

$$2x = er - \frac{r}{4}$$

$8x = 4er - r$

$8x = r(4e - 1)$

$$r = \frac{8x}{4e-1}$$

24.
Make z the subject of the equation

$$xy = zx^2 - 20z$$

$xy = z(x^2 - 20)$

$$z = \frac{xy}{x^2 - 20}$$

25.
Make r the subject of the equation

$$(2r - 9)^2 = y$$

$2r - 9 = \sqrt{y}$

$2r = \sqrt{y} + 9$

$$r = \frac{\sqrt{y} + 9}{2}$$

26.
Make x the subject of the equation

$$\sqrt{\frac{x^2+y}{5}} = 2x$$

$$\frac{x^2+y}{5} = 4x^2$$

$$x^2+y = 20x^2$$

$$y^2 = 19x^2$$

$$\frac{y^2}{19} = x^2$$

$$x = \sqrt{\frac{y^2}{19}}$$

27.
Make A the subject of the equation

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$a^2-b^2-c^2 = -2bc\cos A$$

$$\frac{a^2-b^2-c^2}{-2bc} = \cos A$$

$$A = \cos^{-1}\left(\frac{a^2-b^2-c^2}{-2bc}\right)$$

28.
Make w the subject of the equation

$$4w - 5 = \frac{3t}{4w+5}$$

$$(4w-5)(4w+5) = 3t$$

$$16w^2 - 20w + 20w - 25 = 3t$$

$$16w^2 - 25 = 3t$$

$$16w^2 = 3t + 25$$

$$w^2 = \frac{3t+25}{16}$$

$$w = \sqrt{\frac{3t+25}{16}}$$

29.
Make B the subject of the equation

$$\frac{2}{B}+\frac{3}{C}=\frac{5}{E}$$

$$2CE+3BE=5BC$$
$$2CE=5BC-3BE$$
$$2CE=B(5C-3E)$$
$$B=\frac{2CE}{5C-3E}$$

30.
Make f the subject of the equation

$$(\sqrt{f}-4)(\sqrt{f}+4)=ef+g$$

$$f-4\sqrt{f}+4\sqrt{f}-16=ef+g$$
$$f-16=ef+g$$
$$f-ef=g+16$$
$$f(1-e)=g+16$$
$$f=\frac{g+16}{1-e}$$

31.
Make x the subject of the equation

$$\sqrt{\frac{\sin(x-y)}{3}}=2z$$

$$\frac{\sin(x-y)}{3}=4z^2$$
$$\sin(x-y)=12z^2$$
$$x-y=\sin^{-1}(12z^2)$$
$$x=\sin^{-1}(12z^2)+y$$